

THE PORTUGUESE ECONOMY
IN THE CONTEXT OF ECONOMIC,
FINANCIAL AND MONETARY INTEGRATION

Economics and Research Department
Banco de Portugal

The Portuguese Economy
in the Context of
Economic, Financial and Monetary
Integration

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Banco de Portugal

EUROSYSTEM

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Rua do Comércio, 148
1100-150 Lisboa

Cover: © Almada Negreiros, SPA 2009
Cover design: Marta Figueiredo

Printed by: Tipografia Peres, S.A.
Number of copies printed: 500
ISBN: 978-989-8061-99-7
Legal Deposit: 301004/09

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Preface

Economic research has for long been regarded by Banco de Portugal as a fundamental activity to support the fulfilment of its main tasks: to maintain price stability and financial stability. The importance of economic research, both fundamental and applied, is reflected in the technical quality and rigour of Banco de Portugal's economic analysis and thus in the quality of the policy advice on the Portuguese economy and on the euro area, as well as in an effective participation within the Eurosystem. The research quality of the Economics and Research Department was also recognized - in independent evaluations - with top ratings within the national central banks of the Eurosystem, contributing to sustain the prestigious position of this Department.

The dissemination of analysis and research is a primary vehicle of information for economic agents, which is particularly relevant in the process of expectations formation. In this perspective, Banco de Portugal issues a comprehensive range of economic publications, which are aimed at reaching a wide set of audiences.

This book is an excellent example of this undertaking. Based on independent research by economists of the Economics and Research Department of Banco de Portugal, this volume aims to contribute to a substantive debate on the Portuguese economy in the context of its economic, monetary and financial integration in the European Union and in the euro area. The conclusions largely correspond to what Banco de Portugal's publications have expressed over the past years regarding the adjustment of our economy to the shock of integration in the European monetary union, which implied entering in a new economic policy regime. Some time ago, I characterized the new regime as follows: "Increased substitutability of financial assets; consolidated reduction in the cost of capital; increase in wealth through a reduction in interest rates and reduced liquidity constraints; changed meaning of the current account and the pri-

macy of credit risk of economic agents".¹ As a member of the euro area, Portugal no longer suffers from what Eichengreen and Hausmann called the "original sin",² i.e. the difficulty of issuing long-term debt instruments at fixed rates and/or in their own currency in external markets. In this new framework, the macroeconomic aspects underlying a successful participation in a monetary union depend decisively on the adoption by economic agents of new rules regarding fiscal policy and the behaviour of labour costs. In fact, fiscal policy should be able to play a counter-cyclical role, absorbing shocks of a temporary nature. Additionally, the determination of wages should take as a reference wage developments in trading partners, especially the euro area, and should deviate from this reference only when a productivity growth differential arises.³

Several chapters of the book demonstrate the consequences for Portugal of not always having followed these guidelines and, in addition to longer-term structural problems, identify what we still need to do to return to a real convergence path with our European partners.

Besides the research applied to the Portuguese case, this book also reflects paradigmatically the confluence that took place in recent years between academic research and the theoretical research aimed at policy applications developed in central banks. From this perspective, the empirical and theoretical contributions gathered in these texts are relevant. A prime example of the integration of economic research in universities and central banks is, without doubt, the development of dynamic stochastic general equilibrium (DSGE) models which today shape the dominant macroeconomic thinking. Several examples of these models are presented in the book, illustrating the fact that it was in central banks that this applied methodology flourished. However, as mentioned in the Foreword that follows, these models suffer from several limitations. I think that the models from the first generation, in particular, did not take into account the existence of involuntary unemployment, ignored the role of the State, – dealing with public spending as mere waste (not con-

¹See Vítor Constâncio (2004) "European monetary integration and the Portuguese case" in C. Detken, V. Gaspar e G. Noblet *The new EU member States: convergence and stability* 3rd ECB Central Banking Conference, October.

²B. Eichengreen e R. Hausmann (1999) "Exchange rates and financial stability" in *New Challenges for Monetary Policy* a symposium organized by the Federal Reserve Bank of Kansas City, Jackson Hole.

³See Vítor Constâncio, *ibid.*

tributing to increase welfare or the production capacity) - considered budget deficits as neutral to economic activity, given that they were subject to the unrealistic assumption of the so-called Ricardian equivalence, and did not include financial issues, in the wake of the Modigliani-Miller theorem and the efficient market hypothesis which assumed the absence of financial frictions and the nonexistence of identifiable speculative bubbles. Further, the general assumption of the models being populated only by agents with rational expectations who know the future stochastically (with the exception of random shocks effects) limits the consideration of patterns of behaviour now well documented by the "Behavioural Finance" literature, such as those arising from the difficulty of processing information, from "emotional intelligence" or from simple fashions or "herd behaviour".

Despite the advantages of undertaking a general equilibrium analysis, the weaknesses of these models were highlighted by the recent financial crisis which, following a series of bubbles in asset markets, shook the world economy. The most fruitful work to revise and incorporate new features in this type of models, in order to improve the macroeconomic analysis, is precisely being undertaken in the Economics and Research Departments of Central Banks.

This book is a demonstration that Banco de Portugal continues to work - with professionalism and rigour - in the frontier of knowledge and that is why, I am certain that the following texts will contribute to improve both the debate on the Portuguese economy and the economic research in Portugal.

The Governor
Vitor Constâncio

Foreword

Nuno Alves, Mário Centeno and Ana Cristina Leal

In the last two decades, the Portuguese economy experienced important regime changes. These implied substantial changes in the rules of economic interaction and in the incentives facing economic agents. First, there was a sharp increase in the degree of economic integration, initially with the participation in the European Economic Community and later in the context of the intensification of the globalization process, characterized by increasing global competition. Second, the Portuguese economy embarked on a rapid financial integration in the 90s, enhanced by the participation in the euro area and the elimination of currency risk, which enlarged the possibilities of external funding and of diversification of financial assets portfolios among economic agents. Finally, the monetary unification promoted a move towards a regime characterized by structurally lower and less volatile interest and inflation rates.

In this period, the Portuguese economy displayed a number of features that should be underlined. Income per capita converged significantly to the European Union average between 1986 and 2000, which contrasts with the gradual real divergence observed in the current decade. However, in cyclical terms, the Portuguese economy showed a high correlation with the business cycle of the euro area. The rate of structural unemployment, which remained stable until the beginning of this decade, has since started an upward trend. The indebtedness of the private sector increased substantially, particularly after the mid-90s, which sustained a gap between domestic demand and supply, reflected in significant deficits in the current and capital account. In structural terms, the share of services in to-

tal employment and production increased substantially, to the detriment of industry and, to a lesser extent, of agriculture. Meanwhile, the degree of openness of the economy – measured by the weight of exports and imports in real GDP – increased substantially, and was accompanied by an increase in intra-industry trade, a gradual movement towards export of goods with higher technological content and, more recently, a greater share of exports of services. The level of human capital – in terms of quantity and quality – evolved only very gradually in recent decades. Finally, the budget deficit remained persistently high, although with significant volatility. In this period, the structural revenue and expenditure ratios of the general government increased systematically, recording in the case of public spending a full convergence with the one observed in the euro area.

These features illustrate the analytical potential of the Portuguese case as an example of the challenges facing a small open economy within a framework of economic, financial and monetary integration. This book seeks to explore this potential, presenting various viewpoints on the evolution of the Portuguese economy in recent decades (for other relevant contributions integrating different perspectives on the Portuguese economy, see Amaral, Lucena and Mello (1992), Barbosa (1998) and Franco (2008)).

The book has three main objectives. First, we intend to present a comprehensive overview of the Portuguese economy in the last two decades. Naturally, the analysis is not expected to be exhaustive. In fact, the evolution of an economy is the result of multiple interactions between heterogeneous agents, which are framed by institutions that regulate contractual relations and the structure of markets, by policy decisions (current and expected for the future), as well as by a myriad of shocks that continuously affect the incentives and decisions of economic agents.

Second, this volume aims to cross empirical and theoretical contributions as well as integrate databases and tools of a microeconomic and macroeconomic nature. Thus, each chapter addresses a specific issue from different angles and based on very different instruments. Ideally, the integrated reading of the various chapters will allow obtaining a richer overview of the characteristics and functioning of the Portuguese economy, as well as instrumentally contribute to the formulation of policies.

Third, the book aims to enrich the academic debate on the Portuguese economy and pave the way for future research. The var-

ious essays, written by economists at the Economics and Research Department of Banco de Portugal, rely on several empirical and theoretical tools, allowing a consistent and substantiated regard on the economic evidence. In addition to new research, the various chapters also compile contributions already published in recent years by Banco de Portugal, particularly in articles in the Economic Bulletin and in the Financial Stability Report, as well as in the series of Working Papers and Occasional Papers. In this context, the book is addressed primarily to an audience with knowledge in economics, but may also be of interest to non-specialist readers. A wide set of references at the end of each chapter may guide the reader to the more technical literature, typically not confined to the Portuguese case.

This presentation intends to highlight the potential associated with an integrated reading of the book, briefly developing three themes that run through the various chapters: the importance of the incentive structures that economic agents face; the complementarity between the micro and macroeconomic analyses; and, the challenge of the sustained economic growth of the Portuguese economy. It should be noted that these issues are naturally far from exhausting the main conclusions of the various chapters. The presentation ends with a brief guide to each of the seven chapters of the book.

Regime changes and incentive structures

Economic agents interact continuously in markets, making decisions based on their preferences, given their interpretations of past economic developments and their expectations about the future, and taking into account their intertemporal budget constraints. In this interaction, individuals and firms respond to the incentive structures they face, i.e., the individual and social returns arising from each of their decisions. The essays in this volume offer many examples of how important decisions of economic agents in Portugal resulted from changes in their incentive structures. In this section, we highlight four illustrative dimensions in which the impact of these changes can be understood: (i) the monetary policy decisions of the ECB; (ii) the fiscal policy decisions; (iii) the evolution in the comparative advantages of the Portuguese economy in the last two decades; and (iv) the regime change that represented the entry in the euro area.

Policy decisions directly affect the incentive structures of individuals and firms. In the case of monetary policy, a distinction be-

tween monetary policy shocks and changes in the inflation objective of the monetary policy rule should be made (the latter will be described below when assessing the introduction of the euro). Chapter 1 of this volume illustrates, based on empirical and theoretical models, the impact of an unanticipated change in interest rates in the euro area. In general equilibrium, a temporary decrease in interest rates changes the expected return of investments in physical capital and creates a disincentive to savings in the short term. This has expansionary effects on consumption and investment over several quarters. In case a large proportion of agents are indebted and frictions in credit markets exist, these effects tend to be exacerbated by the so-called “financial accelerator” mechanism (Bernanke, Gertler and Gilchrist (1999)). In nominal terms, the response of inflation and wages is relatively mild in the short term, given the existence of nominal rigidities (evidence on the Portuguese case is presented in Chapter 3). In the long term, the temporary monetary shock only affects the price level and has no real effects on the economy. The unanticipated evolution in the euro area money market interest rates during 2008 and 2009 – with a marked rise until the third quarter of 2008 and a subsequent sharp decline – was reflected in the expectations and decisions of economic agents in line with the stylized features described above. In Portugal, the reaction to these monetary policy shocks was particularly marked. This observation follows *inter alia* from the high degree of indebtedness of the private sector – including the fact that the more indebted families have a higher propensity to consume – and the widespread indexation of interest rates on loans to money market interest rates (see chapter 7 of this volume for more information on these features).

As regards fiscal policy decisions, there is currently a heated debate among economists about the magnitude of fiscal multipliers. This discussion was triggered in the context of the government measures aimed at responding to the international economic and financial crisis and implemented globally since the end of 2008. Different empirical identification schemes and different theoretical modelling structures have radically diverse implications regarding the effects of fiscal policy on the decisions of households and firms. In the centre of discussion lies the degree of empirical validity of the Ricardian equivalence principle, which states that a tax cut financed with public debt does not stimulate private spending, as agents incorporate in their intertemporal budget constraint the future tax hike to

finance that debt (see Mankiw (2009)). Notwithstanding the arguments in the literature, the Portuguese experience in the last decade clearly shows that fiscal policy can have important effects on the dynamics of the economy (see Chapter 6 for a description of the main developments in fiscal policy since 1986 and Chapter 2 for a general equilibrium assessment of the impact on the economy of fiscal policy shocks). In fact, during the transition to the euro and in the beginning of the participation in the area, fiscal policy was clearly procyclical, which exacerbated the economic dynamism and the growth expectations in the late 90s. This expansionary nature of fiscal policy thus contributed to the marked revision in potential growth expectations earlier this decade. Thereafter, the successive revision of plans and budgetary objectives, coupled with a *de facto* persistence of an excessive deficit in the Portuguese economy, increased the uncertainty of economic agents and contributed to accentuate the weak dynamism of domestic demand. Finally, and already in a context of low economic growth, fiscal policy again adopted a pro-cyclical nature in most years. In short, the Portuguese experience definitely points to the importance of creating a predictable fiscal framework in the medium term, which ensures stability of the set of incentives determined by fiscal authorities.

A third dimension in which national economic agents recorded a substantial change in their structure of incentives over the past two decades resided in the significant change in the comparative advantages of the Portuguese economy in the context of an intensification of the globalization process. It should be noted that, at the date of accession to the European Economic Community, there was a marked difference in the relative factor endowments between Portugal and its European counterparts. In particular, Portugal had a particularly low endowment of human capital, with the median education of working-age individuals standing at 4 years, a low endowment of physical capital per worker and a low incorporation of new ideas and technologies. This difference in resource endowments in relation to other European partners implied the existence of strong potential gains from trade. Not surprisingly, the exploitation of the comparative advantages of the Portuguese economy generated a significant increase in the degree of openness of the economy and the emergence of foreign direct investment projects, initially in low and medium-low technology sectors and, later, in medium-high technology sectors. Thus, until the beginning of the 90s, there was

a significant gain in market share of Portuguese exports (Chapter 5 of this book presents a detailed look at these developments). However, the growing participation in international trade of new trading partners since the mid-90s implied a substantive change in the international environment of the Portuguese economy. On the one hand, the prospect of integration of the Eastern European countries in the European Union led to increased competition from countries that had a comparative advantage over the Portuguese economy in several sectors of medium-high technology, resulting from a relatively higher endowment in terms of human capital. On the other hand, the growing integration of Asian economies in world trade – notably China – as a result of the reduction of trade barriers promoted by the World Trade Organization, led to an unavoidable and significant loss of competitiveness of the Portuguese economy in low technology sectors. This evolution in the pattern of comparative advantages of the Portuguese economy occurred in a context in which the structural weaknesses of the Portuguese economy – particularly in terms of the level of human capital of the working-age population and the functioning of key institutions – had not been eliminated in relative terms. Thus, there was a significant loss in market share of Portuguese exports in the last decade. Actually, the low level of qualifications in the Portuguese economy has been particularly problematic for the economy's performance in the recent past, given that the prevalence of skill-biased technological change meant that Portugal could not take full advantage of the opportunities arising from the global technological progress. This contributed *inter alia* to the recent slowdown in productivity (see Chapter 2 for a discussion of these developments). The recent history of developments of national comparative advantages illustrates how latent vulnerabilities in the economy and in society – that at some point may even be mistaken as opportunities – emerge inevitably in the context of changes in the external environment.

A final dimension that should be stressed in terms of changed incentive structures of households and firms arises from the participation of the Portuguese economy in the euro area. This corresponded to a true regime change, with implications on the decisions of all economic agents (see Fagan and Gaspar (2007)). Two distinct periods are worth distinguishing, before and after monetary unification. The evolution of the Portuguese economy in the period of nominal convergence, aimed at the participation in the euro area,

reflected the importance of expectations and the credibility of monetary policy rules. In fact, during this period a gradual decline in short- and long-term rates was observed, associated with a concomitant decrease in the inflation rate, which corresponded to a significant positive wealth effect for the economy. As expected, economic agents reacted to this change in incentives. Thus, there was a surge in consumer spending and investment by households and firms, a decline in the respective savings rates, an increase in indebtedness and an appreciation of the real exchange rate. All these developments reflected, at least in part, changes in the long-term properties of inflation and interest rates, leading also to permanent changes in the sustained equilibrium level of the economy. It should be noted, however, that it is not possible to quantify precisely how much of the observed dynamics of macroeconomic variables had a cyclical nature and how much reflected the equilibrium transition between distinct steady states in the economy (see chapters 2 and 7 for a detailed interpretation of these developments).

In the new monetary regime, characterized by relatively stable and low interest and inflation rates, by the absence of currency risk and by an easy access to external financing (at least until the recent global financial crisis), there was a gradual endogenous adjustment of families and firms in response to economic shocks. Various inter-dependent elements, related to the incentives of the new regime, contributed to this outcome. First, in the context of a monetary union, the endogenous ability of an economy to adjust depends crucially on the quality and mobility of resources, dimensions in which the Portuguese economy continued to record significant weaknesses (see Chapter 1 for a description of the adjustment in a monetary union composed by heterogeneous countries). In particular, the strong segmentation of the labour market in Portugal – characterized by the existence of a high proportion of term contracts in total employment and a high incidence of long-term unemployment – promotes inefficiencies in the marginal returns of production factors and implies a distortion in the incentives for human resources mobility in the labour market (Chapters 3 and 4 present further details on the functioning of the labour market in Portugal). Second, within the framework of a monetary union, financial markets may not generate sufficiently strong incentives for the correction of excessive deficits in small economies of the union, particularly through significant changes in the risk premium on government debt, as at-

tested by the evolution of public finances in Portugal. This fact has contributed to mitigate the effective implementation of the rules defined in the framework of the Stability and Growth Pact. Third, increased financial integration of the Portuguese economy within the euro area and on a global level enabled a greater sharing of risk in the face of idiosyncratic and temporary shocks to the income and wealth of economic agents. On the one hand, this process increased the set of opportunities for agents, reduced the differentiation between their risk profiles and reduced *ceteris paribus* the number of households and firms that, at each moment, record active liquidity constraints. On the other hand, financial integration also allowed deferring some necessary resource adjustments in the economy, particularly in the case of agents with unsustainable financial positions. This allowed significant gaps between domestic demand and supply to emerge for relatively long periods. Additionally, the ease of external financing of the Portuguese economy implied the maintenance of an increasing indebtedness trend of the private sector, even in a context of low trend growth of the economy. In this context, there has been a continued deterioration of the international investment position of the Portuguese economy, which will tend to lower the dynamism of domestic demand in the near future in the absence of reforms promoting an increase in productivity.

The complementarity between the microeconomic and macroeconomic analyses

One of the key features of this book is the continuous intersection of arguments from a micro and macroeconomic nature. This section intends to illustrate the importance of developing studies with this dual approach. Initially, we discuss the importance of building macroeconomic models with microeconomic foundations, as well as their limitations. We will then give examples, taken directly from the various chapters of the book, which support the importance of a complementary analysis between micro and macroeconomic evidence.

An economy is composed of many agents that interact in multiple markets, with the macroeconomic equilibrium resulting from an aggregation of the myriad of individual decisions at a micro level. Understanding this infinity of relations requires the construction of economic models, i.e., analytical tools that reduce reality to rigorous objects, though necessarily simplified. In the current frontier of

knowledge, macroeconomic models are designed based on microeconomic foundations, that is, mathematical representations of the individual behaviour of agents. This option is founded on three basic arguments. First, the derivation of a model from the individual behaviour of agents ensures consistency and internal coherence of its various equations. Thus, it is possible to analyze the dynamics of the economy in general equilibrium, i.e., to define the behavioural equations of agents in terms of deep parameters associated with their preferences, the available technology and the resource constraints they face. Second, it is well known that shocks to the environment in which agents make their decisions – for example changes in monetary or fiscal policies – can change their expectations about future economic developments and lead to a revision of their consumption and investment plans, with an impact on the aggregate behaviour of the economy. An analysis of the aggregate economic evolution cannot therefore ignore the expectations of agents and their individual behaviour. This conclusion was convincingly presented by Lucas (1976), in an article with profound repercussions in the economic literature. Finally, besides allowing simulating the macroeconomic impact of policy changes in a “laboratory” environment, several authors have concluded that the predictive performance of these microfounded macroeconomic models is not inferior to that of traditional large-scale macroeconometric models commonly used in central banks (see the seminal article by Smets and Wouters (2005)). These arguments justify the fact that dynamic stochastic general equilibrium (DSGE) models, designed with explicit microeconomic foundations, are dominant in the theoretical research and are increasingly being part of the instruments available to central banks and major international organizations. The *EAGLE* and *PESSOA* models, described respectively in Chapters 1 and 2, are included in this class of models.

Despite the progress in general equilibrium modelling over the last decade, several contributions have shown the limitations of the microeconomic foundations currently incorporated in DSGE models. These contributions have fundamentally questioned the fact that the individual decision-making process embedded in most macroeconomic models assumes that agents have a thorough knowledge (of the model) of the economy, and that their preferences are limited to maximizing intertemporal utility, typically defined in terms of consumption and leisure. In contrast, the available evidence on

human behaviour suggests that agents have limited capacity for processing information, base their decisions on heuristic rules, have motivations such as the desire for freedom and justice, and value cooperation and reciprocity (see, for example, the contributions in Aghion, Frydman, Stiglitz and Woodford (2003), Akerlof and Shiller (2009) and Sen (2009)). It should be noted that these critics do not question the importance of founding the macroeconomic models in the microeconomic behaviour of agents, but seek mainly to extend and improve the modelling assumptions of the latter. One can even argue that a great potential for development of general equilibrium models in the future lies precisely in the strengthening of their microeconomic foundations.

With regard to empirical studies, this is an area where there is increasingly a combination of micro and macro evidence. Evidently, the nature of the data used stems from the assumptions and theoretical results that are being assessed. For example, the research on the evolution of the natural rate of unemployment in the Portuguese economy presented in Chapter 4 is based strictly on macroeconomic data. Similarly, the analysis of the monetary transmission mechanism in the euro area presented in Chapter 1 is also based solely on synthetic data for the whole area. These are examples where the macroeconomic evidence is inescapable and, in general, sufficient to obtain an aggregate view of the economy. Similarly, there are economic issues that require an analysis based solely on microeconomic evidence. Examples of this case are the studies on the reasons for the rigidity of prices and wages based on surveys of firms, as described in Chapter 3, the analysis of export destination decisions by firms, estimated in Chapter 5, or the research on the reasons underlying the probability of survival of firms, set out in Chapter 7. However, on numerous occasions, the economic issue at hand requires a combination of micro and macro evidence. This book is also testimony to this fact.

The importance of using microeconomic data stems from the fact that they capture the impact of heterogeneity in the economy. In particular, the incorporation of this information brings important qualifications to the reading of the aggregate evidence, contributes to a proper evaluation of economic and financial risks and enables a more founded evaluation of policies. Each of these dimensions can be illustrated using examples of some chapters of the book.

First, the microeconomic evidence allows taking into account the

impact of composition effects on the economy. For example, in order to estimate the wage premium associated with the public sector, one must take into account the different characteristics of the workforce, in particular the higher human capital endowment of civil servants (see Chapter 6). In fact, using microeconomic data from the *Recenseamento Geral da Administração Pública* (Census of Public Administration) and *Quadros de Pessoal* (an administrative private sector employer-employee matched dataset) one concludes that there is a wage premium associated with the public sector, which is concentrated in the lower quantiles of the wage distribution. Another illustrative example of the value of microeconomic data for understanding the macroeconomic evolution is the behaviour of real wages over the business cycle. In fact, the high cyclical flexibility of real wages is one of the characteristics usually identified as fundamental for the adjustment of the Portuguese economy to economic shocks. However, it is known that the aggregate evidence of the cyclical behaviour of wages is biased by composition effects of the workforce, stemming from the fact that firms retain the most skilled workers during recessions and hire skilled workers in expansions. In Chapter 3 an analysis of the cyclical sensitivity of real wages is presented, based on individual data from *Quadros de Pessoal*, which jointly controls the evolution of the characteristics of workers and firms. This study confirms the broad existence of wage flexibility in the Portuguese economy. This may in part be associated with the existence of a wage cushion (the difference between the actual wages paid and the bargained wages), which increases the firms' flexibility in setting wages. It should also be noted that the recent evolution in the cyclical sensitivity of real wages in the Portuguese economy is difficult to assess given the significant uncertainty regarding the magnitude of the increase of the natural rate of unemployment in this decade.

Second, the analysis of microeconomic data can also be quite useful for a proper evaluation of economic and financial risks in the economy, since it allows the identification of vulnerable cases that are not revealed in the aggregate data. This assertion may be exemplified by the analysis of household indebtedness in Portugal (see Chapter 7 for a more detailed analysis). It is well known that household debt as a percentage of GDP in Portugal has increased continuously since the early 90s. However, the analysis of microeconomic data from the IPEF (the Survey on Wealth and Indebtedness of Households) shows that the nature of this increase was clearly

different in the 90s and in the most recent decade. In fact, in the 90s, the increase in aggregate household indebtedness corresponded largely to an increase in the number of households participating in the credit market, without a significant increase in the leverage of individual families, which contrasts to the trend observed in the last decade. Additionally, the same IPEF suggests that younger and lower income households are the most vulnerable to adverse shocks. However, the debt service of these aggregates remains contained, in particular due to the very low participation in the debt market of families with lower incomes and to the lengthening of loan maturities observed during the present decade. The value of micro data to identify vulnerabilities in the balance sheets of the various sectors of the economy is also directly reflected in the set of instruments used in the macro-prudential supervision undertaken by Banco de Portugal. The stress-test exercise of the banking system presented in Economics and Research Department (2007) provides a good illustration of this assertion, since it combines in the same exercise, in addition to the individual accounts of the major banking groups, microeconomic databases as diverse as the Central Balance Sheet of Banco de Portugal, the above mentioned IPEF or the Central Credit Register of Banco de Portugal.

Third, the combination of microeconomic and macroeconomic data is crucial to undertake a correct evaluation of public policies. The evaluation of efficiency of the health and education systems presented in Chapter 6 of this volume is representative of this statement. Additionally, it should be noted that on several occasions, the wealth of micro databases allows isolating causal relationships in quasi-experimental environments. In this context, one should note the studies focusing on the impact of the duration of insured unemployment on the duration of unemployment and on the subsequent wage levels, the impact of active labour market policies on the duration of unemployment or the impact of changes in the minimum wage on employment flows (see Chapters 3 and 4 for the respective references).

A complementary application of micro and macro evidence relates to the calibration of general equilibrium macroeconomic models. This calibration corresponds to assigning values to key parameters regulating the preferences of agents, the available technologies and the degree of nominal and real frictions (for concrete applications, refer to Chapters 1 and 2). The calibration typically uses some

stylized facts from aggregate data as well as microeconomic information, quantitative or qualitative (an example of the latter is the survey of firms presented in Chapter 3). Of course, the use of disaggregated data aims at introducing discipline in the calibration and preventing the proliferation of free arbitrary parameters. Despite the undeniable value in using microeconomic data for calibrating DSGE models, there is usually a marked difficulty in establishing an unequivocal link between the microeconomic evidence and the theoretical parameters of the models. This concern has led to a stream of literature that directly estimates DSGE models from the macroeconomic data, instead of resorting to calibration. However, this procedure has some weaknesses as well, given that a free estimation of the parameters will tend to reflect the fact that the model does not capture – by design – all the properties of the observed data generating process. In short, this seems to be a case in which the theoretical developments in the microeconomic foundations of general equilibrium models should precede their empirical implementations.

The challenge of sustained economic growth in Portugal

In the last decade the Portuguese economy recorded a significant real divergence relative to the average levels of income *per capita* in the European Union. This disappointing performance, associated to low levels of productivity growth, unexpectedly interrupted the real convergence dynamics observed in the previous four decades. These developments are particularly important given that, in the long run, the level of productivity determines the level of real wages, thus influencing directly the economic well-being of the population. In this section, we attempt to briefly examine the challenge of economic growth in Portugal, against the backdrop of the most recent results in the economic literature and the evidence presented in several chapters of the book.

It is worth stressing upfront that the ultimate economic goal is naturally not to maximize economic growth, but social welfare. This goal encompasses a variety of interrelated dimensions, which are materialized in the set of opportunities and capabilities of individuals to fulfil their objectives (see Sen (2009) and Hausman and McPherson (2006)). In particular, when assessing social welfare it is important to value dimensions such as the access to high quality education and health care systems, the equal access to justice and the political system, the achievement of a relatively comfortable level of

material well-being for all, the existence of property rights, freedom of movement and thought, and the prevalence of ties of affiliation, trust and reciprocity in social relations.

However, it is also worth highlighting that economic growth, if shared by most individuals, particularly those with lower incomes, is also instrumental in achieving those objectives. The economic literature reflected this relevance since the primary contributions of Adam Smith (1776). On the one hand, it is well known that societies with higher levels of income *per capita* show, on average, higher levels of life expectancy and schooling, and a higher degree of economic and social freedom (although causality naturally runs in both directions). Moreover, as recently argued by Friedman (2005), an equitably shared economic growth is typically accompanied by externalities that are valued in terms of social welfare, such as the respect for difference, the support for policies directed at the poorest, an openness to immigration, an attention to issues of sustainable development and a commitment to democracy.

From the extensive literature accumulated on economic growth three interrelated dimensions emerge as particularly relevant: the accumulation of physical and human capital, technological innovation and the reallocation of resources in the economy associated with a process of creative destruction (see Acemoglu (2008)). It is important to dwell briefly on the role of each of these elements, against the background of the relative position of the Portuguese economy.

According to the neoclassical growth model of Solow (1956), the rate of capital accumulation is determined by the savings rate, the rate of capital depreciation and population growth. A country with a capital-labour ratio below the long-run equilibrium will tend to record higher rates of *per capita* income growth relative to steady state as the level of capital intensity increases. According to the model, in the long term, growth is strictly determined by technological growth. Subsequent extensions of the original Solow model sought to incorporate the role of investment in human capital. These extensions highlighted the existence of complementarities between the accumulation of physical and human capital and the fact that human capital promotes technological innovation and the adoption of existing technologies. The real convergence process of the Portuguese economy in the second half of the last century can be read broadly in light of the mechanisms of this class of models. In fact, even though in a very stylized way, it can be argued that the Por-

tuguese economy underwent a transition towards a steady state characterized by a higher level of human capital and a higher degree of capital intensity. As described by the theory, over this period, the Portuguese economy recorded progressively smaller rates of growth, higher levels of capital per worker, improvements in the level of human capital and a real convergence process with those countries with higher levels of physical and human capital per unit produced. Finally, it should be noted that, given the complementarity between investments in human and physical capital, and taking into account the slow pace of improvement – with quality – of the level of human capital, the low relative skills of the labour force should be contributing to reduce the current pace of transition and the degree of real convergence of the Portuguese economy.

The original Solow model and its extensions contain several “black boxes”, the most prominent being the absence of an analysis of the mechanisms underlying technological innovation. This is arguably the key to productivity growth in the long run. In recent decades, innovations in areas as diverse as information technology, biotechnology, retail and wholesale trade, telecommunications, pharmaceuticals and leisure industries led to significant increases in aggregate productivity of the economies on a global scale. In the case of countries like Portugal, with low level of investment on research and development, technological progress stemmed largely from the adoption of technologies developed within the technological frontier and from foreign direct investments (see Chapter 2)). This fact is also largely associated with the relative low levels of qualifications of the labour force in Portugal.

Reallocation of resources is another key dimension contributing to growth in a market economy. The process of creative destruction, originally described by Schumpeter, implies the destruction of relatively less productive firms and jobs and the creation of new firms, characterized by new production processes and higher qualifications, which have higher levels of demand towards their products. This endless process occurs in all market economies and is enhanced in the current framework of increased global competition. The Portuguese economy is a good example of this ongoing process. For example, as described in Chapter 5 of this book, the decomposition of Portuguese exports in the contribution of the intensive and extensive margins shows a high level of reallocation of resources at the extensive margin, i.e., an important dynamic of entry and exit

of firms/ products/export destinations. In Chapter 7 evidence on the entry and exit of firms in the Portuguese economy is also summarized. According to available evidence, the dynamics of survival of firms in the Portuguese economy, as well as its main explanatory factors, are in line with similar evidence in the OECD. Finally, given the segmentation of the labour market in Portugal, there is a disproportionate flexibility of younger workers, which coexists with a particularly high degree of rigidity among older workers. Despite the high uncertainty related to the appropriate degree of mobility and reallocation in the economy at any given point in time, the above evidence helps to qualify the conventional wisdom conveying the idea of generalized rigidity in the Portuguese economy.

The three dimensions described above – factor accumulation, technological innovation and resource reallocation – are influenced decisively by the institutions and policies of each country. As detailed in North (2005), institutions are the rules defined by society – formal rules, informal rules and their applicability – that shape human interaction. In this context, the most recent literature has increasingly suggested that the root causes of economic growth in the long run reside in the social infrastructure defined by these policies and institutions (Hall and Jones (1999)).

Policies and institutions affect the incentives leading to the process of economic growth through various interrelated channels (Acemoglu (2008)). First, policies and institutions determine the structure of returns on investment in physical and human capital. In Portugal, for example, the absence of a stable tax system contributes to increasing uncertainty about the return of these investments over the medium term (see Chapter 1 for a discussion of optimal fiscal and monetary policy in a monetary union). Second, institutions determine the contractual structure in force and its effectiveness. In particular, it should be noted that the duration of the legal process and the unequal access to the judicial system in Portugal undermine the incentives for market participation and risk-taking. Third, policies directly affect the quality of investments in infrastructures and of public services, both of which are necessary for economic development (see Chapter 6 for an evaluation of the efficiency of education and health systems in Portugal). Fourth, policies and institutions determine the degree of competition and reallocation in markets, in particular through the laws regulating the markets and the effectiveness of their regulatory bodies. In Portugal, there are im-

portant margins of increased competition in some product markets (see chapter 2 of this volume) and some rigidities in the labour market persist, which affect wage negotiations and labour mobility (see Chapters 3 and 4). Finally, the policies and institutions also determine to a large extent the distribution of income in the economy. This distribution has important implications for the creation of a society of equal opportunities for all and affects the incentives for human capital accumulation.

The recognized weaknesses of the Portuguese economy in several domains of its social infrastructure seem to suggest a clear agenda in terms of policy prescriptions to be adopted in order to promote economic growth. However, this challenge involves a significant complexity, for three fundamental reasons (see North (2005)). First, any institutional change stems from a political equilibrium, in which conflicts of interest between the various individuals and groups are aggregated into collective choices. In defining this equilibrium institutions may emerge which do not promote economic growth, particularly in cases where vested interests are able to perpetuate the pre-existing structure or in cases where the political power creates distortionary policies in order to perpetuate that power.

Second, the performance of an economy comprises interdependent institutions, so the change of only one institution in an attempt to obtain a particular result may be doomed to failure (the importance of the combination of reforms in labour and product markets presented in Chapter 2 is an illustration of this argument). In addition, the incentives promoted by the social infrastructure of a country may be substantially determined by the set of more fragile infrastructures, in case strong complementarities between institutions exist (this reflects a generalization of the idea that “a chain is only as strong as its weakest link”, as presented in Jones (2009)). Finally, the knowledge of the reasons behind the evolution of institutions is still relatively scarce.

Despite this complexity it is clear that the weaknesses of the Portuguese economy in the multiple domains above identified, although a current obstacle to economic growth, also represent a measure of the potential for increased social welfare in Portugal, albeit in a necessarily extended horizon.

Guide and structure of the book

This volume consists of seven chapters. In the first chapter, Nuno Alves, Isabel Correia, Sandra Gomes and João Sousa analyze the functioning of the euro area, which represents the most relevant economic area from the perspective of the Portuguese economy. The authors begin by presenting updated empirical evidence on the cyclical properties of key macroeconomic variables in the euro area, and assess whether these characteristics have changed with the introduction of the euro. Subsequently, the authors rationalize the empirical evidence on the response of the euro area to technology and monetary policy shocks with an open economy stochastic general equilibrium model. Additionally, the chapter presents evidence on the adjustment mechanisms of the various countries comprising the euro area and highlights the sources of heterogeneity within a monetary union, based on a multi-country general equilibrium model called *EAGLE*. The chapter concludes with an analysis of optimal policy in a monetary union characterized by real and nominal frictions, heterogeneous economic structures across countries and segmentation of several markets. The authors contrast the literature on the optimal conduct of policy in closed economies and in monetary unions and expose some recent results that contradict the conventional wisdom in this matter.

The second chapter, written by Vanda Almeida, Gabriela Castro and Ricardo Félix, discusses the key developments in the Portuguese economy in the last two decades from a macroeconomic perspective. Without intending to be exhaustive in terms of the recent history of the Portuguese economy, the chapter describes some of the key dynamics that marked the evolution of the Portuguese economy during this period and interprets these developments in the light of a stochastic general equilibrium model calibrated for the Portuguese economy named *PESSOA*. The analysis focuses on five salient features of the Portuguese economy: the slowdown in productivity in this decade; the impact of the decrease in the risk premium resulting from the participation in the euro area and from the process of financial liberalization; the implications of increased competition in international trade and the competitiveness problem of the Portuguese economy; and, the macroeconomic implications of persistent fiscal imbalances and of measures aimed at fiscal consolidation. In this context, the authors present several ideas concerning the causes of the current lost decade in the convergence process towards the

average income levels in the euro area and the European Union. Finally, the model *PESSOA* is used to assess the potential impact of some reforms in the labour market and in the markets for goods and non-tradable services.

In the third chapter, the emphasis of the book shifts to the analysis of the microeconomic mechanisms of price and wage setting, as well as their macroeconomic implications. The authors, Carlos Robalo Marques, Fernando Martins and Pedro Portugal, first document the processes of price and wage determination based on microeconomic information of diverse nature, including two databases of individual prices at the producer and consumer levels, the panel data from *Quadros de Pessoal*, and two surveys of firms undertaken by Banco de Portugal in the context of the Eurosystem research networks on Inflation Persistence and the Dynamics of Wages. Additionally, the authors evaluate the characteristics of the wage bargaining system in Portugal, based on research undertaken over the last years. In this context, it is worth highlighting the analysis of the role of wages in the determination of flows between states in the labour market, the assessment of the role of the wage cushion in the wage setting process, as well as the estimation of the cyclical behaviour of real wages in the Portuguese economy. Finally, the authors present a macro-econometric model designed to assess the implications of rigidities at the micro level on the evolution of prices and wages at an aggregate level.

The fourth chapter focuses on the evolution of structural unemployment in Portugal, certainly one of the variables with greater impact on social welfare. Mário Centeno, José R. Maria and Álvaro A. Novo present novel evidence on recent developments in the natural rate of unemployment, as well as on the underlying causes of these developments. The authors first investigate the main trends of the natural rate of unemployment in the context of an econometric system in which the rate of structural unemployment and the rate of growth of potential output are jointly estimated. Despite the uncertainty associated with such estimates, the evidence clearly points to a significant increase in structural unemployment in Portugal since the beginning of this decade. Additionally, the analysis confirms the robustness of the relation between the output gap and the unemployment gap in recent decades. Subsequently, the authors describe several theories – based on demand, supply and institutions in the labour market – which allow understanding the recent

upward trend in the natural rate of unemployment in Portugal. In this context, it is worth emphasizing the role of productivity growth over real wage developments, the rules of the unemployment insurance system and the sectoral restructuring due to negative demand shocks. This discussion is also consubstantiated by a cointegration analysis, applied to the Portuguese case.

In the fifth chapter, João Amador, Sónia Cabral and Luca David Opromolla evaluate the integration of the Portuguese economy from the viewpoint of the participation in international trade. In recent decades, the structure of trade relations of the Portuguese economy changed substantially and the nature of international trade recorded also profound changes, particularly regarding the main players in geographical terms, the nature of traded goods and services and the degree of fragmentation of production on a global scale. The chapter crosses microeconomic and macroeconomic data, and uses several empirical models in order to relate the Portuguese experience with the evolution of the characteristics of international trade. In particular, the authors analyze the degree of openness of the Portuguese economy, the evolution of market shares in world trade, the changes in revealed comparative advantages in sectoral terms, the importance of intra-industry trade, the evolution of the degree of vertical specialization of the Portuguese economy, as well as the dynamism of individual export decisions by firms. Where possible, the chapter also includes international comparisons in order to put the Portuguese experience into perspective.

The characterization of structural trends and challenges of public finances has occupied a central place in the economic debate in Portugal. These issues are examined in the sixth chapter, written by Cláudia Braz, Maria Manuel Campos, Jorge Correia da Cunha, Sara Moreira and Manuel Pereira Coutinho. The authors begin by interpreting the main developments of public finances in Portugal between 1986 and 2008, based on the analytical framework currently used in the European Union for the multilateral surveillance of national fiscal policies. In particular, the main structural features of the evolution of expenditure, revenue and debt are analyzed. Additionally, the authors assess the degree of fiscal sustainability in Portugal, particularly taking into account the expected future increase in expenses related to the ageing of the population. In this context, the efficient provision of public goods is an instrumental element that contributes not only to the sustainability of public finances, but

also for the performance of the economy as a whole. In this context, the authors develop an analysis of the efficiency of the provision of education and health in Portugal – taking as reference the best performances in the OECD – and discuss the rules and incentives that characterize the labour market in the public sector. Despite the uncertainty and complexity of this evaluation, the authors conclude for the existence of potential gains in the use of these public resources in Portugal.

Finally, the last chapter of this volume assesses the process of financial integration of the Portuguese economy and its impact on financial structures and on the decisions of households and firms. The authors, Paula Antão, Miguel Boucinha, Luísa Farinha, Ana Lacerda, Ana Cristina Leal and Nuno Ribeiro, consistently collect a wide range of empirical evidence, which allows developing a thorough analysis of the Portuguese economy in those areas. The chapter starts by examining the liberalization process of the Portuguese financial system from an historical perspective, emphasizing the importance of the regulatory and supervisory frameworks in that process. Afterwards, the authors examine the role of the banking system in the intermediation of funds in the Portuguese economy, particularly in the context of banks' funding in international markets. Regarding the implications of liberalization and financial integration on the decisions of the non-financial sector, the authors present evidence regarding the evolution of assets and liabilities of households and firms, and assess how the investment decisions of firms are related to their financial situation. The chapter also includes an assessment of the main vulnerabilities of households and firms associated with their high indebtedness level, as well as the respective mitigating factors. Finally, an assessment of the main vulnerabilities of the Portuguese banking system in the current context of economic and financial crisis is also presented.

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Chapter 1

An insider's view on the euro area: dynamics, heterogeneity and policy

Nuno Alves, Isabel Correia, Sandra Gomes and João Sousa

1.1 Introduction

The introduction of the euro in 1999 was a milestone in monetary history. The eleven initial participating Member States embarked on a true regime change which was to prove highly successful. Testimony of this conclusion are *inter alia* the anchoring of medium to long-run inflation expectations around the European Central Bank's (ECB) definition of price stability during the last decade, the unprecedented degree of convergence of short-term interest rates within the euro area and the convergence of trend inflation rates to the best practices observed in the run-up to monetary unification.

Understanding the mechanisms underlying this new monetary regime spurred many empirical and theoretical contributions in the last decade. Most of this literature aimed at characterising and understanding the trend and business cycle features of the euro area (see Giannone, Lenza and Reichelin (2008), the monetary transmission mechanism in the monetary union (see Angeloni, Kashyap and Mojon (2003), and Weber, Gerke and Worms (2009)) and the opti-

mal conduct of fiscal and monetary policy (see Corsetti (2008)). This chapter presents updated evidence on these issues and critically discusses some of the findings in the literature. The ground covered in the chapter is necessarily wide and thus some issues will not be analysed comprehensively. Further, whenever possible, the most technical material will not be presented in this chapter and the reader will be referred to the relevant references.

The chapter is organised as follows. We start by focusing on the mechanics of the euro area as a whole. We present evidence on the main business cycle features of the area, for the period from the first quarter of 1980 to the last quarter of 2008, and assess whether they have changed significantly since the introduction of the euro. According to the Lucas Jr. (1980) programme, these stylised features of the data should be mimicked by general equilibrium models in order to make them useful laboratories for running economic experiments. It should be clear that the true data generating process is a function of a myriad of shocks, interacting within complex economic structures, conditional on expected fiscal and monetary policies and subject to the behavioural response of economic agents. This involvedness led many researchers to narrow their focus and analyse the response of the economy to arguably well-known and identified economic shocks. During the past two decades, monetary policy and technology shocks have emerged as the two main benchmarks to analyse the transmission mechanisms in the economy. In this chapter we follow these benchmarks, also to ensure comparability of the results with other studies focusing on the euro area.

Accordingly, we present evidence on the transmission of monetary policy and technological shocks in the euro area using vector auto-regressive (VAR) techniques (see Christiano, Eichenbaum and Evans (1999), and Altig, Christiano, Eichenbaum and Linde (2005)). We then attempt to rationalise this empirical evidence using the two-country dynamic stochastic general equilibrium (DSGE) model presented in Alves, Gomes and Sousa (2007) calibrated for the euro area and the US. This model has the advantage of explicitly taking into account open-economy considerations when analysing the functioning of the monetary union as a whole. Further, the model also allows evaluating the role of monetary policy in determining the equilibrium in the euro area.

After analysing the behaviour of the euro area as a whole we zoom in the euro area countries and analyse the mechanics of adjust-

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ment of heterogeneous economies forming a monetary union. This topic has only very recently re-emerged in the literature. We start by documenting the evolution of the dispersion of GDP growth and inflation rates within the euro area since 1970. Subsequently, we study the existence of cross-country cyclical heterogeneity within the euro area using the multi-country DSGE model presented in Gomes, Jacquinot and Pisani (2009).

The chapter ends with an assessment of the optimal conduct of monetary policy in the context of a monetary union characterised – such as the euro area – by the prevalence of real and nominal frictions, by heterogeneous economic structures across countries and by a *de facto* segmentation of the labour markets. This analysis is undertaken by contextualising and presenting the novel results in Adão, Correia and Teles (2009) and Adão and Correia (2007). In particular we discuss the importance of rules as an anchor of private expectations, the differences in optimal policies between open and closed economies, the impact stemming from the existence of heterogeneous structures across countries, the importance of market segmentations in order to replicate the optimal allocation in the union, and the interplay between fiscal and monetary policy.

Three qualifications should be mentioned regarding the scope of the analysis in this chapter. First, even though we do not focus directly on the Portuguese economy, the lessons emerging from the analysis should be in general extendable to a small open economy highly integrated with the euro area from an economic and financial perspective¹. Second, this chapter will not focus on explaining the real and nominal trends in the data, either for the euro area as a whole or for individual countries. We will thus abstract from analysing important features of the data such as the generalised disinflation during the convergence process of the 90s or the productivity slowdown observed in the euro area in recent decades (see Gordon and Dew-Becker (2005)). In practice, this means that the data in this chapter will be mostly described in deviations from the respective trends and that both general equilibrium models will be solved around a well-defined steady state. To be sure, this focus on the cyclical properties of the data is arguably of second-order importance relative to the welfare impact stemming from changes in

¹See the remainder chapters in the present volume for an in-depth account of the Portuguese economy and Adão (2009) for an analysis of the monetary transmission mechanism in a small economy in a monetary union.

the growth trends of the economy. Third, the models used in this chapter are not equipped to evaluate situations where financial frictions play an active role in the economy, where trade does not occur due to lack of trust in the counterparties or where markets simply cease to exist. We will therefore not be able to rigorously analyse the shocks, frictions and policies underlying the financial crisis that began in the summer of 2007. Nonetheless, whenever deemed relevant we will qualify the results in light of the ongoing financial crisis, namely regarding the functioning of the monetary transmission mechanism, the impact of heterogeneous financial structures in the union and the conduct of optimal monetary and fiscal policy. Furthermore, it should also be underlined that the technological frontier in the design and estimation of DSGE models is moving fast, with recent contributions already incorporating issues such as the existence of limited information processing capabilities by agents, search and matching frictions in the labour market and learning behaviour by economic agents. These models will not be the subject of discussion in this chapter.

As previewed above, the remainder of this chapter is organised as follows. In Section 1.2 we focus on the dynamics of the euro area, presenting evidence on the cyclical behaviour of the data (Subsection 1.2.1), estimating monetary policy and technology shocks using VAR techniques (Subsection 1.2.2) and rationalising the evidence with a two-country DSGE model (Subsection 1.2.3). In Section 1.3 we analyse the dynamics of adjustment inside the euro area, starting with some facts on the degree of growth and inflation differentials in the area (Subsection 1.3.1) and assessing the main frictions and structures underlying the transmission of shocks across countries in the euro area, based on results from a multi-country DSGE model (Subsection 1.3.2). In Section 1.4 we present an analysis of the main issues underlying the conduct of optimal policy in a monetary union, starting with a description of optimal monetary policy in a closed economy (Subsection 1.4.1), extending the results to a monetary union set-up (Subsection 1.4.2) and exploring the possibilities created by simultaneously using fiscal policy as a national policy tool (Subsection 1.4.3). Finally, Section 1.5 draws the main conclusions from the chapter.

1.2 The dynamics of the euro area: accounting for shocks and frictions

Even though the euro area economy is still relatively young, the study of its functioning has already been the subject of a voluminous empirical literature. Most of these studies have used synthetic historical series for the euro area, including periods with different economic regimes. This section updates that evidence and assesses whether the empirical functioning of the euro area in the last decade conforms to the behaviour of the past. In particular we look at evidence regarding the aggregate business cycle of the euro area (Subsection 1.2.1) and the empirical response of the euro area to monetary policy and technology shocks (Subsection 1.2.2). Further we aim to understand the transmission of these shocks in the two-country DSGE model described in Alves et al. (2007) and how this transmission depends on the monetary policy rule (Subsection 1.2.3). This contrasts with most of the initial literature on the euro area which focused on closed economy models (see, most prominently, Smets and Wouters (2003)), and is in line with the most recent contribution on this topic (see Coenen, McAdam and Straub (2008)).

1.2.1 Business cycle facts of the euro area

Tables 1.1 and 1.2 present the main business cycle properties of the euro area economy. Table 1.1 presents the volatility, persistence and comovements of the cyclical components of selected real and nominal variables relative to the GDP cycle for the period from the first quarter of 1980 to the last quarter of 1998. Table 1.2 presents the corresponding results for the period from the first quarter of 1999 to the last quarter of 2008. The business cycle component was extracted with a Christiano-Fitzgerald filter applied to the whole sample, but using other filters would not significantly alter the results. Several features are worth highlighting from these tables.

The main business cycle characteristics of the euro area economy conform to the evidence accumulated for many economies, notably the US (see Agresti and Mojon (2003)). Further, these characteristics of the aggregate euro area economy have not changed qualitatively with the introduction of the euro. This finding is in line with the conclusions in Giannone et al. (2008).

The basic features of the euro area business cycle can be described as follows. Consumption, investment and hours worked in

the euro area are strongly procyclical, i.e. they exhibit a positive contemporaneous correlation with the cyclical component of GDP. Investment is more volatile than output, while hours and consumption vary less than output. This evidence can be easily reconciled with a standard real business cycle (RBC) model, where the stochastic fluctuations in the economy are driven by technology shocks and where households smooth consumption (see King and Rebelo (1999)). Tables 1.1 and 1.2 also suggest that real wages are only slightly procyclical and display much lower volatility than output. This pattern – which is conditional on the definition of nominal wages and may be affected by composition biases throughout the business cycle – suggests that elements from both standard RBC models (which imply procyclical real wages) and standard sticky wage models (which imply countercyclical real wages) may play a role in describing the data. The importance of carefully modelling the labour market is also hinted by the strong correlation between hours worked and aggregate output, in particular after 1999.

Tables 1.1 and 1.2 also present evidence regarding the cyclical behaviour of nominal variables. Inflation is pro-cyclical in the euro area, which is reminiscent of a very short-run Phillips curve relation. In turn, the price level is slightly countercyclical, at least after 1999, which is consistent with a business cycle primarily driven by technological shocks. Interest rates are pro-cyclical, most significantly after 1999. This conforms to the idea that a simple Taylor rule may broadly capture the behaviour of the monetary policy in the euro area. Further, interest rates negatively lead GDP by around three to four quarters. This suggests the existence of real lagged effects of monetary policy, namely due to the existence of real and nominal rigidities. Regarding monetary aggregates, M1 is mostly acyclical contemporaneously and positively leads GDP by around 4 quarters. In turn, M3 is slightly countercyclical contemporaneously before 1999 and becomes slightly procyclical afterwards. In contrast, loans to the private sector are clearly procyclical and generally coincident, in particular after 1999. Finally, the exchange rate does not display a clear cyclical pattern with GDP, being acyclical in the period 1980-1998 and countercyclical thereafter.

It is also interesting to note that the amplitude of fluctuations in the main macroeconomic variables have been generally low since 1980, and have not changed sizeably after the introduction of the euro. This is in line with the so-called “great moderation” also ob-

Table 1.1: Main cyclical properties in the euro area: 1980Q1-1998Q4

Variables	Volatility	Persistence	Cross-correlation with GDP (t+j)								
	(st. dev. relative to GDP)	1st order auto-corr.	-4	-3	-2	-1	0	1	2	3	4
Real GDP p. c.	1.00	0.92	0.11	0.40	0.69	0.92	1.00	0.92	0.71	0.43	0.14
Consumption p. c.	0.87	0.93	0.46	0.61	0.71	0.73	0.64	0.47	0.25	0.02	-0.18
Investment p. c.	2.23	0.91	0.09	0.37	0.63	0.82	0.88	0.81	0.63	0.39	0.14
Public consump. p. c.	0.94	0.95	0.42	0.25	0.09	-0.03	-0.13	-0.21	-0.30	-0.39	-0.45
Hours per capita	0.56	0.88	0.26	0.44	0.59	0.64	0.56	0.39	0.19	0.02	-0.09
Real hourly wage	0.01	0.88	0.57	0.51	0.44	0.36	0.24	0.07	-0.14	-0.36	-0.57
Three-month rate	1.11	0.86	0.45	0.47	0.45	0.36	0.18	-0.06	-0.30	-0.49	-0.60
Inflation	0.26	0.81	0.06	0.08	0.12	0.16	0.17	0.12	0.02	-0.12	-0.27
GDP deflator	0.35	0.88	0.39	0.40	0.34	0.22	0.06	-0.12	-0.28	-0.40	-0.47
M1	1.75	0.92	-0.51	-0.45	-0.34	-0.17	0.05	0.28	0.49	0.66	0.76
M3	1.00	0.92	0.07	-0.01	-0.11	-0.18	-0.18	-0.10	0.03	0.20	0.36
Loans	1.72	0.95	0.12	0.17	0.18	0.17	0.16	0.17	0.17	0.16	0.11
EURUSD rate	10.74	0.91	0.32	0.35	0.32	0.21	0.04	-0.15	-0.31	-0.40	-0.39

Notes: The cyclical component was extracted with the Christiano Fitzgerald filter.

Persistence measured by the 1st order auto-correlation. p.c.=per capita

Sources: European Commission (AMECO), ECB, Eurostat, OECD, Thomson Datas-
tream.

served in other advanced economies (see Stock and Watson (2005)). Not surprisingly, this conclusion shall change dramatically in the current context of economic crisis.

Finally, the first-order serial correlation for the cyclical component of both real and nominal aggregates stands at around 0.9, revealing a high degree of persistence in the economy. This widespread feature of the data reflects the prevalence of persistent shocks in the euro area and/or of transmission mechanisms characterised by significant real and nominal rigidities which induce protracted responses of the macroeconomic variables, even in the case of transitory shocks.

1.2.2 Identifying shocks in the euro area: evidence from VARs

The objective of this and the following subsections is to illustrate the transmission of monetary policy and technology shocks in the euro area economy using an estimated Structural VAR (SVAR) model for the euro area which is an updated and slightly modified version of the model of Alves, Brito, Gomes and Sousa (2009) which in turn follows the study of Altig et al. (2005) for the US. The SVAR model

Table 1.2: Main cyclical properties in the euro area: 1999Q1- 2008Q4

Variables	Volatility (st. dev. relative to GDP)	Persistence	Cross-correlation with GDP (t+j)									
		1st order auto-corr.	-4	-3	-2	-1	0	1	2	3	4	
Real GDP p.c.	1.00	0.93	0.35	0.57	0.77	0.93	1.00	0.93	0.75	0.52	0.31	
Consumption p.c.	0.56	0.94	0.06	0.28	0.51	0.72	0.88	0.95	0.90	0.77	0.62	
Investment p.c.	2.05	0.92	0.07	0.29	0.52	0.74	0.90	0.95	0.88	0.75	0.61	
Public consumpt. p.c.	0.38	0.92	0.78	0.76	0.68	0.53	0.31	0.13	-0.06	-0.27	-0.48	
Hours p.c.	0.56	0.92	0.12	0.32	0.50	0.66	0.76	0.76	0.67	0.55	0.43	
Real hourly wage	0.00	0.88	0.37	0.40	0.42	0.38	0.26	0.12	-0.03	-0.17	-0.26	
Three-month rate	0.66	0.92	0.48	0.68	0.83	0.89	0.84	0.67	0.44	0.19	-0.02	
Inflation	0.10	0.92	0.61	0.67	0.65	0.55	0.38	0.19	0.03	-0.10	-0.22	
GDP deflator	0.57	0.95	0.78	0.63	0.43	0.17	-0.13	-0.38	-0.59	-0.73	-0.80	
M1	1.88	0.95	-0.78	-0.73	-0.62	-0.43	-0.16	0.14	0.42	0.63	0.73	
M3	1.71	0.95	0.67	0.59	0.48	0.32	0.12	-0.05	-0.21	-0.37	-0.51	
Loans	2.04	0.97	0.53	0.68	0.79	0.85	0.81	0.76	0.67	0.57	0.45	
EURUSD rate	7.45	0.92	0.04	-0.06	-0.16	-0.26	-0.39	-0.53	-0.63	-0.65	-0.59	

Notes: The cyclical component was extracted with the Christiano Fitzgerald filter.

Persistence measured by the 1st order auto-correlation. p.c.=per capita

Sources: European Commission (AMECO), ECB, Eurostat, OECD, Thomson Datastream.

allows the identification of monetary policy and technology shocks and the simulation of their effects on the main macroeconomic variables. The SVAR includes a minimal set of theoretical restrictions on the data and therefore is particularly suited for uncovering stylised empirical facts and summarising the data.

Monetary policy shock

Determining the effect of monetary policy changes in the economy requires taking into account that macroeconomic data reflect the outcome of current and past shocks, the interrelationship among all macroeconomic variables (including the interest rate set by the central bank) and expectations regarding the future economic evolution. Consequently, a given change in interest rates will have different effects on the economy in different economic conditions. To assess the effect of an interest rate change on a given macroeconomic variable one thus needs to exclude what, in the behaviour of such variable, is due to the effects of other shocks, including lagged effects of past changes in policy. In other words, it is necessary to identify the monetary policy shock and how each variable reacts to it. In a SVAR context, the identification of monetary policy shocks is done by first regressing the variables on current and past values of

all the other variables in the system. Then restrictions are imposed that allow the identification of the “pure” monetary policy shock. The effect of the shock on the other variables of the system can then be computed. This procedure can be seen as determining how each macroeconomic variable reacts to an unexpected interest rate change in the absence of all other shocks.

The identification procedure assumes that the central bank follows a monetary policy rule where the central bank interest rate is set as a function of an information set plus a monetary policy shock (e_t):

$$i_t = f(\text{Information set}) + e_t \quad (1.1)$$

The error term e_t is the “structural” monetary policy shock. The rule implies that the interest rate reacts to current and past values of the variables in the information set. In practice the information set that central banks monitor is very vast and cannot be feasibly incorporated in a SVAR, thus requiring a prior selection of a subset of variables which are thought to be the most relevant for monetary policy. The subset of variables considered in this study is the following: output *per* hours worked, consumption, investment, capacity utilisation, quarterly inflation (as measured by the GDP deflator), real wage, the interest rate and the exchange rate. The identification of the shock is achieved by assuming that e_t is orthogonal to the information set and that real economic activity, wages and prices do not react contemporaneously to the monetary policy shock.

The estimation period for the SVAR comprises data from the second quarter of 1970 to the last quarter of 2007.² The responses of the variables to the monetary policy shock are shown in Figure 1.1. In the figures the solid lines depict point estimates and the dashed lines their respective 95% confidence bands obtained by bootstrap. The responses of all the variables are measured in percentages, except for the interest rate, which is measured in basis points. The size of the monetary policy shock amounts to a minus one-standard deviation, which, according to the estimates, implies a fall in the short-term interest rate of around 40 basis points on impact.

²The sample ends in the last quarter of 2007 in order to avoid the effects of the abnormally high risk premia in money markets observed thereafter and linked to the recent economic and financial crisis. In Alves et al. (2009) it is shown that the impulse responses of the various variables remain remarkably stable in different sample periods (the longer sample used in that study covers the period from the second quarter of 1970 to the third quarter of 2004).

The first feature worth highlighting in the responses is that the fall in the interest rate is quite persistent, lasting over one year before it resumes its movement back to the baseline. Second, there is a hump-shaped response of output, consumption, investment, hours *per capita* and capacity utilisation, with the peak effect occurring one and a half to two years after the shock. As expected, the response of investment is quantitatively stronger than that of consumption. These results are in line with similar findings for the US. Third, the response of inflation is characterised by a fall following the shock but this is followed by a rebound that takes approximately two years to reach its peak. The response of inflation is somewhat unsatisfactory in that there is a short-run decrease in inflation but this result, known as the “price puzzle”, is usually found in SVAR models in the literature.³ Finally, as regards wages, there is a short-run decline in real wages but this effect is eventually reversed so that real wages’ response eventually moves into positive territory.

Technology shock

As for the technology shock, we again follow the procedure of Altig et al. (2005), namely assuming that technology shocks are the only ones that can affect labour productivity in the long run. This is done by imposing restrictions on the long run responses of the variables, i.e., the long-run responses to the technology shock of the variables other than labour productivity are set to zero (see Alves et al. (2007), for details).

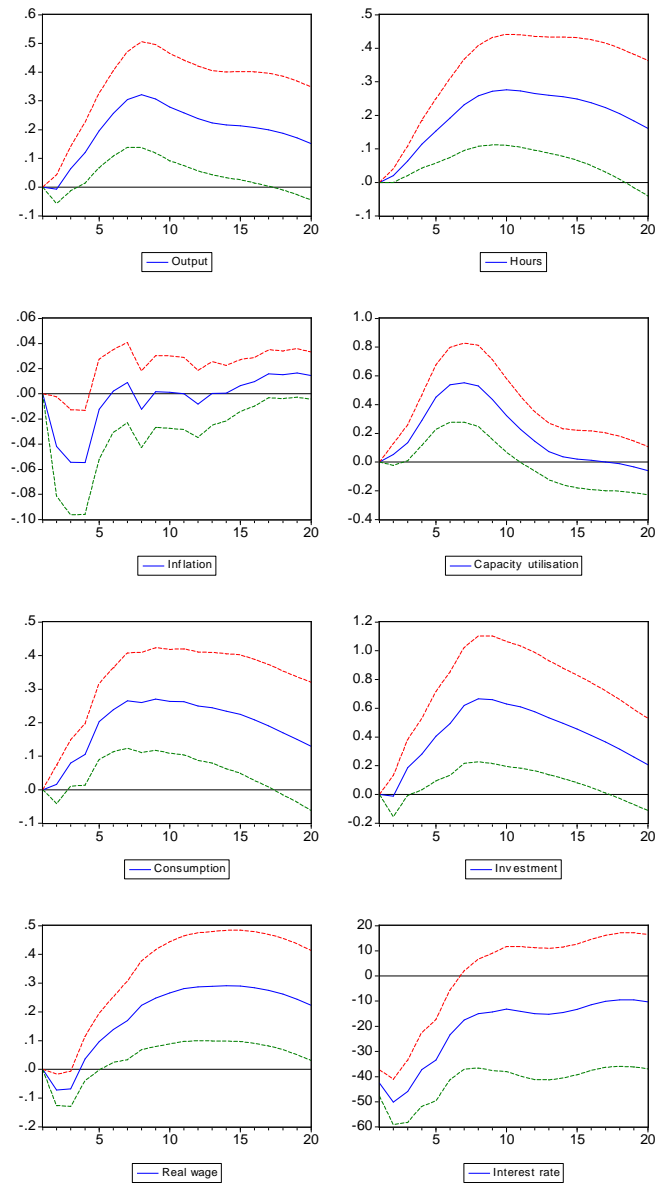
The responses of the variables to the neutral technology shock are shown in Figure 1.2. An increase in labour productivity raises output, consumption and investment. The effect on these variables gradually builds up, with the maximum being reached one and a half to two years after the shock. Real wages rise, as expected, but capacity utilisation drops. The response of inflation to the technology shock is small, mostly contemporaneous and occurs mainly on impact. However, this response is not statistically different from zero. *Per capita* hours endure what seems to be a permanent fall, a result similar to the one reported by Galí (2004) for the euro area.⁴

This outcome means that positive technology shocks generate a

³In the literature it has been argued that the price puzzle can be eliminated by including commodity prices in the VAR, see Peersman and Smets (2003).

⁴This is so in spite of Galí (2004) using employment rather than hours as the measure of labour input.

Figure 1.1: SVAR: Impulse responses to a monetary policy shock



Note: Solid lines: point estimates; dashed lines: 95% confidence bands obtained by bootstrap.

lasting drop in the amount of labour input used in the economy. One possible explanation for this result is that improved production capabilities allow firms to achieve the same production levels with a smaller amount of factor inputs. In addition, increasing productivity generates a wealth effect as households can expect higher future real wages. Therefore, it may be optimal to reduce working hours today as the future return from labour has increased.

1.2.3 The transmission of shocks through the lenses of a two-country DSGE model

The model

In the previous section it was shown that the responses of euro area variables to shocks display some persistence which is indicative of the existence of nominal and real frictions in the economy. In this subsection we use a structural micro-founded model DSGE model calibrated for the US and the euro area (which is a slightly modified version of the model of Alves et al. (2007)⁵). The model includes such frictions and to a large extent the model is able to qualitatively reproduce the empirical findings of the previous section. The main advantage of the model is that it allows uncovering the underlying mechanisms of the economy.

The frictions included are price and wage rigidities, adjustment costs on investment and imports and habits in consumption.⁶ The economic agents are households, intermediate and final goods firms, a government sector and the monetary authority. The model is symmetric in the sense that the underlying structure of the two economies is basically the same but the countries differ in terms of size and calibration.

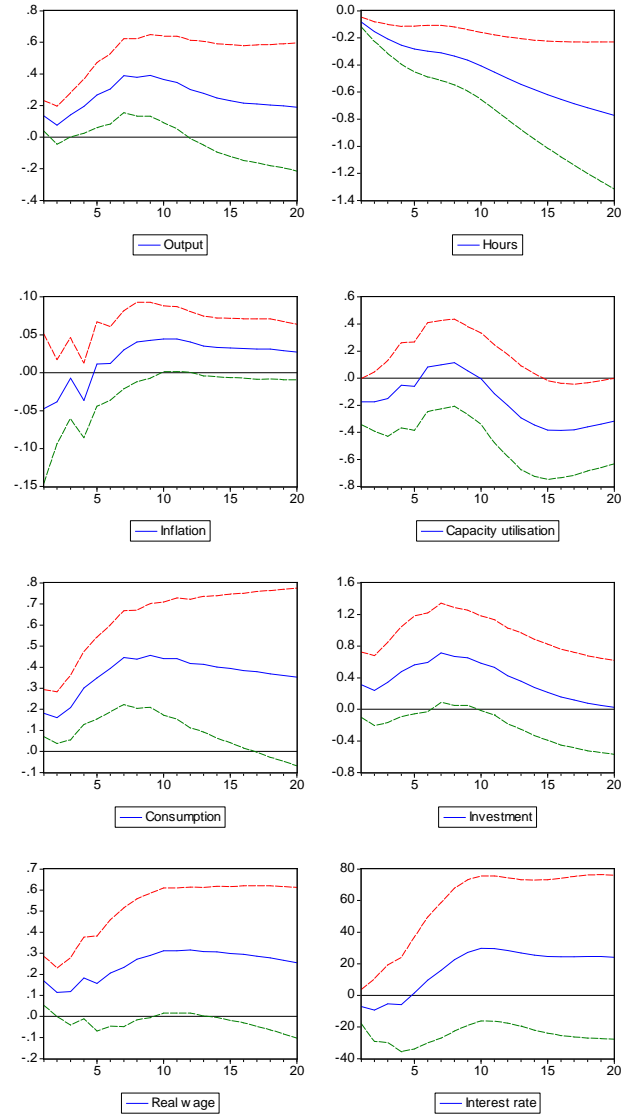
In each country, the representative household is infinitely lived and derives utility from consumption (assuming internal habit formation⁷) and leisure. Households decide on how much to consume/

⁵The main differences compared to the model in Alves et al. (2007) are the absence in the current version of the cash in advance constraint and the calibration used, in particular of the monetary policy rule.

⁶Habit formation means that households change their consumption (more or less) slowly. In more formal terms, habit formation implies that the marginal utility of consumption depends both on current and lagged consumption. This feature introduces persistence in the way aggregate consumption reacts to shocks.

⁷In the case of internal habits, household's utility depends both on its current

Figure 1.2: SVAR: Impulse responses to a technology shock



Note: Solid lines: point estimates; dashed lines: 95% confidence bands obtained by bootstrap.

lagged consumption. In contrast, in the case of external habits utility depends on the lagged aggregate consumption instead of the lagged individual consumption.

spend and also set wages in monopolistic markets. Wages are sticky *à la* Calvo (1983) with indexation. Households own the domestic firms and the domestic capital stock that they rent to the intermediate firms. We assume there are adjustment costs in investment and we allow for variable capital utilisation subject to adjustment costs.

Regarding the production side, in each country there are firms producing intermediate goods sold both in the domestic and the foreign market. Only the intermediate goods are traded internationally. Markets are segmented and firms set their prices in the currency of the country of destination of the goods. We assume prices are set *à la* Calvo with indexation. The production technology is Cobb-Douglas, combining domestic capital services with domestic labour and we allow for technological progress. As for the final good sector, there is a single final good produced in each country that can be used both for consumption and for investment. The final good sector is perfectly competitive and its production merely consists in combining intermediate goods (domestically produced and imported) into the final good. The technology used to combine these inputs is a Constant Elasticity of Substitution (CES) production function. A quadratic adjustment cost to changing the composition of the final good is introduced with the purpose of temporarily lowering the response of demand to changes in relative prices. There is international price discrimination since firms set prices in the currency of the importing country.

The model includes a simple government sector. The government in each country buys the final good, makes nominal transfers to households and receives taxes from households (both on payrolls and consumption expenditures). The government budget is balanced every period, i.e. there is no fiscal rule and exogenous lump-sum transfers are used to keep the balance. As for monetary policy, the central bank is assumed to follow a Taylor rule.

Finally, international financial markets are incomplete as there is a risk premium in the transaction of foreign bonds that ensures that Net Foreign Assets (NFA) are stabilised. Only US bonds are traded internationally. A modified uncovered interest parity relation holds for the exchange rate.

Regarding calibration, the two countries are of slightly different size, namely the euro area stands for 42 per cent of total population. Behavioural parameters have been chosen using information from the existing literature (see Alves et al. (2007)). Differences between

the two economies are kept as small as possible, i.e. we chose different parameter values for the two economies only when we found evidence strongly favouring that choice. As for price setting, prices are reoptimised on average every 10 quarters in the domestic sector and 1.4 quarters in the export sector.⁸ The degree of price indexation is set to 0.5 in both economies. The price markup is set to 0.3 both in the domestic and the import sector in the two economies. Wage contracts last on average 4 quarters and the degree of wage indexation is set to 0.75 in the two countries. The wage markup is set to 0.3 in both countries.

Monetary policy shock

In the DSGE model, there is a large set of behavioural equations that describe in detail the interrelations of the variables. The model is non-linear but it was log-linearised around the stationary steady state. The structural shocks are explicitly included in the model and therefore the identification of the monetary policy shock is achieved by construction. In particular, the model includes a generalised Taylor rule of the following (log-linearised) form:

$$\hat{i}_t = \phi_i \hat{i}_{t-1} + (1 - \phi_i)(\hat{\pi}_t + \phi_\pi(\hat{\pi}_t - \hat{\pi})) + \phi_{\Delta y}(\hat{y}_t - \hat{y}_{t-1}) + \hat{\epsilon}_t \quad (1.2)$$

where the hat ($\hat{\cdot}$) indicates that the variables are expressed in deviations from steady state. The above rule implies that the interest rate (\hat{i}_t) reacts to past values of itself, to current deviations of inflation ($\hat{\pi}_t$) from the central bank inflation target ($\hat{\pi}$) and to output growth ($\hat{y}_t - \hat{y}_{t-1}$). For simplicity, the inflation target is assumed to remain at all times at its steady state value (so ($\hat{\pi} = 0$)). The calibration of the parameters is the following: the interest rate smoothing parameter (ϕ_i) is set to 0.9, the parameter on inflation ϕ_π is equal to 2 and the parameter on output growth ($\phi_{\Delta y}$) is equal to 0.1.

It should be noted that there is no correspondence between the above policy rule and the one of the SVAR. First, in the DSGE model the variables are in difference from the steady state but not in the VAR. A second difference is that the functional form of the policy rule of the VAR does not coincide with the one above⁹.

⁸The calibrated values of the Calvo parameters are the same as those used in the New Area Wide Model of Coenen et al. (2008).

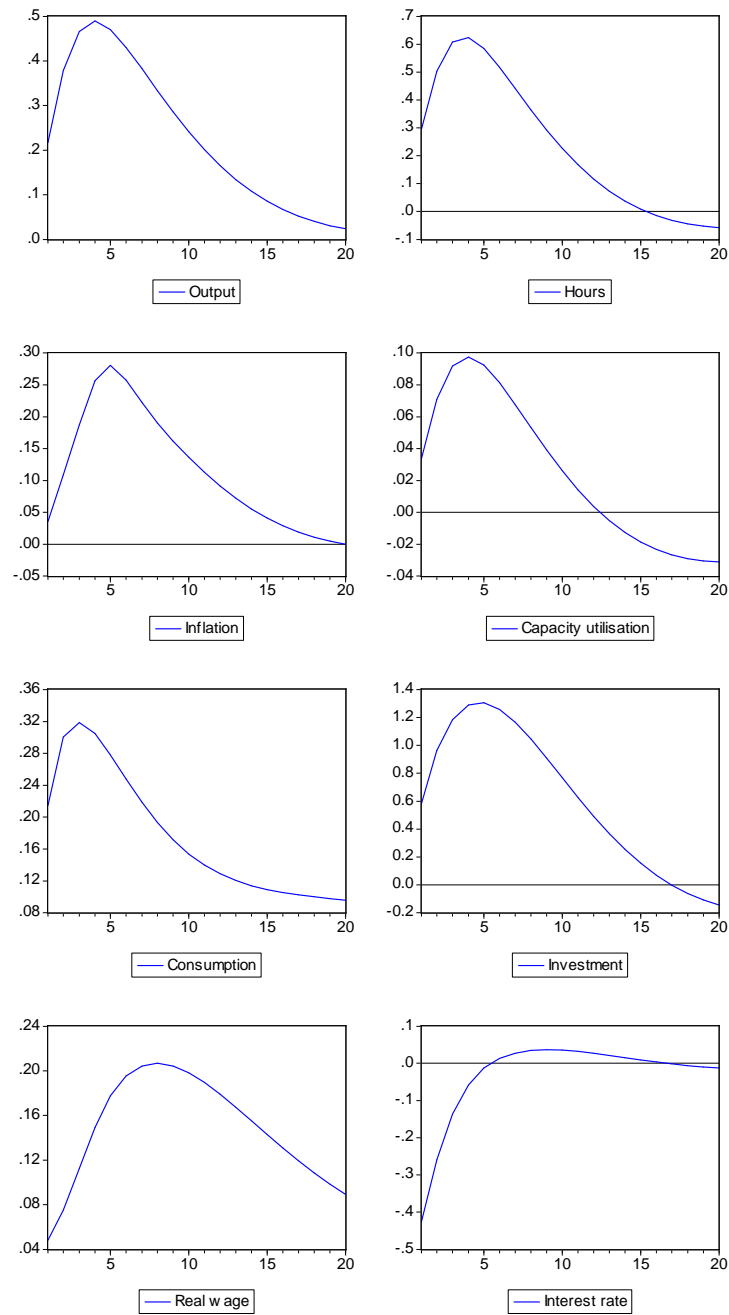
⁹For instance, in the VAR the systematic part of the monetary policy rule includes current and up to four lags of the following variables: output per hour worked, consumption, investment, capacity utilisation, quarterly inflation, real wage, the interest rate and the euro exchange rate against the US dollar.

The results of the simulation are shown in Figure 1.3. The figure displays the dynamic responses of several variables to a one-period monetary policy shock, i.e. an unanticipated exogenous change in e_t . The size of the shock is calibrated so that the annualised euro area interest rate declines by the same amount as in the SVAR case, i.e. the short-term interest rate falls around 40 basis points on impact.

According to the model, the policy rate remains below its steady state level for almost two years. The decrease in the interest rate stimulates demand, reduces the incentives to save and lowers the cost of capital. As a result there is a hump-shaped increase in real GDP, real consumption and real investment in the euro area. As expected, real investment responds more strongly than consumption. The decrease in the euro area interest rate, together with a muted response to the shock by the US monetary authority, leads to a large real exchange rate depreciation which switches foreign demand towards euro area goods which ends up having an expansionary effect on euro area GDP. In fact, the real exchange rate depreciates on impact and then returns to its steady state value, implying consequently a gain of competitiveness. This is translated into a decline in imports and, initially, a rise in exports that is reversed at a later stage.

Following the monetary policy shock, hours worked increase, as firms produce more to satisfy increased demand. Higher demand for labour puts upward pressure on nominal wages. The effect on real wages will depend on the nominal rigidities (on both wages and prices), on the degree of workers' market power and also on the utility parameters (governing the disutility from work). In the model, following a surprise decline of the interest rate, real wages increase which is in line with the stylised facts following an unanticipated monetary policy shock in the euro area (Peersman and Smets (2003), Alves et al. (2009)). Note that the positive income effect due to the increase in hours worked and in the real wage contributes to the expansion in consumption. As regards annual inflation, it increases following the shock and, after peaking a year after the shock, gradually returns to the steady-state. Thus, contrary to the results obtained with the SVAR, in the DSGE model monetary policy shocks have a significant impact on inflation. This result is in line with available empirical results obtained with estimated DSGE models (for instance, with the Smets and Wouters (2003) closed economy model).

Figure 1.3: DSGE: Impulse responses to a monetary policy shock



Technology shock

In the DSGE model, the technology shock is introduced directly in the production function, which is a Cobb Douglas function with constant returns to scale, namely

$$Y_t = e_t^N K_t^a L_t^{1-a} \quad (1.3)$$

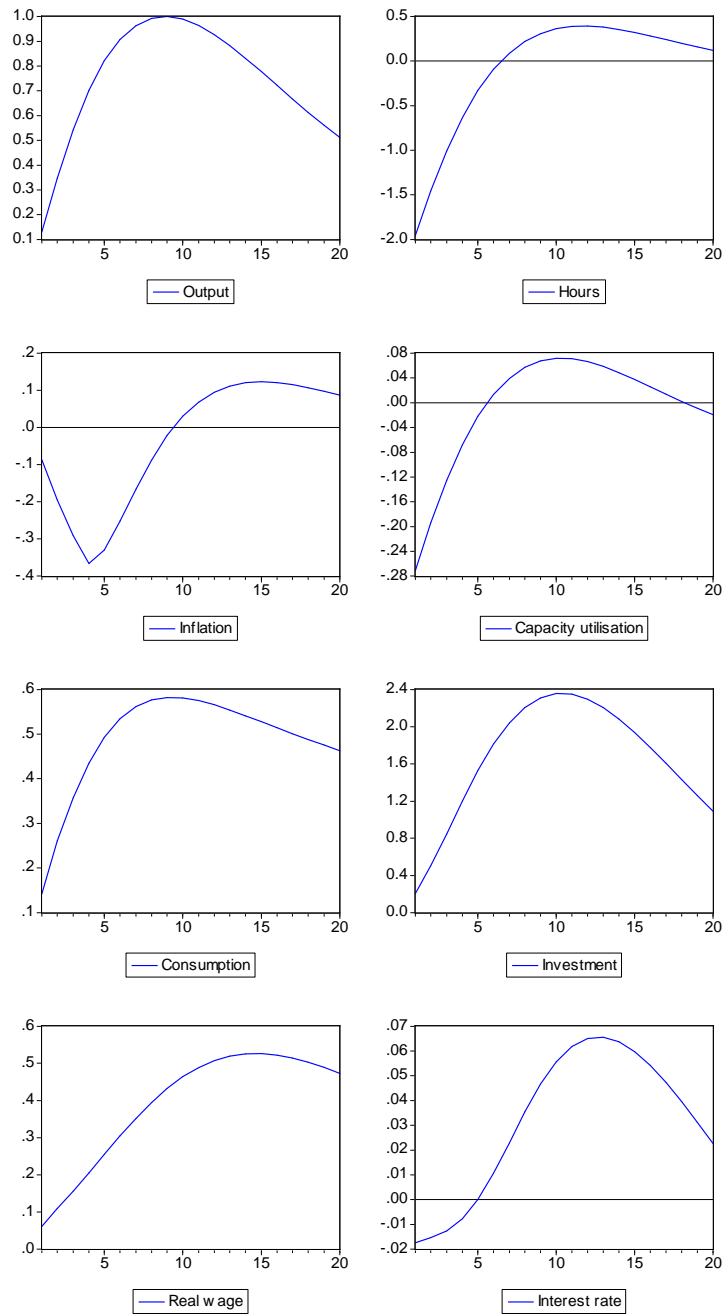
where Y_t represents output, K_t capital services, L_t is the labour input (i.e. hours worked), a is the share of capital income in value added and e_t^N is the technology shock. Note that while in the SVAR approach the technology shock implies a permanent effect on labour productivity, the technology shock effect in the DSGE model is only a temporary one (though persistent).

Figure 1.4 depicts the impulse responses to a technology shock which is calibrated so that the maximum impact on real GDP in the euro area is one per cent (in deviations from the steady state). Both consumption and investment rise after the shock, again with investment being more volatile. Hours worked initially fall which is a result similar to the one found in Smets and Wouters (2003) and Alves et al. (2009). One explanation for this fall is that the technology shock, by increasing labour productivity, makes it possible for firms to produce more with the same or even a lower amount of labour. As the real wage increases in the future, households prefer to work less today and more in the future at a higher real wage.¹⁰

The technology shock expands temporarily the production capacity of the economy and therefore lowers the marginal cost of production. As a result, the optimal behaviour of firms would be to lower their prices. However, given the existence of nominal rigidities, in particular price stickiness *à la* Calvo, only a fraction of the firms are re-optimising in each period. Thus, inflation declines sluggishly, with the maximum effect occurring four quarters after the shock. The decline in inflation explains why the short-term interest rate declines while GDP is increasing. The real exchange rate appreciates slightly initially but subsequently depreciates and then slowly returns to the steady-state.

¹⁰It should be noted that the strong response of hours also reflects the choices made in the calibration of the model, in particular the values of the Calvo parameters which imply a high degree of persistence in prices. With a lower degree of price stickiness, the response of hours would be weaker.

Figure 1.4: DSGE: Impulse responses to a technology shock



Sensitivity analysis

The response of the economy to shocks depends on the way monetary policy is conducted. In this regard, it is interesting to assess how the response of the economy would change if the parameter values used in the monetary policy rule would be changed. Therefore, in this section we recompute the impulse responses of the various variables with different parameters of the Taylor rule (1.2). Two exercises are conducted. In a first exercise, we change the inflation coefficient (ϕ_π) from 1.1 to 3.1 in steps of 0.1. The initial value is 1.1. given that a value of 1 or below would imply that the model would become unstable. This seems to indicate that in this model the central bank interest rate should be raised more than one-for-one with inflation increases to ensure determinacy.¹¹ A second exercise consisted in raising the value of the coefficient on the output gap ($\phi_{\Delta y}$), from 0.1 to 2.1.

The results of changing the coefficient on inflation are shown in Figure 1.5, concentrating only on the responses of output and inflation to monetary policy and technology shocks. As seen in the chart, lower levels of the parameter ϕ_π imply a stronger impact of the monetary policy shock on inflation and output. However, as this parameter value is increased, output and inflation become less reactive so that for values of ϕ_π above 2, changes in the parameter of a 0.1 magnitude lead only to limited movements in the responses, with the effect becoming smaller the higher the level of ϕ_π . The responses of output and inflation to the technology shock appear to be less sensitive to changes in this parameter, as the impulse responses are quite close to each other.

Figure 1.6 shows the results of the simulations when the coefficient $\phi_{\Delta y}$ is increased. Starting with the monetary policy shock, when the interest rate reacts less to the output growth, the effect of a monetary policy shock on output is larger on impact and achieves a stronger effect than is the case with higher parameter values. However, the response of output is more short-lived in this case than when $\phi_{\Delta y}$ is larger. As regards inflation, it can be seen that if $\phi_{\Delta y} = 0.1$ the effect of the monetary policy shock on inflation reaches a maximum around 6 quarters after the shock, but declines thereafter much more rapidly than with higher parameter values. In fact, the response of inflation to a monetary policy shock becomes very persistent when $\phi_{\Delta y}$ is larger than 0.5. The response of output

¹¹See for instance, Woodford (2003), Chapter 2, Section 2.3.

to the technology shock is interesting in the sense that the short-term impact of a technology shock may be negative depending on how the central bank reacts to the output growth term. If the response coefficient is roughly equal to or less than 0.2, output rises on impact following a positive technology shock. However, if the central bank is more reactive to the output growth, then output may fall in the short-run following a positive technology shock. The reason for this short-run behaviour is very much related to the behaviour of investment in the short-run. When there is a positive technology shock, GDP should increase but such increase, by the Taylor rule, implies a tightening of monetary policy. However, when the interest rate rises, investment is negatively affected depressing output in the short-run. If the central bank does not react so strongly to the output gap then the short-run response of output to a technology improving shock is always positive. As regards the impact of the technology shock on inflation, it can be seen in the chart that the higher the value of $\phi_{\Delta y}$, the higher and the more persistent is the impact of the technology shock on inflation.

Figure 1.5: DSGE: Sensitivity of the responses of output and inflation to changes in ϕ_{π}

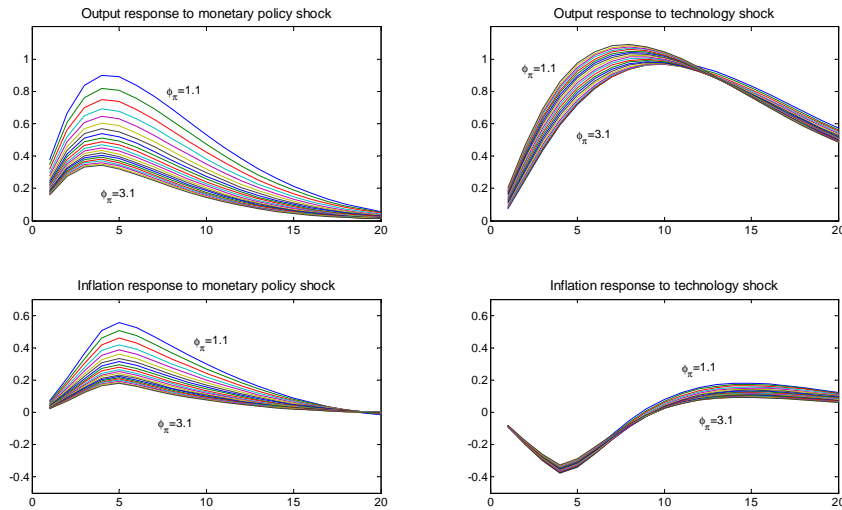
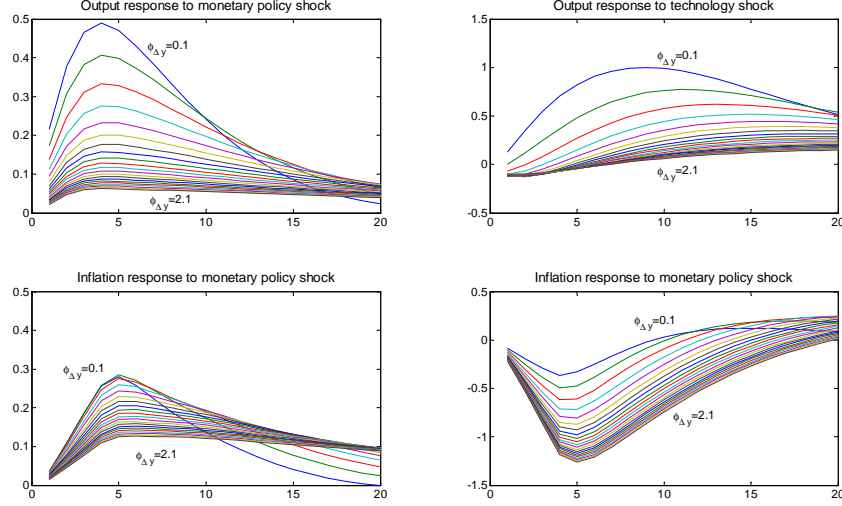


Figure 1.6: DSGE: Sensitivity of the responses of output and inflation to changes in $\phi_{\Delta y}$



1.3 The mechanics of adjustment inside the euro area

Heterogeneity is a feature of any monetary union. The interplay between the different degrees of market integration and segmentation, the diverse national economic structures and the specific nature of the shocks hitting the economies determines these differences in market outcomes. As mentioned in Section 1.4, this implies that in some cases heterogeneity is not only unavoidable but actually desirable. Nonetheless, worries are recurrently voiced concerning the disparity of economic outcomes among euro area economies and the potential costs of losing national monetary sovereignty. In this section and in Section 1.4 we will show that these concerns are based neither on empirical facts nor on solid theoretical grounds.

In this section we mainly focus on two issues. First, we are interested in measuring the degree of heterogeneity in growth and inflation outcomes in the euro area (Subsection 1.3.1). Second, we aim at uncovering the sources of heterogeneity among economies in a monetary union (Subsections 1.3.2 and 1.3.3). This latter analysis will be

based on the multi-country DSGE model presented in Gomes et al. (2009).

1.3.1 Some facts on GDP growth and inflation heterogeneity in the euro area

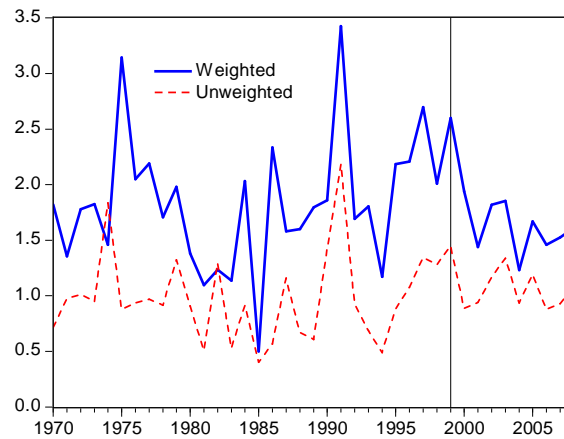
There are many economic dimensions on which heterogeneity could be illustrated in the euro area. For parsimony reasons, we focus on GDP growth and inflation differences among euro area countries. We present the results for each variable in turn.

Figure 1.7 displays the dispersion of the annual rates of growth of euro area countries between 1970 and 2008. Figure 1.8 shows the correlation between each country's GDP growth and the corresponding figure for the euro area as a whole. Several interesting results stand out from the figures. First, the dispersion of growth rates in the euro area since the introduction of the euro is in line with the historical average. Second, there is a very high correlation between national and euro area GDP rates of growth, standing above 0.8 in most cases. This correlation has actually increased in most cases since the introduction of the euro. These conclusions also broadly apply to the cyclical components of GDP, extracted with the Christiano-Fitzgerald filter.

These facts suggest that the euro area economies have experienced sizeable common shocks and/or share comparable structures and transmission mechanisms. Even though preliminary, this evidence seems to contradict the prediction of Krugman (1993) that monetary unification would contribute to increase the specialisation of productive structures in the monetary union, leading to increased heterogeneity in GDP growth outcomes. In turn, this evidence tends to support the prediction by Frankel and Rose (1998) that monetary unification would endogenously contribute to approximate the behaviour of the euro area economies, namely through the expansion of trade flows.

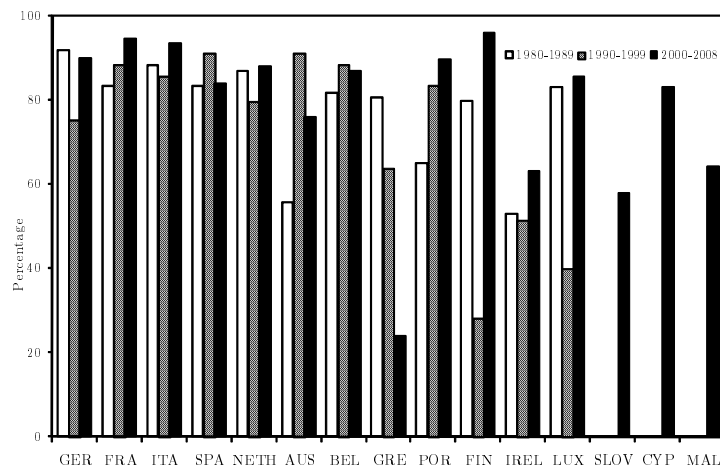
Figure 1.9 displays the dispersion of inflation rates in the euro area countries since 1970. The main striking result is that monetary unification was followed by historically low levels of inflation divergence, an important illustration of the success of the ECB in anchoring inflation expectations in the euro area as a whole. The weighted and non-weighted standard error of inflation is close to but below 1 percentage point since 1999, highlighting the relatively low levels of inflation differentials persisting in the euro area.

Figure 1.7: Euro area countries - Dispersion of the annual growth rates of GDP



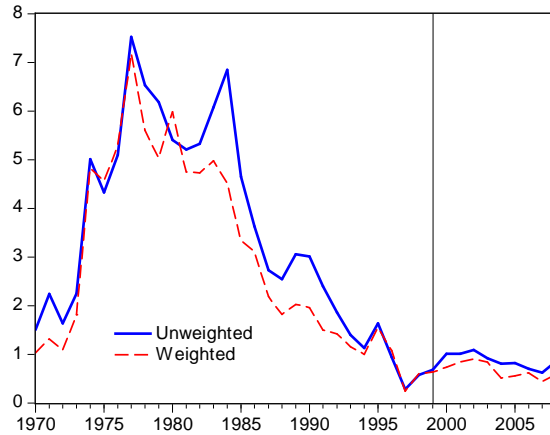
Sources: European Comission (AMECO) and authors' calculations..

Figure 1.8: Correlation of the national annual GDP growth with the euro area GDP growth



Sources: European Comission (AMECO) and authors' calculations..

Figure 1.9: Euro area countries - dispersion of the annual growth rate of HICP/CPI



Sources: European Commission (AMECO), Eurostat and authors' calculations.

1.3.2 General equilibrium adjustments inside a monetary union

In this section we interpret the heterogeneous developments in GDP and inflation described above in light of a multi-country DSGE model of a monetary union. Cyclical divergences in output and inflation developments may arise either because the economies are hit by country-specific shocks or because different national economic structures imply different national adjustments to (common or idiosyncratic) shocks.¹² We illustrate this by simulating both common and country specific shocks hitting the monetary union that show that heterogeneous developments are an integral characteristic of adjustments inside a monetary union. In addition, we perform sensitivity analysis with respect to a number of rigidities that have become quite standard in DSGE models in order to mimic the responses observed in the data (usually in VAR studies such as the one presented in Section 1.2.2). First, we analyse the importance of

¹²Verhoef (2003) finds that symmetry of shocks (demand and, to a lesser extent, supply) in EMU increased during the 80's and 90's. Giannone and Reichlin (2006) find that heterogeneity in the euro area is generated by small and persistent idiosyncratic shocks while most output variation is explained by a common shock.

nominal rigidities, namely price and wage rigidities, that allow for nominal shocks to have real effects. For example, in face of a monetary shock, higher price rigidity implies that prices react sluggishly while the response of real variables is increased. We also have in the model real rigidities that dampen the responses of real variables to changes in relative prices. To give another example, the existence of habit formation in the model introduces persistence in the real variables, notably consumption, as well as in inflation. Finally, given the open economy dimension of the model, we should also stress that asymmetries in the behaviour of the economies can also arise because their trade matrices are different. This will play an important role when simulating international shocks, as the impact of such shocks in each euro area economy will hinge on the openness towards those countries, either as a destination market for exports or the market where imports originate from.

In this section we only focus on the business cycle adjustment to shocks, contrary to the previous one where we focused the analysis on the raw data.

The model

The model used in this section, called EAGLE, is a multi-country DSGE model of a monetary union.¹³ In particular, the world is composed of the euro area, the US and the rest of the world. In the euro area we differentiate two countries, where the smaller one weights around 10 per cent of the euro area GDP.

Despite being more detailed, there are several similarities between this model and the one used in Section 1.2.3. Regarding households, EAGLE also assumes the infinitely lived consumer framework. Each household consumes a final good,¹⁴ supplies labour to all domestic firms in a monopolistic competitive market and decides how to allocate their time between work and leisure. However, unlike the two country model, a fraction of households does not have access to capital markets and finances consumption exclusively through disposable labour income.¹⁵ The remaining households own the domestic firms and the domestic capital stock,

¹³For a detailed description of the EAGLE (Euro Area and the GLoBal Economy) model, see Gomes et al. (2009).

¹⁴There is external habit persistence in consumption.

¹⁵We set the share of the liquidity-constrained agents to 25 per cent in all countries.

which they rent to domestic firms. They also buy and sell two bonds, one issued domestically in domestic currency and the other is an international bond issued in zero net supply worldwide.¹⁶ In the case of the monetary union, there is a bond denominated in the common currency which is traded across member countries. The market for capital is competitive, and capital accumulation is subject to adjustment costs. Another difference as compared to the model in Section 1.2.3 is the inclusion of non-traded intermediate goods.

Focusing on the production side, unlike the two country model, in EAGLE there are three final goods in each country produced in perfectly competitive markets: a consumption good, an investment good and a public good. Consumption and investment final goods are produced by using all available intermediate goods as inputs whereas the public good is a composite of only non-tradable intermediate goods. As in the two country model there is monopolistic competition in the intermediate goods sector. Each good is produced by using domestic labour and domestic capital. The non-traded intermediate goods, the domestic traded goods and imported traded goods are used in the production of the final goods. Imports are subject to short-term adjustment costs. In EAGLE the government sector is somewhat more intricate than in the two country model. The government purchases the public good and finances its expenditures with public debt and taxes on the domestic private sector.¹⁷

Standard fiscal rules that target the level of public debt ensure the stability of the model. As for the monetary authority, it also sets the national short-term nominal interest rate by means of a Taylor-type interest rate rule. In the case of the monetary union, the central bank sets the interest rate for all the countries in the union.

Regarding the calibration of the EAGLE model, the steady-state ratios have been set to match actual national accounts data and the key behavioural parameters have been chosen using information from the literature, some of which are invariant across countries while others were modified to match country-specific great ratios.¹⁸

¹⁶When households sell or purchase the international bond they pay a premium to financial intermediaries, which is a function of the aggregate net asset position of the country.

¹⁷There are *lump-sum* and distortionary taxes. The distortionary taxes are levied on the price of consumption, the rental rate of capital and wages.

¹⁸Note that the chosen calibration presents some differences compared with Gomes et al. (2009).

Home bias and the weight of nontraded goods in the consumption and investment baskets assume different values across countries since they are set to match the shares of imported and non-traded goods in the considered economy, given the values of the intratemporal and intertemporal elasticities of substitution.¹⁹ In particular, the small euro area economy is a relatively open economy.²⁰ Around 60 per cent of its trade flows are directed to or originate from the rest of the euro area. As for the larger economy, it is not as open as the other one,²¹ but still more than either the US or the rest of the world. Given the small size of the small economy, the weight of the smaller economy as a trade partner to the larger is not very large, but it is still significant at close to 15 per cent, both for exports and for imports. Close to 80 per cent of the large economy's exports are directed to the rest of the world while the US has a significant weight in its imports at close to 60 per cent of total imports.

As for nominal rigidities, we assume that wages are reset optimally once per year, on average, which is close to the estimates in Smets and Wouters (2005) for the euro area and the US. As for prices, we assume that the average duration of price contracts is larger in the domestic market compared to the export market. In the baseline calibration we assume a high level of price stickiness in the domestic market in the euro area (that is identical across the two euro area economies), given that we will pay particular attention to the impact of reducing this rigidity. In particular, prices change once every 10 quarters on average for firms producing to the domestic market. In the pricing decision to the export market we assume prices change once every 1.5 quarters, approximately. The calibration of the rest of the world assumes a lower degree of rigidity in wages and export prices.²² Real rigidities allow to produce realistic dynamic adjustment patterns. Monetary policy authorities are assumed to target inflation. We assume identical calibration of the Taylor rules in all the economies.²³ For the euro area, the nominal interest rate in the

¹⁹In the calibration we used trade data for the US and the euro area as a whole. The calibration of the small euro area economy is relatively stylised and meant to mimic a relatively open economy where a significant part of the trade flows originate or are directed to the rest of the euro area.

²⁰Imports and exports weight around 30 per cent of GDP each, including intra euro area trade.

²¹Imports and exports each weight around 15 per cent of GDP.

²²Wages change on average twice per year and export prices more or less every quarter.

²³Similarly to the DSGE model in subsection 1.2.3, in the Taylor rule the smooth-

two euro area economies is determined by the single monetary authority on the basis of area-wide indicators. The calibration of the fiscal policy rule is standard.

Common shocks in the euro area

As already mentioned, the fact that economies have different structures implies that even in face of common shocks economies may present cyclical divergences, namely in output and inflation developments.²⁴ In a monetary union, the way economies adjust to shocks is also influenced by the fact that monetary policy is set for the monetary union as a whole and also by the fact that the nominal exchange rate inside the union is fixed. In the case of the countries belonging to the monetary union, changes in the bilateral relative prices (real exchange rate and terms of trade) *vis à vis* other countries in the union are due to inflation differentials. Inflation differentials determine the region-specific real interest rates, given the common nominal interest rate set by the central bank of the union. In order to illustrate the adjustments inside the monetary union in face of common shocks, we consider three shocks common to both euro area regions: a monetary policy shock and a productivity shock in the euro area and an international productivity shock.

Monetary policy shock in the euro area We consider a one-period shock to the Taylor rule that drives the interest rate down by the same amount as that estimated in the VAR in Subsection 1.2.2 (around 40 basis points in annualised terms). Note that the fall in the interest rate is the result of two things: the shock to the monetary policy rule and the systematic part of monetary policy.

Overall, the shock has, as expected and similarly to the results in section 1.2, an expansionary effect on GDP, driven by consumption and investment. In a context of higher GDP growth and higher inflation in the euro area, the interest rate starts increasing after the initial drop induced by the shock. The real exchange rate depreciates and the terms of trade increase (deteriorate),²⁵ that shift world demand

ing parameter equals 0.90 while the coefficient on inflation equals 0.2 (i.e., $(1 - 0.9) \times 2$) and the coefficient on output growth equals 0.1.

²⁴In this, as well as the following simulations with EAGLE, the shock is unanticipated on impact.

²⁵The bilateral terms of trade are defined as the domestic price of imports relative to the price of exports, both in terms of domestic currency.

towards euro area goods. As a consequence, euro area exports increase. Euro area imports also rise, due to higher domestic demand, which has a positive effect in the US and the rest of the world.

Focusing now on the adjustment to the monetary policy shock of the two economies inside the union, there are some differences in the responses to the shock due to the structural characteristics that differ between the two economies (Figure 1.10). In particular, we observe a somewhat stronger increase of GDP in the larger economy, given a stronger response of investment and exports and a lower response of imports, while the response of inflation is similar across regions. Regarding the bilateral intra euro area terms of trade, the larger economy's exports become cheaper relative those of the smaller economy. On the other hand, the bilateral real exchange rate of the larger economy, which also corresponds to an inflation differential in this case, depreciates. Even so, intra euro area exports increase more for the smaller economy which benefits from the increased demand by the other economy.

In the baseline calibration most of the main structural parameters are similar across the two economies, namely the price and wage stickiness parameters. In Figure 1.10 we show the GDP and inflation responses to the monetary policy shock when price or wage flexibility is increased in the larger euro area economy and also when real flexibility is increased in that economy. In the alternative scenarios, prices that firms set in the domestic market are allowed to be re-optimised twice per year, and wage contracts duration is reduced to 1.5 quarters. As for the higher real flexibility case, we decrease the parameter on habits and on investment, capacity utilisation and imports adjustment costs (to zero or close to zero).

If one increases price flexibility in an economy, then the adjustment to shocks will rest more on prices than on quantities. Therefore higher price flexibility in the larger economy implies that prices react more while the expansion of GDP is diminished, actually ending up being less pronounced than in the smaller country, contrary to the baseline case. In parallel, one now observes an inflation differential, that was basically non-existent in the benchmark case. In particular, in the first year and a half after the shock annual inflation rate is lower in the smaller economy. Given the spike in inflation in the larger economy, the monetary authority does not cut interest rates by as much as in the benchmark case. This implies a smaller decrease in the real interest rate in the smaller economy which, together with

lower demand by the larger euro area economy, dampens the GDP expansion in the smaller economy as compared to the benchmark case.

When wages are more flexible in the larger economy, the behaviour of inflation is still similar to the benchmark case, which is easily understood if one remembers that price rigidity is kept high, while in the short run the larger economy output increases less than before.

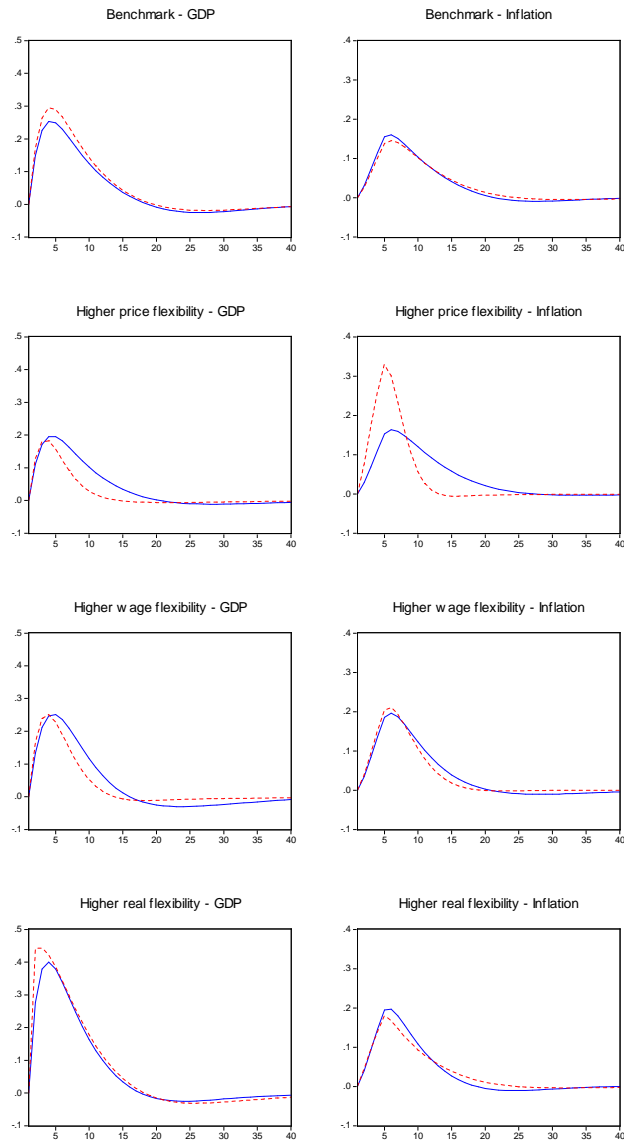
Note however that when both wages and prices are more flexible it is not straightforward to say how the adjustment will be carried out, as in this case it is not clear what happens to the real wage. In the case of both higher price and wage flexibility (as described above) the GDP expansion in the larger economy is much more muted than in the other economy, while there is a very pronounced increase in inflation in the first quarters after the shock. Finally, when we increase real flexibility in the larger country of the euro area, we observe a higher GDP response by both economies. GDP in the more flexible country reacts somewhat more in the first quarters after the shock. In fact, in this case the decrease in habits and in adjustment costs in investment lead consumption and investment to jump in the period of the shock and we no longer obtain a hump shaped response by these variables. In addition, the expansion in the large euro area economy drives imports up which therefore benefits the smaller economy.

Technology shock in the euro area We now consider a transitory but persistent technology shock in the euro area. We simulate a shock that drives GDP in the euro area as a whole up by a maximum of 1 per cent. GDP and inflation responses are presented in Figure 1.11. We observe a hump-shaped increase in GDP, consumption and investment. Since inputs are more productive, firms decrease their demand for labour, and hours worked fall following the shock.²⁶

Capital services also decrease, given the lower utilisation of capital. The increased supply of euro area goods implies that a real exchange rate depreciation is needed so that world demand towards euro area goods increase. Exports increase while, after an initial fall, imports also rise in tandem with increased domestic demand. Due to the technology shock marginal costs fall significantly in the im-

²⁶As mentioned in Subsection 1.2.3 this result is in part explained by the relatively high level of price rigidity assumed in the baseline calibration.

Figure 1.10: EAGLE: Monetary policy shock in the euro area



Notes: Solid line: small economy; dashed line: large economy. GDP response is in per cent deviations from the steady state while inflation is in percentage point deviations from the steady state.

pact period, inducing a fall of inflation that lasts over one year as a result of the assumed high price rigidity. The central bank cuts interest rates given the fall in inflation, accomodating therefore the expansionary effect of the shock on GDP.

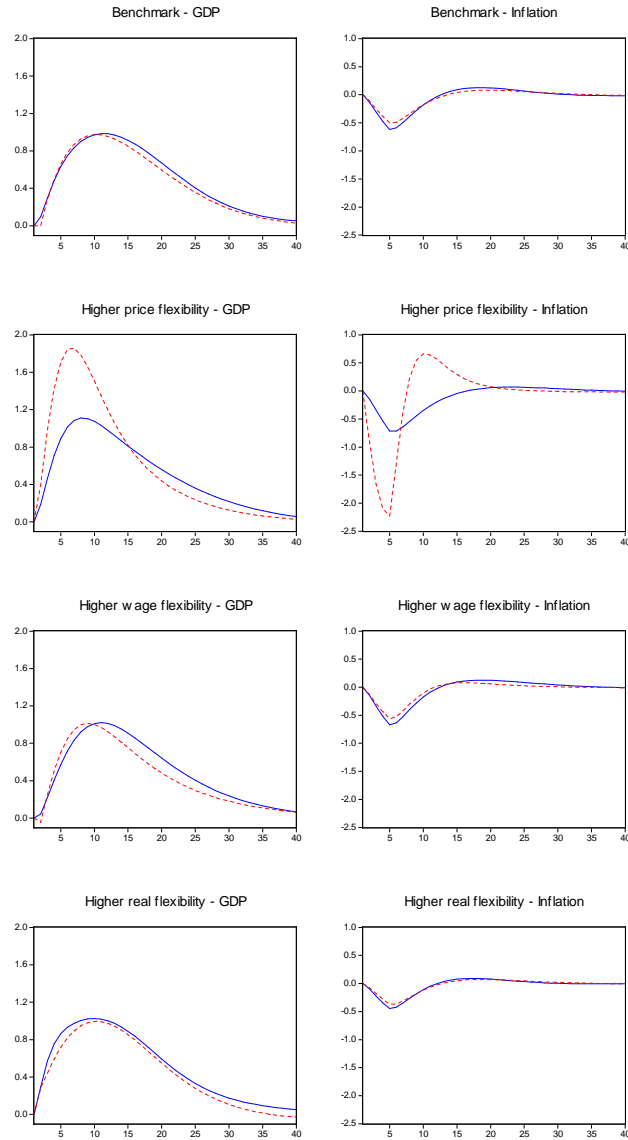
The technology shock is common to both economies in the euro area, in terms of its size and also of its timing. Even though the responses of the two euro area economies are slightly different as a result of different economic characteristics, these differences are not very significative. One should mention that the benchmark case is the one where we keep the two economies more alike, namely in terms of their nominal and real rigidities. When we increase price flexibility in the larger economy, we observe sizeable output and inflation differentials. In this case, GDP increases more and inflation drops more in the more flexible country as compared to the benchmark case, while the responses of the other economy are basically unchanged. The impact on differentials of either increased wage flexibility and increased real flexibility are not so important in term of GDP and inflation. However, there are noticeable differences in other variables. In particular, in the case of increased real flexibility we observe a more muted response of consumption than in the benchmark case but a higher increase of investment in the larger euro area economy.

International productivity shock Figure 1.12 presents the GDP and inflation responses to an international shock, namely a transitory but persistent technology improvement in the US and in the rest of the world. The shock is calibrated so that it leads to a maximum increase of GDP outside the euro area of 1 per cent.

This shock has a broadly expansionary effect in the US and the rest of the world while at the same time there is a drop in inflation in these economies. There is an appreciation of the euro. Euro area imports increase significantly, while exports show an initial drop. However, the world shock ends up having a positive impact on the euro area, explained by the increased imports by the US and the rest of the world.

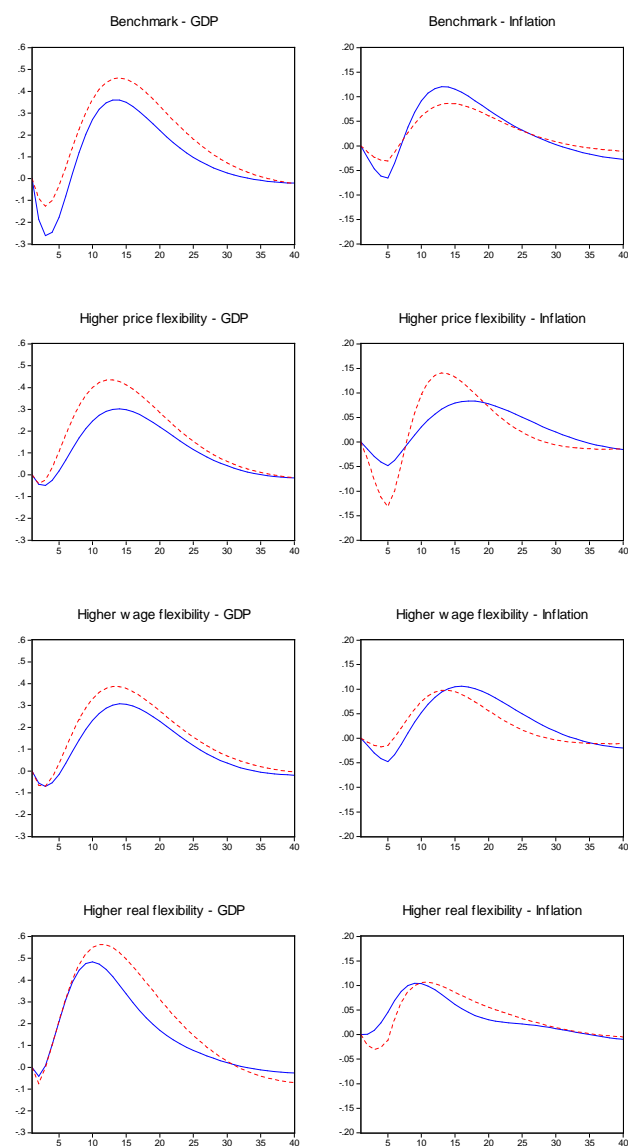
The fact that the two euro area economies are not symmetric, specially in what regards their trade matrix, results in different spillovers to these economies. In fact, there is an increase of GDP in both euro area economies. Since the share of exports to the US and the rest of the world is higher in the case of the large economy, the spillovers

Figure 1.11: EAGLE: Euro area technology shock



Notes: Solid line: small economy; dashed line: large economy. GDP response is in per cent deviations from the steady state while inflation is in percentage point deviations from the steady state.

Figure 1.12: EAGLE: International technology shock



Notes: Solid line: small economy; dashed line: large economy. GDP response is in per cent deviations from the steady state while inflation is in percentage point deviations from the steady state.

are bigger in this case. Regarding inflation, the fall in import prices more than offsets a rise in prices of domestic production, leading to a very small decrease in consumer price inflation in the two euro area economies. The differences in GDP and inflation behaviour are larger when we increase price flexibility in the larger economy but change much less when there is only increased wage flexibility. One can also stress that the sign of the inflation differential is actually inverted relative to the benchmark both in the case of high price flexibility and high real flexibility.

Country specific shocks

Cyclical divergences may also arise among economies because they are hit by different shocks, even if there are not structural differences between them. In this section we simulate in the EAGLE model two country specific shocks: a technology shock and a government spending shock. In both cases we assume the shock only hits the large country in the euro area. We simulate these shocks in the benchmark version of the model, i.e. the version where the countries are more alike, namely with respect to price and wage rigidity which is assumed to be high.

Technology shock in the large euro area economy We now consider a temporary but persistent technology shock in the large euro area economy, that drives euro area GDP up by a maximum of 1 per cent.²⁷

Following the technology improvement in the euro area larger economy, GDP, consumption and, particularly, investment increase while labour declines²⁸ as well as capital services, given a drop in the utilisation rate of capital. The increase in the supply of domestic goods is accompanied by a real depreciation which switches demand towards national goods and therefore exports increase and imports decline slightly. Marginal costs drop pushing inflation down in the large euro area economy while lower imported inflation drives down consumer price inflation in the smaller economy. Therefore, inflation in the euro area drops leading to the interest rate cuts.

²⁷Similarly to Subsection 2.3.2, the shock is modeled as an AR(1) process with parameter equal to 0.9.

²⁸A similar result was obtained in subsection 1.2.3.

As shown in Figure 1.13, the expansion of the larger euro area economy has only a mild and, after some quarters, positive effect on the other economy's GDP, where there is an increase in investment that is however offset by the rise in imports. In fact, the goods produced in the larger economy become relatively cheaper, the terms of trade of the smaller country improve, and imports of the smaller economy increase. The spillovers to the US and the rest of the world are qualitatively similar to those of the smaller euro area economy, though quantitatively lower since the weight of the larger economy as a trade partner is considerably higher for the smaller euro area economy than for the US or the rest of the world.²⁹

Note that compared to the international productivity shock, the maximum response of GDP in the smaller euro area economy is somewhat milder. In this comparison one has to keep in mind that in the case of the international productivity shock the technological improvement benefits around 80 per cent of the world while the larger euro area economy weights less than 20 per cent of world GDP. In addition, as mentioned above, since the goods produced in the large euro area economy are now relatively cheaper, there is a sizeable increase in imports in the smaller euro area economy which dampens the expansion in this economy.

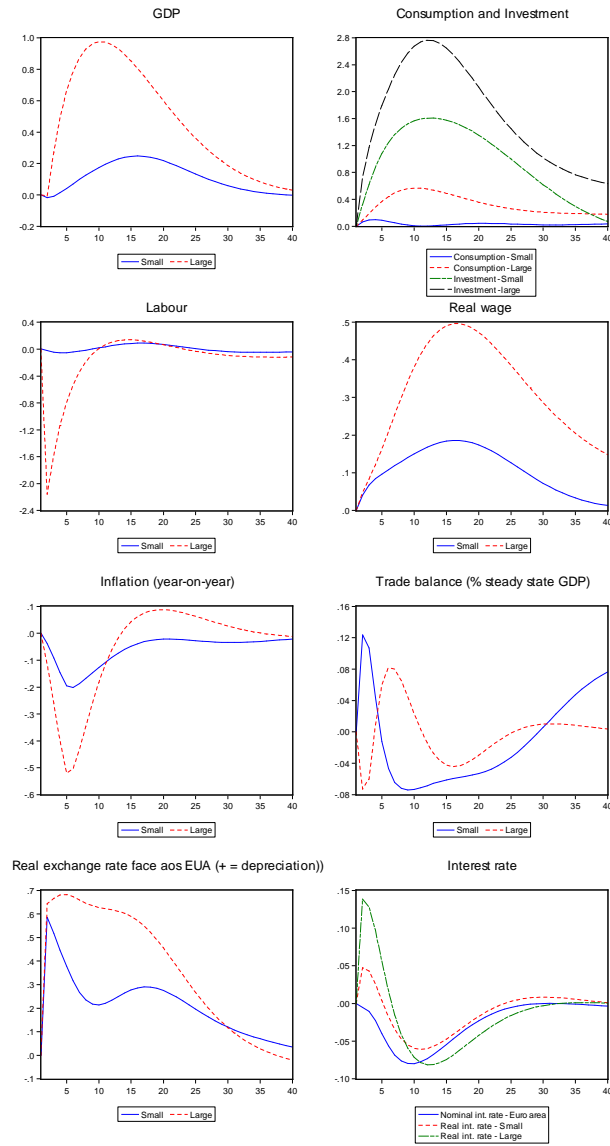
In the baseline parameterisation, the adjustment just described leads to a considerable differential in the GDP path between the two euro area economies but, given high price rigidities, inflation moves little in both economies and there is only a small inflation differential. If we were to increase price flexibility in the larger economy, the drop in prices after a technology shock would be larger leading to a larger increase of demand for domestic goods and therefore the differential with respect to the output path would be amplified.

Government spending shock in the large euro area economy We now simulate an exogenous and persistent increase in government spending, amounting to 1 per cent of steady state output in the large euro area economy on impact. Government spending as a percentage of steady state GDP is modeled as an autoregressive process, taking around 5 and a half years for 90 per cent of the shock to die out (see Figure 1.14).³⁰ Figure 1.15 shows the responses of the main

²⁹The real exchange rate of the large euro area block depreciates by more against the US and the rest of the world than against the other euro area block.

³⁰The process is an AR(1) with parameter equal to 0.9.

Figure 1.13: EAGLE: Technology shock in the large euro area economy



Notes: Variables response is in per cent deviations from the steady state, except from inflation, trade balance and interest rate that are in percentage point deviations from the steady state.

macroeconomic variables to this shock.

The government spending increase in the large economy leads to a close to 1 per cent increase in GDP that gradually returns to its steady state value. Given higher demand of factor inputs, both labour and capital services increase³¹ while we observe an increase in the capital rental rate and also the real wage. Higher employment and higher real wages induce a positive income effect that only partially offsets the negative wealth effect associated with the increase in government spending (that induces households to work more and to consume less) and we observe a very small crowding out effect on consumption.³²

When the shock hits there is an increase of consumption by the liquidity constrained households which is more than offset by the decline in consumption of non-constrained households. One should stress that the constrained households are 25 per cent of total consumers. We would need a higher share of constrained households in the model in order to obtain an increase in consumption. For example, if we increase the share of liquidity constrained agents to 50 per cent we are able to generate an increase in consumption in the period the shock hits and consumption stays above its steady state value for more than one year. Another reason for the crowding out effect in consumption is the fact that the shock is very persistent generating therefore a large negative wealth effect.³³

Regarding the behaviour of the monetary authority, higher input costs lead to a small rise in inflation, which together with initially higher GDP growth explains the small increase in the interest rate. As in Liennemann and Schabert (2003), we also find that a positive consumption response could arise if monetary policy was sufficiently accommodative.

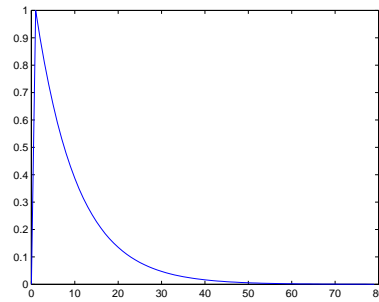
The increase in government spending in the large euro area economy increases demand for domestic goods relative to foreign goods (the public good is produced only with non-tradable goods) and

³¹Higher demand for capital is matched by a higher utilisation of capital while the capital stock decreases, given the decline in investment.

³²The fall in consumption obtained in the model is not consistent with most of the empirical evidence. Following Blanchard and Perotti (2002), several other authors have provided evidence suggesting that private consumption increases (or is unchanged) after fiscal expansions based on SVAR. Note however that this result hinges on the assumed behaviour of monetary policy (see Adão and Brito (2005)).

³³If we simulate a one-period 1 per cent increase in government spending the fall in consumption by non-constrained households is smaller and total consumption ends up increasing slightly in the two periods after the shock.

Figure 1.14: EAGLE: Government spending in the large euro area economy



Notes: In percentage point deviations from the steady state.

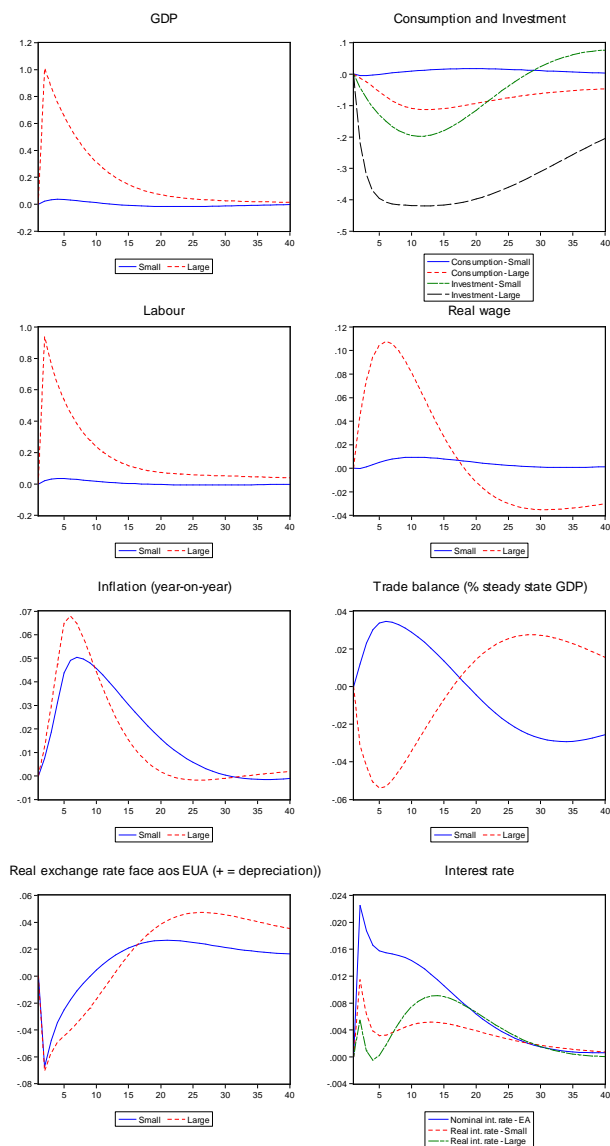
raises the international price of domestic output, i.e. the real exchange rate appreciates.³⁴

The terms of trade improve, implying a positive wealth effect. Following the shock, imports increase and there is a decline in exports. The spillovers to the smaller euro area economy are not very large, given the fact that government spending on goods is concentrated only in non-tradable domestic goods. Even so, the smaller economy experiences a small increase in GDP, given that higher import demand by the large economy. Therefore one observes a significant difference in the GDP path in the two economies but the behaviour of inflation is very similar.

In the benchmark case both economies show high price and wage rigidity which is kept the same across the two economies. If one increases either price or wage flexibility in the larger economy, the responses of GDP do not change significantly but there is a higher inflation differential because of the increased response in the now more flexible economy. The international spillovers of this shock in the euro area are relatively small.

³⁴This common result in models is however at odds with empirical work, that finds that the real exchange rate depreciates in response to a positive shock to government spending (see, for example, Kim and Roubini (2008), Monacelli and Perotti (2006), Ravn, Schmitt-Grohé and Uribe (2007)).

Figure 1.15: EAGLE: Government spending shock in the large euro area economy



Notes: Variables response is in per cent deviations from the steady state, except from inflation, trade balance and interest rate that are in percentage point deviations from the steady state.

1.3.3 Concluding remarks on the adjustments inside a monetary union

In a monetary union, asymmetries between regions may arise either because countries are structurally different or because countries are hit by asymmetric shocks. Based on a number of simulations in the EAGLE model we illustrate that inflation and output differentials arise as part of the adjustment process in a monetary union.

In EAGLE significant inflation and GDP path differentials may arise in face of common shocks. These differentials are explained by structural differences, namely in the country's trade matrix and in the degree of nominal and real flexibility. In particular, the sensitivity analysis conducted in the previous section shows that both GDP and inflation differentials depend on the nominal and real flexibility of each economy, and actually can change not only in magnitude but also in sign when we change these structural features.

In what regards idiosyncratic shocks, we present the results of both a technology and a government spending shock. In both cases, significant differentials arise in the path of both inflation and GDP. Spillovers of government spending shocks between euro area economies are not very large, which is akin to the fact that government spending on goods is concentrated only in non-tradable domestic goods. The spillovers following a country specific technology shock are more important.

Note however that the results are conditional on the model, the shocks that are analysed as well as the choice of parameter values.

1.4 The role of monetary policy in a monetary union

In the previous sections, we concluded that the euro area can be described by a model characterised by a significant degree of real and nominal frictions. Here we want to discuss the state of the literature on the role of monetary policy in monetary unions with those characteristics.

The benefits of a monetary union are mainly driven by the coordination gains of changing from a situation where monetary policy is decided at a national level to a centralisation of the monetary policy decisions. The benefits for the payment systems and of the elimination of the exchange rate risks should also be taken into ac-

count when evaluating those benefits. However, a monetary union is characterised, in addition to having a coordinated policy, by the existence of an “harmonised” monetary policy, in the sense that not only monetary policy deliberations are taken centrally but that they are identical for the whole area. By having just one money the single policy leads to identical interest rates across countries.

The costs of having a single monetary policy and one money were the main focus of the first works on the so-called Optimum Currency Area theory.³⁵ In this literature the costs of a monetary union were derived from the costs of exchange rate rigidity and of loss of autonomy of monetary policy. When the set of countries that belong to a monetary union are characterised by nominal rigidities and are subject to asymmetric (country specific) shocks there would be costs associated with the monetary union. These costs would be higher the lower is labour mobility across countries and the lower the risk sharing devices in the monetary union. This is the conventional wisdom, which was derived in the old macroeconomic keynesian tradition, which is now beginning to be tested in the new micro-founded general equilibrium monetary models.

In the new literature, the environment has been extended from monetary unions where countries are subject to idiosyncratic shocks, to countries that have different structures. This means that the emphasis in the literature today is not only on asymmetric shocks but also on different responses to common shocks due to different transmission mechanisms. This is our understanding of heterogeneity. It should be noted that the two dynamic general equilibrium models presented in the previous sections, namely the one in Subsection 1.3.2, also belong to this new strand of the literature.

1.4.1 Monetary policy in the closed economy

The study of policy in stochastic environments focuses on decomposing the effects on the long run, or trend of the economy, and the effects on the short run, or business cycles components.

This contrasts with the initial discussion on optimal monetary policy on the optimal inflation rate (or interest rate) in deterministic models. That is, the main focus was on the optimal trend in a monetary economy. The costs of inflation were discussed during the 80’s and the 90’s mainly as anticipated costs in environments with-

³⁵See Mundell (1983), McKinnon (1963) or Kenen (1969).

out other frictions than the monetary one. In addition, those models included exogenous government expenditures which should be financed with distortionary taxation. That literature highlighted the importance of the role of money in the economy with the results depending on whether money was considered simply as a unit of account or also as a transaction device, as well as the existence of commitment technologies that guarantee the credibility of the announcements of policy makers.

The generalisation of rational expectations in dynamic macro-economic models in the 70's and 80's led to some scepticism about the role of monetary policy. Monetary policy shocks would either have no role or a destabilising one on the economy. In addition, the work of Kydland and Prescott showed the cost of using discretionary policies instead of stable rules. The importance of monetary policy as a stabilising device was recovered in the new literature on optimal policies, (Lucas Jr. and Stokey (1983)), where policy is described as rules that react to fundamental shocks in the economy. This new literature introduced two main differences that are relevant for the discussion of the conduct of monetary policy. First, the objective of monetary policy is welfare, as measured by households' utility. Second, there is an intensive use of intermediate targets of policy.

Let us focus on a closed economy. In an *ideal economy*, with no frictions or distortions, and subject to fundamental shocks these shocks create cycles in the economy, and the path described by every aggregate variable characterises the first best. This means that there exists an optimal *reference cycle* for every economic aggregate. When the economy is subject to the same shocks but is characterised by some frictions, namely nominal rigidities, and any other distortions, like the financing of exogenous government expenditures and/or imperfect competition in markets, the outcome is usually a cycle which is quite different from the reference, or first best one. The role of policy would be to close the difference between this cycle and the reference cycle. In the new literature this distance is called the gap. For example, the *output gap* represents the distance between the actual output cycle and the reference cycle of this aggregate. When it is feasible to close every gap, optimal policy can induce the economy to follow the reference cycle, and the policy achieves the first best. But what is well known is that given policy instruments, not so much the number but the type, the first best is usually not feasible

when there are frictions or distortions. Then policy should aim at the best feasible outcome in terms of welfare, the so-called *second best*. It is in this sense that *stabilisation policy* has now a clear welfare criteria and should be denominated optimal cyclical policy. An important result is that the optimal cycle which results from the implementation of optimal policy can be more or less smooth than the cycle that would result without policy intervention. Thus the optimal "stabilisation" policy can be stabilising or destabilising in the sense that it may increase or decrease volatility. An easy way to understand this result is that policy interventions affect the volatility of economic aggregates, but also affect their mean, in comparison with the path of the economy without those policy interventions. Using the impulse responses in Subsection 1.3.2 (Figure 1.13) we can easily understand that optimal policy should amplify fluctuations. For example, when the economy has less frictions the output response to a technological shock is much stronger than the response to the same shock in an economy with a higher degree of nominal frictions. To be able to eliminate the costs of those frictions monetary policy should then be expansionist (contractionist) in response to a positive (negative) technological shock (see figure 1.10).

In this literature the optimal rules can be stated in terms of direct or indirect targets, like inflation or inflation expectations, or in terms of the monetary instruments. In most of the literature, namely in the quantitative one that tries to replicate the effects of a monetary policy shock as identified in the data (see Subsection 1.2.2), the interest rate is usually the monetary instrument.

It is important to understand that, even if the calibration or estimation of those models is undertaken so that a discretionary monetary shock replicates the data, this literature does not propose the use of those monetary shocks by policy makers, but a rule such that the official interest rate reacts in a systematic way to endogenous variables. In addition to what we said before about the desirability of a systematic policy behavior in reaction to the state of the economy, namely to endogenous variables like inflation or some measure of output, this systematic policy also has the very important role of leading to a unique local equilibrium. For small variability of shocks the solution usually computed is a good approximation. When the rule implies this property in the equilibrium, it is usually said that policy is able to "anchor expectations".

The answer to the question of how monetary policy should be

conducted in models with nominal rigidities, namely price stickiness, does not necessarily require complex models that try to replicate data, where different types of rules are compared in terms of welfare. There are also more restricted models that, even if not replicating some properties of data, maintain the main transmission of fundamental and monetary shocks and which, given the lower level of complexity, can aim at giving a better understanding of the best outcome, the so called second-best result, or maximum welfare, given the imposed frictions and the available instruments. The main friction due to price rigidity is developed in monetary models where money is an unit of account (Woodford (2003)). The potential of monetary policy, usually through an interest rate rule, is exactly to disentangle quantities (the real interest rate) and aggregate prices (the inflation rate) subject to the restriction of being consistent with the pricing of firms.³⁶

Models that use just the characteristic of money being an unit of account are called cashless models. But money is also a means of payment. Given this role of facilitating transactions, economic agents are willing to pay a cost to hold money. This cost is the interest rate. Models that take into account the distortion that a positive interest rate creates between cash goods (which require holding money for transactions) and credit goods (which include leisure), are models where monetary policy has a role even if prices were flexible. The conduct of monetary policy in this class of models is more complex since the policy rule should take into account the distortionary effect that the interest rate changes have on welfare.³⁷

In cashless economies the optimal monetary policy with nominal rigidities is the one that eliminates relative price distortions due to staggered price setting: goods that otherwise would have the same price would have different prices after a fundamental shock if some firms are restricted from freely choosing prices every period. Then the optimal policy, when steady state inflation is zero, is the one that avoids those relative price differentials, by implying that firms that are not constrained in their price choices choose a price identical to the last period price level. For inflation rates different from zero relative price distortions would be avoided if firms chose to in-

³⁶Notice that when prices are flexible, price setting by firms determine relative prices. In the simplest environment this relative price is the real wage, or the real wage as a function of quantities.

³⁷Examples of works in this area are Clarida, Gali and Gertler (1999), Rotemberg and Woodford (1997), Ireland (1996), and Adão, Correia and Teles (2003)

dex last period price to that steady state inflation. This implies that optimal policy maintains the steady state inflation rate over time. The particular path taken by the optimal interest rate in reaction to shocks depends on the specific distribution of these shocks and on the specificities of the model, like the functional form of preferences, technologies and real rigidities. The interest rate rule that is able to implement that equilibrium is not unique and is also model specific. If the environment is more complex, in the sense of explicitly taking into account money frictions due to the costs of holding money, a trade off is created: on the one hand, the desirability of maintaining prices constant, across time and contingencies, would imply that the nominal interest rate follows the path of the real interest rate and thus should react to different shocks in the economy; on the other hand, there is the benefit of reducing the nominal interest rate to a value near zero, so that the costs of holding money are minimized. General equilibrium models in the Ramsey tradition allow for the evaluation of these opposite forces, and the result is an extension of the well known Diamond and Mirrlees (1971) result, which states that even in a second best environment there should be no distortion in intermediate goods when there is the possibility to tax “final goods”.³⁸ When this tax is not available relative prices should be different from the ones that would occur with no nominal frictions. In the one-good model typically used in closed economy settings, this corresponds to the price level not being constant. Furthermore, the distortion across cash and credit goods is also not eliminated since the nominal interest rate is different from zero. Since the zero inflation result can be interpreted as an extension of Diamond and Mirrlees (1971), the last explanation can be extended to other type of environments. When there are cost-push shocks (shocks that alter the choice of the minimum cost by firms, like wage stickiness), or exogenous volatility of markups, or when in spite of having public expenditures and a tax on final goods (like a consumption tax or a labour income tax) government debt is not state contingent, the result of Diamond and Mirrlees cannot be applied and again relative prices should be different from the ones that would occur without nominal frictions. This theoretical result is quite robust. However, when computed numerically, the conclusion is that, even if the second best *à la* Diamond and Mirrlees is theoretically not the optimum, the deviation of relative prices from unity, and of inflation from zero,

³⁸“Goods” in a broad sense that include leisure.

is very small (see e.g. Schmitt-Grohé and Uribe (2004)). This implies that a good approximation for the optimal conduct of monetary policy is the so called "price stability".

Since in the typical monetary model the first best allocation is not feasible, the path of the real interest rate, which implies a certain path for the optimal interest rate given the path of prices, cannot be the first best. In general the optimal reaction to a positive productivity shock is to implement an expansionary monetary policy and vice versa for negative shocks. Remember that the objective of policy is to approach the realized cycle of the economy to the so-called "reference cycle". When the economy is subject to a positive technology monetary policy should expand the economy to allow for the more efficient outcome: in summary it should be procyclical. One reason why this result can be seen as counterintuitive is the fact that monetary policy in recent decades is well explained by a type of Taylor rule, where the interest rate reacts positively to inflation (relative to the inflation target chosen by the monetary authority) and to the output gap. The question here is what measure of output gap is used in the rule. If we think that in the Taylor rule the output gap is measured as deviations of output from an empirical trend computed with a standard filter, monetary policy would be counter-cyclical. However in the literature the output gap is measured as a deviation from the reference cycle. In this case, policy is procyclical since this output gap has a negative correlation with deviations of the output from the empirical trend, see e.g. Galí (2002) as a first example of this result.

The large majority of works on closed economies considers a one sector model, or models with several sectors but with aggregate shocks. If shocks were firm (or sector) specific, monetary policy could not avoid the distortions created by nominal rigidities. In a second case nominal rigidities may differ across sectors subject to identical shocks. In this case monetary policy can be used and it is possible to target the price level of the more rigid sector, if the elasticity of substitution across those goods is higher than between those goods and the ones in the more flexible sector. These conjectures are not developed in the literature, with the exception of Aoki (2001), who studies inflation targeting in closed economies and proposes core inflation (the inflation of the more rigid set of firms) as a target.

1.4.2 Monetary policy in a monetary union

In the literature the issue of monetary policy in a monetary union is relatively recent. When monetary policy is centralised in a group of countries and there is a unique money for the area we have a monetary union. The literature on the conduct of policy in this environment can be divided into two branches. The more developed one is deeply rooted in the closed economy analysis of optimal monetary policy. As we described for the closed economy literature, this branch is characterised by a particular way of looking at the role of money and the way of defining policy. Most of these contributions have their origin in Woodford's seminal work, in the sense just described in the previous subsection, that relative price distortions caused by nominal rigidities are the main concern of policy, essentially because money is primarily, or uniquely, a unit of account. In these environments policy is usually defined as a target of endogenous variables, like inflation or inflation expectations. Using this framework, the change from a closed economy to a monetary union creates a new problem, mainly due to the more disaggregated production structure of the monetary union. The typical structure of a monetary union is that of a set of open economies, where each one is specialised in a different set of tradable goods. Shocks to the domestic production are supposed to be aggregate and, therefore, in this case national or sectorial shocks are not distinguished.³⁹

Then, even when countries (or sectors) have different degrees of rigidity, relative prices should be allowed to change to reflect different opportunity costs. These relative prices are usually terms of trade but we could also look at the real exchange rate if there was production of non-tradables. Rigidity of prices that is reflected on rigidity of relative prices creates a distortion in the allocation of resources. The role of monetary policy should then be to overcome price rigidities by affecting not just the aggregate price level but also sub-indexes of this price. When sectorial shocks coincide with national shocks, the loss of exchange rate flexibility imposes, in principle, a cost. The question is then the determination of the optimal policy given this constraint, that is a second or third best allocation. Usually optimal policy is characterised by the definition of which price index should be used as the policy target. The most repre-

³⁹When nontraded goods are introduced, shocks to these sectors can be identified with country specific shocks. This is also the case when government expenditures have national characteristics.

sentative normative paper on this approach, Benigno (2008), tries to analyse how should special features of the regional economies be taken into account in the central bank's conduct of monetary policy. In the referred work the question is exactly how to optimally conduct monetary policy in a currency area characterised by asymmetric transmission mechanisms (due to different degrees of price stickiness) and by sectorial or national idiosyncratic shocks. The main result is that the optimal targeting is an inflation rate with higher weight on the inflation rate of the region in which the degree of nominal rigidity is higher. To target the HICP is optimal just in the particular case of countries with identical degrees of rigidity. The main discomfort raised with this work is that the chosen environment is equivalent to the one in a closed economy with sectorial shocks and different degrees of rigidity across sectors. This means that the only reason why this is called a monetary union analysis is due to the higher level of disaggregation used in the model. As we said above, this disaggregation was not treated in the literature on optimal monetary policy in closed economies because the monetary instrument cannot deal with such a problem. To analyse the effects and to determine the optimal conduct of monetary policy in a monetary union by simply extending the closed economy framework allowing for the existence of several sectors and asymmetric shocks, can be a first approach to the questions but it should be clear that this modelling strategy is simplistic.

Another branch of the literature originates from the optimal exchange rate regime literature. When a set of open economies is taken into account and the optimal monetary policy is derived for every economy by a central planner, i.e. in a coordinated framework, the optimal exchange rate regime is also determined. If the optimum is characterised by a fixed exchange rate and by identical monetary policies then the literature points to the non-existence of costs of fixing exchange rates in the open economy. Monetary policy in most of this literature is not usually presented as a price targeting device, being alternatively defined as the choice of the money supply rule in every country. Further, most of this literature assumes that the quantity of money can directly affect aggregate demand (see Corsetti and Pesenti (2001), Duarte and Obstfeld (2008) and Devereux and Engel (2003)). The case of optimal monetary unions is equivalent here to the case where the optimal policy is characterised by fixed exchange rates and identical monetary supplies in every country. However

this equivalence is just a special case since in a monetary union the control of money supply is done at the level of the union as a whole and the distribution across countries is always endogenous.

We can conclude that these two approaches are, in different ways, extensions of existing literatures to the monetary union case. The first one extends a closed economy setting and the second extends a world of open and autonomous economies. Both are poor representations of the particularities of a monetary union. In terms of the literature let us refer to a third approach that tries to take into account the special characterisation of a monetary union. In this case the role of money is considered to be, in addition to a unit of account, a transaction device that has a direct effect on demand and also has a cost to agents that perform transactions. This cost is due to the existence of alternative assets with a higher return in the economy. As we said this monetary cost, given by the interest rate, introduces an additional distortion in the monetary economy, but it also implies an alternative channel through which monetary policy is transmitted.

It is well known that the analysis of a set of countries in a monetary union, even when goods and money markets are integrated, differs in relation to the analysis of a closed economy in three important points, that turn out to be relevant for the study of monetary policy. First, markets are more incomplete across countries than in a closed economy: labour in these models is supposed to be immobile at least at the normal business cycle frequency and, in the absence of state contingent assets, the existence of market risk sharing is much lower across agents in different countries than across agents inside a given country. Second, fiscal policy is nation specific, implying that government transfers across countries are almost inexistent. And third, both interest rate determination and the supply of liquidity by the central bank is done in the single union money market. How different can the results described in the literature above be when those issues are taken into account?

Another problem with this analysis, which is similar to the one found in the closed economy literature, is the question of implementation. How is the target reached? Which are the operational instruments that guarantee the optimum? And does heterogeneity affect these issues?

To understand the importance of introducing explicitly the main characteristics of a monetary union, namely labour immobility across countries and limited risk sharing, Adão and Correia (2007)

develop a model of a monetary union where countries are fundamentally identical: they share identical preferences, technologies and share of government in every economy. They differ just on dimension. Monetary policy is designed by a central bank for the whole union through an interest rate rule. Opening the economies to trade leads to complete specialisation in production in every country. Government consumption is identical across countries but differs from the composition of private consumption in the share of goods produced at every country. When labour is immobile and risk sharing is incomplete the transmission of a common policy monetary shock is very different from the one described in the literature. In particular this common shock has asymmetric effects in every country. The main channel through which the common shock affects differently the economies is through a change in terms of trade. This effect is completely neglected in models with complete markets inside the union. Additionally it is very clear in this model that this common monetary shock leads to an asymmetric distribution of the liquidity across countries, and also to persistent trade imbalances (see also Alves (2008)). This can be interpreted as money having more power in the monetary union than is usually assumed. The main message here is to stress the importance of the right assumptions of the environment when describing the transmission of shocks in a set of open economies.

Most studies either impose explicitly the existence of complete markets or they impose this assumption implicitly (as well as the irrelevance of labour immobility) through specific parametrisation. This assumption of completeness of markets is very important not only for the understanding of how shocks (policy or fundamentals) are transmitted, as we just described, but also, and perhaps more important, in the way we can think of optimal policy. Every normative work in the new tradition constructs optimal policies as efficient ones: those that maximise the expected utility of a representative household. This simplicity is completely lost when markets are incomplete and the representative household story cannot be applied. Not only is aggregate equilibrium dependent on distributional effects, but more importantly “the most efficient” is no longer a well defined concept. We can use a planner (or social) welfare function that weights countries by normative reasons. But then the results on optimal policies will be heavily dependent on these weights, see e.g. Soares (2008). The main question of whether heterogeneity should

be taken into account depends also on the way different countries are seen *ex-ante* by the policy maker. Note that the assumption of weighting identically (or by population, or GDP) is as determinant in terms of the aggregate equilibrium and the respective distribution as the one resulting from any other weights.

These theoretical difficulties can not be eliminated since the simplification of assumptions affects the results. Related to this issue is the result of the optimal currency area literature that the costs of a monetary union are lower the higher is labour mobility and the more complete are state contingent markets. This suggests that the use of the stabilisation of the area price level as a natural “instrument” to an efficient allocation of resources in the area has to be taken with caution. In fact, it is an extension of a particularly robust result of how to conduct monetary policy in closed economies, but as we have described the extrapolation to a monetary union is far from immediate or simple.

Another related question to the topic of this chapter is whether heterogeneity is endogenous to the monetary union. If it is, and the monetary union synchronises the cycles, there is no question to discuss. Some literature (see e.g. Frankel and Rose (1998)) has suggested that since observed business cycles are more similar after the union, countries are less heterogeneous. This position is in contrast with another in which more integration leads to a higher concentration of industries, and would result in every country with specialisation in a specific sector. If shocks are really sector specific this industry concentration would lead to a higher heterogeneity across countries. Therefore, even if heterogeneity were endogenous to the construction of the monetary union, it is not clear whether heterogeneity would be reduced. How does the new literature help on the issue in discussion? Let us take a quotation from Corsetti (2008) where he claims that “Looking at the recent literature on the topic, it is fair to say that the scope and importance of policy trade-offs raised by heterogeneity is far from clear”.

1.4.3 Monetary union and fiscal policy

An alternative way of exploring the trade-offs due to heterogeneity in the analysis of the optimal single monetary policy is to recognise that it is more realistic and efficient to explore the possibilities that can be created by using simultaneously fiscal policy as a national policy tool. Then focusing on stabilisation policy, meaning the op-

timal policy in environments subject to shocks, implies understanding the connection between a unique monetary policy with heterogeneous shocks and/or transmissions across countries, and country specific fiscal policy.

Most of the contributions in the literature take a very simple position in relation to fiscal policy. Usually a huge role is given to fiscal policy, in the sense that subsidies are allowed to eliminate distortions, different from the relative price distortions, with these subsidies being financed by *lump-sum* taxes. However most works do not study the interactions between monetary policy and tax instruments available in most fiscal codes. This interaction, that can change completely the results of optimal monetary policy in closed economies, is even more important in monetary unions, where the country specific characteristic of these fiscal instruments give them additional power. Galí and Perotti (2003) showed that data does not support the popular view among economists, policy makers and the media that the Maastricht Treaty and the Stability and Growth Pact have significantly impaired the ability of EU governments to conduct a stabilising fiscal policy and to provide an adequate level of public infrastructure. In fact, they find that discretionary fiscal policy in EMU countries has become more countercyclical over time, following what appears to be a trend that affects other industrialised countries as well.

Galí and Monacelli (1998) is one example of how the interaction between fiscal and monetary policy in a monetary union is analysed in the literature. Using a specific environment (specific preferences, complete risk sharing, monetary policy targeting the “natural” real rate of interest, money as a unit of account), this article is just a first step to understand the connection between a common monetary policy and country specific fiscal policies. The way fiscal policy is treated is a very particular one: the fiscal instrument is the share of government consumption in total output. These expenditures are financed with lump-sum taxation and are chosen to maximise either the total welfare of the union (coordinated equilibrium for every policy) or as a Nash game across policy makers of different countries. The main role of fiscal policy as a stabilisation device is to affect demand when otherwise identical countries are subject to idiosyncratic shocks.

In Adão et al. (2009) a benchmark is developed against which particular cases could be compared. This article revisits the issues

in the optimal currency area literature, as in Mundell (1983) and the more recent literature, on the optimal choice of an exchange rate regime. This literature focuses on the following question: what are the costs of a fixed exchange rate regime when there is a role for stabilisation policy?

The literature usually suggests that when different shocks hit different countries or when there are different transmission mechanisms of shocks across countries, autonomous monetary policy - which has a stabilisation role due to the existence of nominal rigidities in the economy - would have to react differently in different countries. Because of this heterogeneity, it is common to infer that there are costs of harmonising monetary policies, either through a fixed exchange rate regime or a monetary union, since each country loses the autonomy over monetary policy. Building on Mundell (1983) the literature concludes that these costs are higher the stronger are the asymmetries, the more severe are the nominal rigidities, the more pronounced is the incompleteness of international asset markets, the less mobile is labour, and, finally, the less able is fiscal policy in effectively stabilising the national economies (Corsetti (2005)).

In Adão et al. (2009) it is shown that when both fiscal and monetary policies are considered jointly, and assumed to have the same flexibility in response to shocks, the loss of the country specific monetary tool is of no cost. This is true irrespective of the asymmetry in shocks and the transmission mechanisms, in particular the severity of the nominal rigidities. The elements that are crucial in assessing the costs of a single monetary policy are therefore the existence of fiscal policy that is able to influence country specific conditions. The degree of labour mobility and completeness of asset markets work in the opposite way to the conventional wisdom. In fact labour mobility and markets of contingent assets across countries would imply additional (non-traditional) fiscal instruments to guarantee that there are no costs of monetary unification.

As said before, Adão et al. (2009) answer the question of whether the transition from a monetary regime where the monetary authority has full autonomy to a different regime, namely a monetary union or a specific exchange rate regime, reduces the choices of a decision maker (or of a set of decision makers). This is a particularly interesting question when national monetary policies have a potential stabilisation role due to the presence of nominal rigidities. It is

concluded that, even if monetary policy is common to both economies and the producer price level does not react to states, or change with time, the same set of equilibrium allocations can be achieved in equilibrium. If this is the case, in an economy with fixed exchange rates and any type of price rigidity these restrictions will not be active, and the same set of allocations that was derived in the flexible prices and flexible exchange rates economy could be achieved in a monetary union.

1.5 Conclusions

This chapter focused on the dynamics of the euro area, on the mechanisms of adjustment in a heterogeneous monetary union, and on issues related to the optimal conduct of policy. In this conclusion we highlight several ideas emerging from the analysis.

1. **There is a stylized euro area business cycle, which has not changed significantly with the introduction of the euro.** This conclusion emerges from an analysis of the persistence and relative volatility of the cyclical components of the main macroeconomic aggregates in the euro area, as well as of their cross-correlations with the cyclical component of GDP. In particular, consumption, investment and hours worked are highly procyclical, with investment being the more volatile aggregate. Wages are slightly procyclical and vary much less than output. Inflation and interest rates are pro-cyclical. All real and nominal variables display high degrees of persistence – this implies that the business cycle in the euro area is to a certain extent predictable. Further, the intertemporal robustness of the above characteristics, even with the introduction of the euro, suggests the existence of a relatively stable configuration of preferences, structures and policies underlying the mechanics of the euro area economy.
2. **There are sizeable real and nominal rigidities in the euro area.** This conclusion, which is supported by micro evidence collected in the context of the Eurosystem Networks on Inflation Persistence and Wage Dynamics, can be ascertained with the combination of some empirical and theoretical results. In particular, according to the VAR evidence, there is a protracted and hump-shaped response of the main euro area

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macroeconomic variables after monetary policy shocks. These responses display a remarkable stability over time. In order to roughly mimic this empirical pattern within a two-country DSGE model, several real and nominal frictions are important: habits in consumption, variable capacity utilization, adjustment costs in capital formation and sticky nominal prices and wages. These rigidities impact significantly on the dynamics of the euro area economy. For instance, the real effects of monetary policy shocks are positively related with the degree of nominal rigidities and negatively related with the degree of real rigidities. In turn, in the case of a technology shock, both real and nominal frictions contribute to deviate the response of the economy from the optimum, i.e. from the behaviour of a frictionless economy.

3. **Monetary policy can play a crucial role in determining the equilibrium of the euro area.** Using a two-country DSGE model as a laboratory for the mechanics of the euro area economy, we conclude that monetary policy significantly influences the shape of the equilibrium. This is not so much due to the impact of monetary policy shocks – i.e. to randomizations of the economy induced by the monetary authority – which account for only a small part of the fluctuations of inflation and GDP in the euro area. Actually, it is the systematic component of the monetary authority – its policy rule – which plays the crucial role in anchoring agents' expectations and in determining the agents' response to shocks. For illustrative purposes, simulations within the DSGE model show that a positive technology shock can be followed by a positive or negative output response depending on the monetary authority's interest rate rule. Further, theoretical results confirm that a systematic and credible monetary policy has the crucial role of determining a unique local equilibrium, thus avoiding a situation where any shock could lead to an unpredictable and potentially undesirable trajectory of the economy.
4. **Heterogeneity is an integral feature of the mechanics of adjustment in the euro area.** Examining solely the aggregate dynamics of euro area overlooks important general equilibrium adjustments inside the euro area and, in particular, across participating Member States. Since the introduction of the euro,

and contrary to some popular perceptions, GDP growth differentials across euro area countries have remained near their historical mean and inflation differentials have stood at historically low levels. Using a multi-country DSGE model we trace these differentials to the existence of country-specific shocks and to different national adjustments to common euro area shocks, namely due to heterogeneous economic structures or to idiosyncratic responses of national policies. For example, GDP and inflation differentials within the euro area can actually change in magnitude and even sign when the degree of real and nominal flexibility of each economy is varied. Further, even in the absence of real and nominal frictions, GDP and inflation differentials would still emerge in the case of differences in the set of cross-country shocks/structures/policies. This confirms that differentials are not necessarily an undesirable feature in a monetary union. Naturally monetary policy cannot and should not aim at reducing these differentials *per se*.

5. **The degree of openness plays an important role in understanding the equilibrium of the euro area.** Opening the economy introduces new channels of transmission of shocks and new mechanisms of adjustment within a monetary union. Some examples illustrate this assertion. First, in the case of monetary policy shocks in the euro area, the behaviour of the exchange rate acts as a real and nominal accelerator. Concretely, after a non-anticipated decrease in the euro area short-term interest rates, there is a real and nominal depreciation of the euro on impact, which tends to exacerbate the expansionary real effect of the shock and contribute to a sizeable rise in inflation. Second, within the euro area, each country's trade relations have a direct impact not only on the spillover effects from international shocks, but also on the transmission of shocks stemming from other euro area members. The speed and magnitude of changes in the terms of trade across euro area countries play an important role in determining these relative adjustments. Third, it is interesting to note that shocks affecting output and inflation in small open economies in a monetary union are not counterbalanced by responses of the monetary authority, thus contributing to amplify their cycle *vis-à-vis* the union.

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6. **Optimal monetary policy results for closed economies cannot simply be extrapolated to the case of a monetary union.** There is a broad consensus in the literature that the optimal conduct of monetary policy in closed economies, even in second best environments, should aim at achieving price stability or low rates of inflation. Interestingly, this optimal monetary policy can either exacerbate or dampen the observed fluctuations in the economy. For example, we know that after a positive technology shock, the existence of nominal rigidities dampens the expansionary impact of the shock; in this case, monetary policy should undo the effects of those nominal rigidities, i.e. it should be conducted pro-cyclically and aim to amplify the cycle, reaping the full benefits of the shock. Unfortunately, this robust result for closed economies cannot be directly extrapolated to the case of the euro area, for three main reasons. First, markets are more incomplete across countries than in a closed economy. The segmentation of labour markets in the euro area is a good example of this fact. Second, fiscal policy is determined on a national level, with government transfers between countries being almost non-existent. Finally, the determination of interest rates and the supply of liquidity by the central bank are undertaken at a euro area level. These three elements imply that a meaningful characterization of the euro area must move beyond the currently popular strand of the literature that models monetary unions simply as closed economies with several regions.
7. **Recent research suggests that the interplay between fiscal and monetary policies radically changes the results regarding the optimal conduct of monetary policy in a monetary union.** In case of segmented labour markets or incomplete asset markets in the monetary union, allowing national fiscal policies to quickly respond to shocks ensures that the monetary union can achieve the same set of allocations as under flexible prices and flexible exchange rates. In this case, the loss of the national monetary instrument is of no cost. Note that this stands in contrast with the conventional wisdom, which states that labour immobility and incompleteness of asset markets increase the costs of monetary unification. Actually, it is precisely this market incompleteness that allows a national instrument such as fiscal policy to influence country-specific

conditions and thus recover the optimal allocation. Nonetheless it should be underlined that this result raises complex implementation issues.

Ten years past the introduction of the euro, there are still many open questions – on both empirical and theoretical grounds - regarding the mechanics of adjustment of the euro area and the optimal conduct of fiscal and monetary policies. Two challenges may be illustrative in this respect. On the one hand, from an empirical point of view, the introduction of the euro is still a relatively recent event, and longer databases will be required to definitely understand the dynamics of the monetary union and to assess the possible structural breaks arising from this regime change. On the other hand, from a theoretical point of view, the ongoing economic and financial crisis raises substantial challenges to the design of the general equilibrium models used to rationalise the data, as well as to the policy prescriptions emanating from those models. These and other open questions are bound to spur further research on these topics in the future.

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Chapter 2

The Portuguese economy in the European context: structure, shocks and policy

Vanda Almeida, Gabriela Castro and Ricardo Mourinho Félix

2.1 Introduction

The evolution of the Portuguese economy over the last twenty years has been highly uneven. From the late 80's to the late 90's the country experienced a period of prosperity, with a booming economic activity that translated into an improvement in living standards towards the European Union (EU) average levels. From the early 2000s onwards, however, the situation changed, with the country entering a period of poor economic performance, which implied an interruption in the real convergence process.

The understanding of the main driving forces behind this disparate evolution and their impacts on the economy is fundamental to inform policymakers on reforms required to resume the real convergence process. The persistence of structural fragilities is a key issue, particularly in what concerns the low quality of production factors, which translates into low productivity levels, undermining the country's efficiency and international competitiveness. This is especially true with respect to the level of human capital (as proxied by formal education), which is low, when compared with the

most advanced economies, posing a strong limitation to innovation, in particular in a context of skill-based technical progress.

Furthermore, the evolution of the Portuguese economy in the last decades has been marked by major changes in its environment, with a particular focus on the process of economic and financial liberalisation and integration. More specifically, in the last decade, one must highlight the country's participation in the euro area and the consequent elimination of the exchange rate risk premium. In the same period, the intensification of the globalisation process also played a key role, with the integration in the world trade of new players with low unit labour costs, and in many cases higher human capital levels, and an exports pattern similar to the Portuguese one. Finally, the active role played by fiscal policy is also crucial to understand the Portuguese economy developments in the last decade.

The role played by these features in shaping the developments of the Portuguese economy in the recent past is discussed in this article. The analysis is performed by interpreting the main trends present in the data through the lens of a general equilibrium model. Firstly, supply side developments are investigated, with specific a focus on the slowdown in productivity recorded in Portugal since the early 2000's. Secondly, it is addressed the role of financial liberalisation and integration with the participation in the euro area acting as a catalyst. Thirdly, trade integration is examined, in particular the developments in exports, which brought to light a structural competitiveness problem faced by the Portuguese economy. Finally, the role played by fiscal policy issues is also crucial to understand the developments in the Portuguese economy over the last decade.

In addition, the model is used to explore the possible impact of reforms aimed at correcting some of the Portuguese structural fragilities, focusing on an improvement of the regulation in non-tradable goods and labour markets, towards an increase in competition and a higher flexibility. *Ceteris paribus* an increase in competition in these markets is likely to reduce intermediate goods prices and moderate wage developments, translating into lower final goods prices' and inducing international competitiveness gains. In turn, a reduction in the degree of rigidity will promote a faster adjustment of prices and wages to the prevailing economic conditions, resulting in a higher efficiency and improving resource reallocation.

The interaction between all the factors previously mentioned is intricate and their overall consequences are certainly not easy to dis-

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entangle, therefore a proper analysis requires the use of adequate formal models. Dynamic Stochastic General Equilibrium (DSGE) models are currently widely used to provide an integrated and coherent analysis of macroeconomic developments. This analysis is not achievable with partial equilibrium models, which do not capture all the complex interactions between economic agents' behaviour and economic variables. Thus, the analysis of the role of shocks and frictions is performed using *PESSOA*, a DSGE model for a small open economy participating in a monetary union, calibrated to match the main Portuguese data features, described in Almeida, Castro and Félix (2008).

It is important to note that, just like any economic model, *PESSOA* has its limitations, in particular concerning the absence of a financial sector and an explicit role for energy, which may have proved particularly relevant in the aftermath of a financial crisis and of large swings in oil prices. However, it must be noted that the embedment of realistic financial features and of energy as a production factor in DSGE models used by policy-making institutions is very recent and the specific modelling strategy is still a matter of fierce debate. Moreover, though the absence of these features might limit the scope of the shocks that can be addressed with the model, it is not likely to affect the main results and conclusions obtained for the shocks and frictions being addressed.

The remaining of the article is organised as follows: in Section 2.2 the empirical evidence on structural and business cycle features of the Portuguese economy is presented; in Section 2.3 the usefulness of formal analytical models in macroeconomic analysis, with a special focus on DSGE models, is discussed and *PESSOA* is synthesised; in Section 2.4 the macroeconomic impacts of the main shocks and frictions that have influenced the evolution of the Portuguese economy over the past ten years is assessed using *PESSOA*; in Section 2.5 *PESSOA* is used to explore the possibilities surrounding an increase in competition and flexibility of the Portuguese labour and non-tradable goods markets; finally, in Section 2.6 the main conclusions are wrapped up and some economic policy implications are derived.

2.2 Some empirical evidence

2.2.1 Structural features

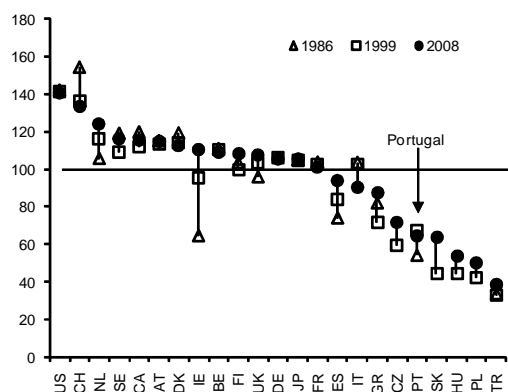
The Portuguese economy successfully accomplished the nominal convergence process required to become a member of the euro area since its inception, in 1999, which implied the fulfilment of a number of quantitative goals mostly related with a sound and credible macroeconomic policy. The real convergence process, in turn, which concerns the improvement of citizens' living standards, although also related to the soundness of macroeconomic policy, is mostly determined by the prosecution of adequate structural policies and reforms.

Living standards, measured by the gross national product (GNP) per head in purchasing power standard (PPS), recorded an important progress in the Portuguese economy in the period 1986-1999, increasing from around 55 to 70 per cent of the euro area average (Figure 2.1).¹ However, this process was interrupted in the early 2000's as Portugal entered a protracted period of low economic growth, with the above mentioned indicator declining to 65 per cent of the euro area average in 2008, reflecting, to some extent, the impact of shocks that hit the Portuguese economy in this period. In addition, it was also strongly determined by the persistence of a number of structural fragilities that became more evident in a context of increased international competition and skill-biased technological progress. Though these issues can hardly be tackled overnight, it is important to assess them, to understand what has prevented a more favourable performance of the Portuguese economy and which reforms are required to improve the situation.

A country's living standards is highly correlated with its income level, which tends to reflect the ability to produce goods and services that can either be consumed by domestic agents, ultimately households, or traded in international markets in exchange for other goods and services. The overall efficiency of a country in the production of goods and services is usually captured by productivity indicators that measure the amount of output obtained from each unit of input. In a multi-factor production context this might be less

¹Please note that this time series is subject to a statistical break due to methodological changes in the calculation of the PPS, which is likely to induce an upward shift from 2005 onwards. However, this is not likely to change the qualitatively results.

Figure 2.1: GNP per head in PPS
(as a % of the euro area average)



Source: AMECO.

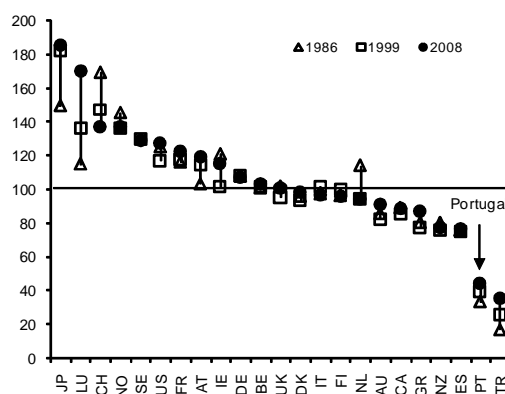
trivial, but under simplifying assumptions it can be properly measured by the output per worker. This measure tends to be highly correlated with the income level and, therefore, with living standards, since it approaches the same phenomenon in a supply side perspective. In this respect, the Portuguese economy is among the group of advanced economies with lower output per worker, suggesting that improvements in per capita income require a corresponding increase in productivity, which in turn implies an improvement in the quality of production factors and in the production technologies.²

The evolution of output per worker can be decomposed into contribute of capital deepening (the amount of available capital per worker) and of total factor productivity (TFP), by resorting to a standard Cobb-Douglas production technology.³ The evolution of the Portuguese net capital stock per worker and its relative position among European countries suggest that there is large room for further capital deepening, since the country has less than half of

²An important refinement in measuring labour productivity is to consider hours worked instead of heads. The utilisation of the number of heads may distort country comparisons in case average hours worked differ substantially across countries. Information on hours is, however, limited in terms of the country coverage. Nevertheless, the considerations made do not change when hours worked are used for the countries with available data.

³TFP is a more sophisticated measure of overall productivity, since it adjusts output per worker from the amount of available capital to each worker, the so-called capital deepening. For technical details see Almeida and Félix (2006).

Figure 2.2: Net capital stock per worker, at 2000 prices
(as a % of the euro area average)



Source: AMECO.

the capital per worker in comparison to the euro area average, despite the improvement recorded over the last 20 years (Figure 2.2). The weak capital deepening might well be one of the causes of the low overall productivity, which also reflects the economy's production structure and the manufacturing specialisation pattern, resulting from the relative factor endowments. In this respect, there are two main features that are worth mentioning. Firstly, the sector breakdown of gross value-added (GVA) reveals that the Portuguese economy's supply structure has evolved to something very similar to the euro area average, while the structure of employment still reveals some important differences (Table 2.1 and 2.2). Secondly, the inner structure of the manufacturing sector in Portugal is differs substantially from the one prevailing in the euro area, reflecting a higher specialisation of the Portuguese economy in low and medium-low technology products, notwithstanding the evolution towards products with higher technological content, recorded over the last 20 years (for a detailed analysis see Chapter 5 in this volume).

In terms of the sectoral breakdown of the GVA, the share of agriculture in Portugal in 1986 was higher than in the euro area, while the opposite occurred in the services sector. Over the last 20 years, agriculture lost more than two thirds of its share in GVA, while services' share increased substantially, standing at levels closer to the euro area (Table 2.1). The sectoral structure of employment evolved similarly, with the share of agriculture workers declining and the

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Table 2.1: The structure of output
(as a % of overall GVA)

	Portugal			Euro area		
	1986	1999	2007	1986	1999	2007
Agriculture	9.2	4.0	2.5	4.0	2.6	1.9
Industry	27.1	21.1	17.9	27.7	22.2	20.2
Construction	6.3	7.3	6.5	6.1	5.7	6.5
Services	57.4	67.6	73.1	62.1	69.5	71.4

Note: Industry includes electricity, gas and water.
Source: BP and AMECO.

Table 2.2: The structure of employment
(as a % of overall employment in heads)

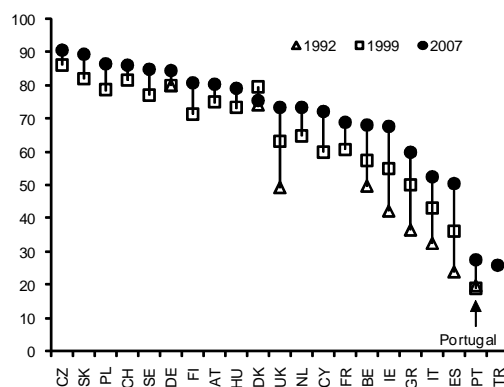
	Portugal			Euro area		
	1986	1999	2007	1986	1999	2007
Agriculture	16.1	10.8	9.3	9.0	5.1	4.1
Industry	27.6	22.5	19.0	25.4	19.7	17.0
Construction	9.5	10.9	10.6	7.0	7.4	7.7
Services	46.8	55.8	61.1	58.5	67.8	71.2

Note: Industry includes electricity, gas and water.
Source: BP and AMECO.

share of services workers increasing (Table 2.2). Moreover, in comparison with the euro area, the share of workers in low productivity sectors, like agriculture and construction, is still higher in Portugal.

The available evidence suggests that the evolution of qualifications has been very disappointing and there is still a large room for improvement, in order to bring the Portuguese labour force qualification to levels closer to the European standards. Portugal is among the countries where there is a lower incidence of workers with complete lower secondary education (which was the minimal compulsory education level in Portugal in the last decades) and where the evolution of this indicator over the last 15 years was more limited (Figure 2.3). In addition, the current scholarisation rate of the youngest population is below the European average and well below the figures for the EU new member states, which are important competitors in the medium-high technology manufacturing sectors (e.g. machinery and car manufacturing). This evidence is of major impor-

Figure 2.3: Population with upper secondary education or higher
(as a % of population 25-64 years old)

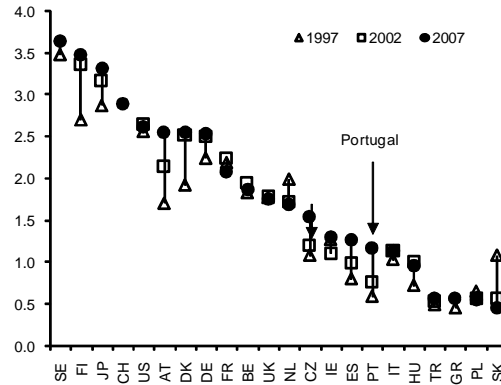


Source: Eurostat.

tance, as the scholarisation rate is a leading indicator of labour force qualification since, according to the same data, the role of on-the-job education and training in Portugal is very limited. One should note, however, that this is not a close substitute for formal education. Furthermore, besides the low progress in quantity of education, its quality is also poor, as illustrated by international comparisons such as the PISA indicators (for further details on the quality of education see Chapter 6 in this volume). The policy implication one may gather from these results is that it is crucial to implement reforms in the education system, not only to reduce the number of early school leavers and increase the participation rate in education, but also to improve its quality standards.

Another important dimension of the structural factors behind productivity developments is investment in research and development (R&D). Though the share of workers involved in research activities, as a percentage of overall employment, remains at a low level in Portugal in the European countries context, the situation has improved in the last decade. Moreover, in terms of the expenditure in R&D, Portugal also stands on the lowside, despite the significant improvement in the more recent period (Figure 2.4). It should be noted that public financing still accounts for more than half of the overall funding, despite the fact that this share has declined over the last decade, which may suggest a stronger R&D effort by the corporate sector.

Figure 2.4: Gross domestic expenditure in R&D
(as a % of GDP)



Source: Eurostat.

Finally, turning to the business environment, there is evidence pointing to the maintenance of some bottlenecks, despite the improvement recorded in the most recent years in a number of aspects, in particular, the simplification of administrative procedures and the considerable developments in *E-Government*. Nevertheless, the administrative burden and the complexity of licensing processes still have a large margin to improve in Portugal (see, for instance, OECD (2006) and OECD (2008)). In addition, according with the Product Market Regulation (PMR) indicators released by the OECD, there are low competition levels in some network industries, which may induce the persistence of sizeable price mark-ups. Moreover, in what regards labour market, the Employment Protection Legislation (EPL) indicators also reveal that there is margin for improvements, despite the progress made in the recent years. These factors might have non-negligible impacts not only in the attractiveness of the country for foreign direct investment (FDI), but also in the competitiveness of the tradable goods producers in an increasingly competitive international market. This issue is analysed more in depth in Section 2.5.

Summing up, although the Portuguese economy recorded a notable progress in its convergence to European standards after its adhesion to the European Economic Community (EEC), the real convergence process was halted, with real divergence occurring since the early 2000's. This can be mainly attributed to a number of struc-

tural fragilities that became more evident as competition in international markets increased and in a context of skill-biased technical progress. These fragilities reflect the persistence of low formal education levels, which translated over the years into a large pool of low skilled workers and led to a specialisation pattern concentrated in labour intensive manufacturing sectors. In addition, the expenditure devoted to R&D activities is limited, notwithstanding some visible improvement achieved over recent years. Finally, though there have been significant improvements in the business environment in recent years, some unfavourable factors still persist. Therefore, to resume the real convergence process, the implementation of deep reforms is crucial, particularly in what concerns the education system and the environment for doing business.

2.2.2 Business cycle features

In addition to the analysis of the above discussed structural features, a deeper understanding of the Portuguese economy's developments in the last twenty years can be obtained by exploring business cycle features. Considering the evolution of real GDP and its components in the periods 1986-1997 and 1998-2008, which roughly correspond to the last two business cycles in Portugal, it is clear that the country's economic performance was highly uneven (Table 2.3). In the period 1986-1997, the economy experienced a period of prosperity, with real GDP exhibiting an expressive annual growth rate, almost 2 percentage points (pp.) above the euro area, reflecting a buoyant domestic demand and a considerable expansion in trade volumes. However, in the period 1998-2008, the situation reversed. The pace of real GDP fell by more than 2 pp., to a growth rate below the one of the euro area average, domestic demand slowed down considerably and exports and imports experienced a severe slowdown, although still exhibiting a robust growth. One should point out that the deceleration in domestic demand, in annual average terms, combines a sizeable deceleration of private consumption with a pronounced slow down in GFCF, which is to some extent a reflection of the stagnation of the GFCF in transport equipment and in construction, after the buoyancy recorded in the second half of the 90's.

The cyclical behaviour of GDP and its components can be further characterised by making use of the traditional practice in the business cycle literature of removing the trend component of each variable, obtaining a series that exclusively captures the variable's

Table 2.3: GDP and demand components*(average annual growth rate, in %)*

	Portugal		Euro area	
	1986-1997	1998-2008	1986-1997	1998-2008
GDP	4.1	1.8	2.4	2.1
Private consumption	5.3	2.4	2.4	1.9
Government consumption	4.5	2.3	1.9	1.9
GFCF	6.5	1.0	2.9	3.1
<i>of which:</i>				
Machinery and equipment	8.8	5.0	NA	4.3
Transport equipment	11.8	1.0	NA	5.5
Construction	4.0	-0.9	NA	1.8
<i>of which:</i>				
Residential investment	1.1	-2.6	NA	1.9
Exports	7.6	4.4	5.9	5.7
Imports	12.2	4.6	6.1	5.8

Note: all variables are expressed in real terms.

Source: BP and AMECO.

short-run characteristics. One must recognise that the methods used to estimate potential output and the output-gap suffer from limitations, since they rely to some extent on statistical filters, even in the case of methods rooted in growth theory like the production function approach. To illustrate the uncertainty surrounding output-gap estimates, results obtained using alternative methodologies are presented (Figure 2.5).⁴

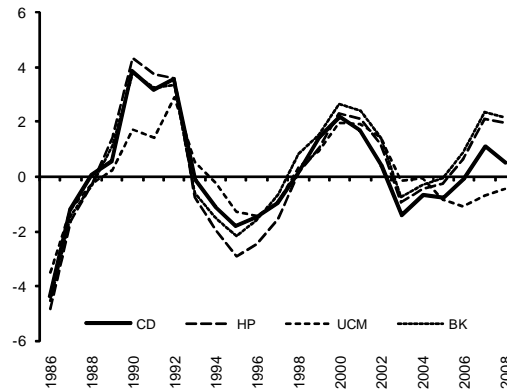
Results reveal the existence of two business cycles for Portugal in the period 1986-2008 and a decline in the amplitude from the sub-period 1986-1997 to 1998-2008 (Figure 2.5). Furthermore, they show a strong reduction in the volatility of the Portuguese business cycle, though it still remains above the euro area (Table 2.4).⁵ The higher business cycle volatility is a typical feature of small open economies, as they tend to reflect fluctuations in the international environment more intensively than larger economies where domestic developments are relatively more important. As for the persistence of business cycle fluctuations, measured by the autocorrelation coefficient, results point to a decline over time both in Portugal and in euro area.

An analysis of the expenditure components leads to some further interesting conclusions. The sharp volatility decrease of GDP is related with a fall in the volatility of all expenditure components,

⁴For a detailed discussion refer to Almeida and Félix (2006).

⁵Results presented in Tables 2.4 and 2.5 are exclusively based on the HP filtered version of the GDP cycle, but are robust to all the methods considered.

Figure 2.5: Output-gap in Portugal
(deviation from potential output level, in %)



Note: the methods considered are the Hodrick-Prescott filter (HP), the Baxter-King filter (BK), the Cobb-Douglas production function approach (CD) and the methodology used in Chapter 4 in this volume based on Kalman filtering of unobserved components (UCM).

Source: BP, AMECO and authors calculations.

exception made to exports. These features may reflect the fact that monetary integration and the elimination of the exchange rate risk premium led to higher international risk sharing, which contributed to smooth the domestic demand cycle, particularly in the case of private consumption. In what concerns exports, it should be noted that the bulk of the impact of the economic integration occurred in the period after the participation of Portugal in the EEC, 1986-1997, with no major changes in volatility occurring in the period 1998-2008. Additionally, one should note that GFCF, exports and imports are the aggregates revealing a higher volatility and that government consumption is the least volatile component of GDP. These features are broadly similar in the euro area (see also Chapter 1 in this volume).

Turning now to the analysis of persistence, GFCF, exports and imports exhibit the highest autocorrelation in the most recent period, standing slightly above the euro area figures. In turn, the least persistent component in Portugal is government consumption, a feature that contrasts with the evidence for the euro area where this is the most persistent component. The small persistence of Portu-

Table 2.4: Volatility and persistence: GDP and demand components

	Portugal		Euro area	
	1986-1997	1998-2008	1986-1997	1998-2008
GDP				
Volatility	2.9	1.1	1.4	0.9
Persistence	0.8	0.6	0.7	0.5
Private consumption				
Volatility	3.1	1.2	1.3	0.6
Persistence	0.7	0.5	0.7	0.4
Government consumption				
Volatility	2.9	1.0	0.7	0.5
Persistence	0.6	0.2	0.4	0.8
GFCF				
Volatility	7.8	4.3	4.2	2.5
Persistence	0.6	0.7	0.7	0.6
Exports				
Volatility	4.5	4.9	2.3	2.6
Persistence	0.5	0.7	0.4	0.4
Imports				
Volatility	5.8	5.0	3.7	2.9
Persistence	0.5	0.8	0.6	0.5

Note: all variables are expressed in real terms. Volatility is proxied by the standard deviation of the cycle, while the persistence indicator corresponds to the 1st order autocorrelation coefficient of the cyclical component.

Source: BP, AMECO and authors calculations.

guese government consumption in the more recent period is likely to reflect changes in the behaviour of government spending, mainly related with the adoption of fiscal consolidation measures.

Another interesting approach to the business cycle features of expenditure components is to consider the lagged, contemporaneous and lead correlations between their respective cycle and the GDP cycle (Table 2.5). The evidence points to a strong pro-cyclical behaviour of private consumption, GFCF and imports both for Portugal and the euro area in the most recent period. Furthermore, concerning private consumption, in the most recent period, the correlation with the lagged cyclical component of GDP is clearly below the correlation with the lead cyclical component, suggesting that consumption now peaks somewhat earlier than real GDP. This result contrasts with the behaviour in the previous period, when the private consumption cycle clearly lagged the GDP cycle.

The correlation between GDP and government consumption was quite strong in the first period, but decreased substantially since 1998. The cyclical features of this component in the recent period are, however, particularly difficult to assess since they are affected

Table 2.5: Correlation between x_t and GDP_{t+i}
(correlation coefficient)

	1986-1997					1998-2008				
	i=-2	i=-1	i=0	i=+1	i=+2	i=-2	i=-1	i=0	i=+1	i=+2
Portugal										
Private cons.	0.5	0.9	0.7	0.2	-0.3	-0.4	0.3	0.9	0.7	0.1
Government cons.	0.3	0.8	0.8	0.5	-0.1	-0.3	0.1	0.2	-0.1	0.1
GFCF	-0.3	0.3	0.8	0.7	0.6	-0.1	0.6	1.0	0.5	-0.2
Exports	-0.4	0.0	0.7	0.8	0.7	-0.6	-0.2	0.5	0.9	0.5
Imports	-0.5	0.1	0.8	0.8	0.7	-0.7	-0.1	0.7	0.9	0.4
Euro area										
Private cons.	-0.1	0.7	1.0	0.6	0.3	-0.4	0.5	1.0	0.6	-0.2
Government cons.	0.6	0.5	-0.1	-0.6	-0.6	1.0	0.5	-0.4	-0.8	-0.7
GFCF	-0.3	0.5	1.0	0.7	0.4	-0.5	0.2	0.9	0.8	0.0
Exports	-0.1	0.4	0.9	0.6	0.1	-0.5	0.3	1.0	0.7	0.0
Imports	-0.3	0.4	1.0	0.7	0.3	-0.6	0.1	0.9	0.8	0.1

Note: all variables are expressed in real terms.

Source: BP, AMECO and authors calculations.

by the impact of fiscal consolidation measures adopted by the Portuguese government.

Exports are also pro-cyclical, even though their contemporaneous correlation is lower than the one of private consumption and GFCF. In addition, the correlation with the leading cyclical component of GDP is clearly above the correlation with the contemporaneous and the lagged cyclical components of GDP, suggesting that exports tend to peak somewhat earlier than GDP. The pattern of comovement of Portuguese exports with output is similar across the two sub-periods considered. In the euro area, the exports cycle is strongly correlated with the GDP cycle contemporaneously. Since Portuguese exports are heavily concentrated in euro area countries,⁶ the strong correlation of exports with real GDP reflects a strong correlation of the Portuguese business cycle with the one of its main trading partners (for further insights on the dynamics of a small open economy in a monetary union, refer to Chapter 1 in this volume).

Regarding imports, a strong pro-cyclical behaviour has been found, as well as a high correlation with the leading cyclical component of GDP, which indicates that imports, as exports, peak somewhat earlier than GDP both in Portugal and in euro area. In the case of imports, the high correlation levels are something one should ex-

⁶Intra-euro area exports of Portugal account for around 70 per cent of overall Portuguese exports.

pect, since imports are driven by current and expected demand conditions, which are, to a large extent, reflected in real GDP.

Finally, it is important to briefly refer to the degree of cyclical synchronisation between Portugal and the euro area and its evolution over the period under analysis. The debate about developments in the cyclical synchronisation across euro area countries became particularly relevant in the recent past, as a high degree of cyclical synchronisation is commonly considered one of the requirements to reap full benefits from a single monetary policy (this assertion is discussed in Chapter 1 in this volume). The literature on this subject is vast and, although there is no broad consensus, empirical evidence seems to suggest that business cycles convergence has increased among the euro-area countries (see, for instance, Haan, Inklaar and Jong-A-Pin (2007), Montoya and Haan (2008) and Darvas and Szapáry (2008)). Based on alternative cyclical synchronisation measures, it is possible to conclude that the synchronisation between the Portuguese and the euro area business cycles increased substantially over the past two decades (Figure 2.6).⁷ This evolution can be chiefly attributable to the economic and monetary integration, which, among other effects, has led to an increase in the degree of openness of the Portuguese economy. Financial integration is also likely to have played a role, since it may have triggered spill over effects across the different financial markets, stabilising changes in demand conditions in each individual country. In fact, the integration of financial markets is likely to have allowed for a higher risk sharing, since it allows for the smoothing of temporary idiosyncratic shocks on income and wealth through trade in financial assets.

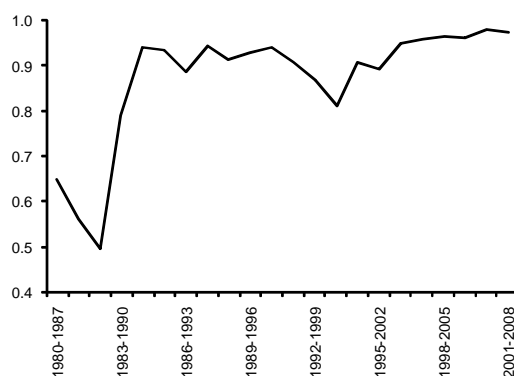
2.3 Using models in the analysis of shocks and frictions

2.3.1 The role of models in macroeconomic analysis

Macroeconomic analysis is nowadays inseparable from formal macroeconomic models. These are analytical tools used to describe in a rigorous way the main features characterising the joint behaviour of economic agents. They constitute a privileged laboratory for the

⁷For a detailed exposition of these results please refer to Box 3.1., “Cyclical synchronisation between Portugal and the euro area”, published in Banco de Portugal (2007).

Figure 2.6: Business cycle correlation: Portugal vs. euro area
(correlation coefficient, rolling windows)



Source: BP, AMECO and authors calculations.

study of economic issues, since they allow for an analysis of the fundamental driving forces of economic phenomena, which can then be used by policy-making institutions to produce well-grounded diagnosis that can help in the decision processes.

Notwithstanding the importance of the insights provided by macroeconomic models, they are necessarily simplified and incomplete representations of reality, since otherwise they would become analytically and computationally intractable. Therefore, results provided by models must always be taken cautiously, in light of their simplifying assumptions whose validity and implications are in many cases difficult to assess. Despite these limitations, and following the words commonly attributed to the statistician George P. E. Box, “All models are wrong, but some models are useful”, macroeconomic models have undoubtedly become a crucial tool for modern macroeconomic analysis. A myriad of models has emerged over the years to study a number of issues both in academia and in policy-making institutions and a vast literature has been devoted to the development of richer and more realistic frameworks, inducing significant changes in macroeconomic modelling over the last thirty years.

During the 60s and the 70s, large-scale macroeconometric models, composed by several equations linking variables of interest to explanatory factors, were the main tool available for applied macroeconomic analysis. While the choice of which variables to include in each equation was guided by economic theory, the coefficients as-

signed to each variable were mostly determined on purely empirical grounds, based on historical data.

In the late 70s these models came under sharp criticism. On the empirical side, they were confronted with the emergence of stagflation, which was incompatible with the traditional Phillips curve equation. Furthermore, the usual practice of making some variables exogenous was questioned in Sims (1980), since it excludes meaningful feedback mechanisms between variables included in the models. But the main critique was on the theoretical side, raised in Lucas (1975), the so-called "Lucas critique". Lucas pointed out that the empirical puzzle of stagflation was a mere reflection of a more general problem. He noted that agents maximise welfare over their entire lifetime, taking into account not only the past and present economic conditions but also their prospects about the future economic developments. Agents anticipate future changes in the economic environment, using all the available information, and incorporate those expectations in their decisions, adapting their plans. Being exclusively based on the past developments, traditional models could not account for the fact that changes in agents' expectations could alter their behaviour, which could invalidate the previously estimated relationships. Therefore, economists would not be able to correctly predict the effects of new policies unless they built models that could account properly for the role of expectations in economic agents' decision rules.

As a response to these critiques, in the 80s economists departed to a different type of macroeconomic models, where decisions of economic agents were modelled in a structural micro founded way, in a Dynamic Stochastic General Equilibrium (DSGE) framework. The genesis of these models can be found in the seminal work by Kydland and Prescott (1982). In Kydland and Prescott (1982) economic agents solve optimisation problems deciding on the best actions to take by maximising their entire lifetime welfare subject to a set of constraints and take into account their expectations. The economy was considered to be perfectly competitive and frictionless, with prices and quantities immediately adjusting to their long-run optimal, levels after a shock hit the economy. Fluctuations were exclusively generated by the agents' reactions to technology shocks continuously hitting the economy and therefore business cycles are simply as efficient response of rational optimising agents to a real exogenous shocks. The model was largely adopted by macroeco-

nomists, who introduced several sophistications over the years, exploring its theoretical and empirical possibilities. This strand of literature is known as the Real Business Cycle (RBC) approach to macroeconomic modelling and has constituted a major advance in modern macroeconomics, by firmly establishing the use of general equilibrium models as the new paradigm.

Despite their important methodological contribution, RBC models soon came under criticism. The main issue was that the complete flexibility of prices implied that any change in the nominal interest rate was always matched by a one-for-one change in inflation, leaving the real interest rate unchanged. This meant that any action taken by the monetary authority would have no impact on real variables and therefore there was no room for monetary policy, a result that was at odds with the widely held belief of its influence on the real variables in the short-run. Furthermore, since cyclical fluctuations were the optimal response of the economy to shocks, stabilisation policies were unnecessary and could even backfire, as they would divert the economy from the optimum. This was in stark contrast with the Keynesian view that the trough of the business cycle was mainly due to a low utilisation of the available resources, which could be brought to an end by means of economic policies aimed at stimulating aggregate demand. In addition, the primary role attributed to technology shocks in explaining economic fluctuations was at odds with the traditional view of technology shocks as a source of long-term growth unrelated to business cycle fluctuations, which were mainly considered to be demand driven. Also, the ability of RBC models to match the empirical evidence started to be disputed, as they were not able to reproduce some important stylised facts. All these concerns determined that although RBC models had a strong influence in academia, they had a very limited impact on central banks and other policy-making institutions, which continued to rely on large-scale macroeconometric models despite their acknowledged shortcomings.

The insufficiencies of RBC models began to be overcome in the 90's when economists in academia, started to introduce some new elements in the DSGE models giving birth to a new school of thought, the so-called New-Keynesian Macroeconomics (NKM). Contrary to the RBC approach, NKM assumed that the economy was not perfectly flexible nor perfectly competitive and that instead, it was subject to a variety of imperfections and rigidities and that

were key elements to understand the dynamics of the economic developments. Based on this view, NKM economists introduced monopolistic competition and various types of nominal and real rigidities, as well as a broader set of random disturbances. Some notable examples are: the introduction of sticky prices following Calvo (1983) and Rotemberg (1982) to allow for price inertia, breaking the strong assumption of money neutrality present in RBC models; the introduction capital adjustment costs following King (1991); the featuring of demand shocks as in Rotemberg and Woodford (1993); the extension of nominal stickiness to wages following Erceg, Henderson and Levin (2000), which play an important role in explaining inflation and output dynamics; the introduction of habits in the utility function, following Abel (1990), which helped in capturing consumption persistence; the featuring of price and wage indexation, following Christiano, Eichenbaum and Evans (2005), which improved the ability of the models to capture the inflation persistence present in the data; and the inclusion of investment adjustment costs as in Christiano et al. (2005), which enhanced the ability of models to capture investment dynamics. The introduction of these new elements highlighted the role for monetary and other economic stabilisation policies and proved to be extremely successful in capturing some of the salient business cycle features that RBC models previously missed, determining the spreading of DSGE models from the academia to policy-making institutions.

In parallel with these theoretical developments, major advances were accomplished with respect to the econometric apparatus associated with DSGE models. Numerous methods have been proposed to parameterise and evaluate DSGE models, with calibration and Bayesian MLE being currently the most used techniques (for a detailed discussion of the methods used to quantitatively evaluate DSGE models refer to Almeida (2009)). The choice between them is however far from trivial. Although estimation is in principle preferable, severe identification problems arise in large-scale DSGE models, with the data being many times insufficiently informative about the models' parameters, making the task of estimating these models a very difficult one. In practice, the large-scale models used by policy-making institutions tend to be calibrated, using both information from other types of models, as well as from small-scale sister models that are estimable using Bayesian MLE techniques.

In short, DSGE models are currently one of the most attractive

tools for modern macroeconomic analysis, which has led to their widespread use not only in academia but also in policy-making institutions. Some prominent examples are: the utilisation by the IMF of the model, presented in Kumhof and Laxton (2007) to assess the impact of the fiscal stimulus in the context of the ongoing global crisis in Freedman, Kumhof, Laxton and Lee (2009); the extensive utilisation by the Bank of Sweden of the DSGE model described in Adolfson, Laseén, Lindé and Villani (2007), both for policy analysis and forecasting; the utilisation of the Bank of Finland DSGE model described in Kilponen and Ripatti (2006), both for the analysis of the impact of ageing and in the projection exercises; and the utilisation by the ECB of the New Area Wide Model exposed in Christoffel, Coenen and Warne (2008) for a wide range of purposes within the Eurosystem.

One should, however, note that DSGE models are not free from caveats. They face a challenging trade-off between being sufficiently simple to be analytically and computationally tractable but at the same time sufficiently complex to be realistic. To be tractable, they rely on a set of simplifying assumptions, which are many times questionable and whose validity and implications is usually difficult to assess. An important example is the rationality assumption, according to which agents perform their choices using all available information and always act optimally in pursuit of their goals. Based on this general idea, agents are assumed to form rational expectations, meaning that although the future is not fully predictable, agents are able to form expectations that are not systematically biased, differing from reality only by some zero-mean random disturbance. Alternatively, agents can be seen as having bounded rationality, which considers that perfectly rational decisions are often not feasible in practice, since people face limits in formulating and solving complex problems and in using information, being unable to process and compute the expected utility of every alternative action, to choose the best one. In addition, models are not able to cover all the relevant aspects in the real world, focusing on the ones considered to be crucial.

2.3.2 *PESSOA*: a DSGE model for the Portuguese economy

In Sections 4 and 5, *PESSOA*, a DSGE model calibrated for the Portuguese economy, is used to study how Portugal's macroeconomic developments in the last twenty years have been shaped by the im-

pact of a number of shocks and frictions. In this Subsection, a bird's eye view on the model is provided, to allow for a deeper understanding of the transmission mechanisms and of the model's main simplifying assumptions and caveats (for a detailed description of the model refer to Almeida et al. (2008)).

PESSOA is a New-Keynesian DSGE model for a small open economy participating in a monetary union, the euro area, with a rich fiscal policy setup. Its structure mainly builds on the IMF's model, Global Integrated Monetary and Fiscal model (GIMF), presented in Kumhof and Laxton (2007). In *PESSOA*, monetary policy is defined by the monetary union's central bank, the European Central Bank (ECB), and the size of the domestic economy is assumed to be negligible. This supports the assumption that domestic fluctuations have no influence on euro area aggregates and thus on monetary policy decisions. Furthermore, for the sake of simplicity, it is assumed that all trade and financial flows are performed with countries within the euro area, which in the context of the model implies that the nominal exchange rate is irrevocably set to unity. Although monetary policy is defined by the ECB, an exogenous interest rate risk-premium on the ECB policy rate is considered to allow for a spread between the domestic and euro area interest rates. The model features a number of nominal and real frictions, which allow for smoother and more realistic short-term impulse responses, and a number of structural shocks, that drive economic developments. Six types of economic agents are featured: households, labour unions, intermediate goods producer (also named manufacturers), final goods producers (also named distributors), the Government and the foreign economy (which consists in the rest of the euro area).

Households follow the Blanchard-Yaari overlapping generations framework to break the Ricardian Equivalence even for intertemporal optimising households, which are not liquidity constrained. In this type of framework, each household has finite stochastic lifetime and different cohorts coexist in every period. Each household faces a constant instant probability of death, which limits the average planning horizon of the typical household. The death probability induces over-discounting of future events, meaning that each individual household discounts future events at a rate higher than the intertemporal discount rate, introducing appealing non-Ricardian features of fiscal policy (for a detailed description of the Blanchard-Yaari perpetual youth model and its implications for fiscal policy

refer to Frenkel and Razin (1996) or Blanchard (1985)). This means that households prefer debt financing of government expenditure to taxes, since they might not be around in the future when taxes are levied to pay for today's issued debt. Furthermore, we allow for declining lifetime labour productivity to mimic lifecycle behaviour, which also induces households non-Ricardian behaviour, since a non-negligible part of the tax revenue is charged on labour income which declines with productivity over lifetime.

Two types of households are considered: those who access asset markets and that perform inter-temporal optimisation, smoothing consumption by trading in assets (named OLG households); and liquidity constrained households (named LIQ households) that can only perform intra-temporal optimisation, since they do not access asset markets. Liquidity constrained households are an additional source of non-Ricardian behaviour, since they are not allowed to shift consumption over time. Therefore, all shocks affecting their budget constraint impact on consumption decisions directly and immediately, implying that all fiscal policy shocks affecting these households' consumption are fully passed on to output. Both types of households derive utility from consumption and leisure, which is modelled by means of a constant relative risk aversion (CRRA) utility function and is subject to external habit formation.

Households supply labour services to unions, which exploit the market power arising from the fact that labour is differentiated across households. A typical household rents its labour to a labour union, receiving in turn a wage for its services over which it pays labour income taxes. Furthermore, the typical household receives its fair share from the monopoly rents earned by labour unions and lump-sum transfers from the government and abroad. In the case of OLG households, they also earn dividends from firms, transferring a small part of the firm dividends to LIQ households; and earn/pay interest on asset/debt holdings.

All households solve an optimisation problem, choosing each period's consumption and labour supply. In the case of OLG households, they also decide on domestic bond holdings and on foreign bond/debt holdings, that maximises the present discounted value of their utility stream, subject to the inter-temporal budget constraint. However, it should be noted that in the case of LIQ households this collapses into an intra-temporal optimisation problem, since they are not allowed to trade in assets/debt and therefore cannot shift

consumption across periods.

Unions rent labour services from households and sell them to manufacturers, charging a mark-up over the wage paid to households. This is a widely used strategy to introduce monopolistic competition in the labour market in general equilibrium models, implying that households are rewarded for labour in excess of their marginal rate of substitution of consumption for leisure. In order to feature sticky wage growth, quadratic adjustment costs are imposed. Each union sets the wage that maximises the present discounted value of its “dividends”, subject to the constraints imposed by the wage adjustment costs and the labour demand. The union’s “dividends” are then fully transferred to households. These are very peculiar dividends, since they simply correspond to the share of each household in the wedge generated by monopolistic competition in the labour market.

Turning to the production block of the model, two types of firms are featured: intermediate goods producers (manufacturers) and final goods producers (distributors). All firms operate in monopolistic competition in their output markets, charging a mark-up over their marginal cost, and in perfect competition in their input markets, rewarding production factors at their respective marginal productivities.

Manufacturers produce two types of differentiated intermediate goods, tradable and non-tradable goods, which are demanded by distributors to produce final goods. Manufacturers combine capital and labour through a constant elasticity of substitution (CES) technology with labour-augmenting productivity, which is the only source of long-term real growth in the model. Intermediate goods price inflation is subject to quadratic adjustment costs to feature staggered price adjustment. Furthermore, investment is also subject to quadratic adjustment costs on the investment-capital ratio and on the investment growth rate to ensure a smooth response to changes in the desired capital stock level. A fixed cost term is included to eliminate economic profits arising from monopolistic competition in the steady-state. Firms pay social security contributions on the wage bill and capital income taxes on the firm’s dividends. The manufacturer’s problem consists in setting the optimal plan for labour demand, capital stock, investment and output price in order to maximise the present discounted value of dividends, subject to the constraints imposed by the adjustment costs, the production technology,

the capital accumulation and the demand for the intermediate good.

Distributors produce four types of differentiated final goods (private consumption, government consumption, capital and exports). Each type of final good is demanded by a unique type of customer: private consumption goods by households, government consumption goods by the public sector, capital goods by manufacturing firms and export goods by foreign distributors. The four types of distributors use a similar technology, which involves a two stage production process. In the first stage, the distributor combines the domestic tradable goods with the imported goods through a CES technology, to obtain an assembled good. In the second stage, the distributor uses a CES technology to combine the assembled good with the domestic non-tradable good to obtain the final good. Analogously to the intermediate good case, quadratic price adjustment costs and fixed costs are assumed and capital income taxes are charged on the distributors' dividends. To obtain a realistic response of import contents in the case of real exchange rate fluctuations import adjustment costs are considered. The problem faced by each distributor is to maximise the present discounted value of dividends subject to the constraints imposed by the production technology, price and import content adjustment costs and the demand for the final good.

Government consumes a very particular good, since it is highly intensive in non-tradable intermediate goods, and performs transfers across households. To finance its activities, the government levies taxes on labour income, firms' dividends and households' consumption and benefits from EU transfers. Furthermore, the government issues one-period bonds and pays an interest rate on the stock of bonds held from one period to the next, which might differ from the monetary union interest rate through an exogenous country risk premium. To prevent a divergent government debt path, a fiscal rule is featured, with the labour income tax rate adjusting endogenously to ensure that debt-to-GDP ratio converges to a pre-specified target. The practice of making the labour income tax rate the instrument that adjusts to ensure the fulfilment of the fiscal rule is a standard approach adopted in the literature on fiscal general equilibrium models, and determines that the labour income tax rate becomes as endogenous variable in the model. The labour income tax rate delivered by the model is therefore the one consistent with a non-explosive government debt trajectory for the prevailing levels

of expenditure, under the assumption that the other tax rates remain unchanged. Thus, the path of the labour income tax can be at odds with the outcome of the model and ultimately be used as an indication of the sustainability of the prevailing fiscal policy arrangement.

As previously mentioned, in the context of *PESSOA*, the rest of the world is assumed to correspond to the rest of the monetary union, implying that the nominal effective exchange rate is irrevocably set to unity and that all flows are recorded in the same currency, the euro. Furthermore, since the domestic economy is small enough, domestic shocks are assumed to have no impact on the euro area aggregates and, therefore, on monetary policy decisions. Portugal interacts with the rest of the euro area through trade in goods and in financial assets. Trade in goods is performed between distributors in Portugal and in the rest of the world, with the former buying a tradable goods that are used in the production of final goods and the later buying Portuguese exports. As for financial flows, households access foreign asset markets and engage in trade in assets/debt to smooth out consumption over time. Since the home economy is small, changes in its net foreign asset (NFA) position have no impact in the monetary union's interest rate. However, one should mention that contrary to what happens in most DSGE models that feature infinitely lived households, the Blanchard-Yaari framework allows for an endogenous pin down of the NFA position (for further details refer to Frenkel and Razin (1996) and Harrison, Nikolov, Quinn, Ramsay, Scott and Thomas (2005)).

The current version of *PESSOA* was calibrated. The choice of calibration instead of estimation using Bayesian techniques was determined by the large-scale of the model and by the fact that for many parameters the available dataset is likely to be non-informative, in particular in what respects parameters that are highly dependent on the tradable/non-tradable goods breakdown. Hence, the model was calibrated using national accounts data to pin down the steady-state, while the calibration of the remaining parameters relied on standard values in the literature and estimates for Portugal whenever they were available.

It is also important to note that, just like any economic model, *PESSOA* has its limitations, in particular concerning the absence of a financial sector and an explicit role for energy, which may prove particularly relevant in the aftermath of a financial crisis and of large swings in oil prices. However, it must be noted that the embedment

of realistic financial features and of energy as a production factor in DGSE models used by policy-making institutions is very recent and the specific modelling strategy is still a matter of live debate. Moreover, the limitations posed by the absence of these features might limit the scope of the shocks that can be simulated, but it is not likely to affect the main results and conclusions for the shocks being considered.

2.4 Shocks and frictions in the Portuguese economy

In this Section, *PESSOA* is used to assess the impact on the Portuguese economy of a number of shocks, selected on the basis of an heuristic approach, which were of primary importance to the evolution of the economy since the mid-90's. It must be made clear from the outset that though *PESSOA* includes a significant number of shocks, it does not span all the shocks that affected the Portuguese economy in the recent past, since it is a simplified representation of the economy. Therefore, some potentially important shocks were not been considered. In addition, one must note that the results of the simulations conducted are approximations to the effective impact of the shocks and, therefore, the quantitative interpretation of the results must be cautious. Furthermore, all shocks are simulated under the assumption that Government adjusts labour income taxes as much as required to render public debt stable in line with the fiscal rule, included in the model.

In this Section, the impact of four shocks that hit the Portuguese economy in the period under analysis is assessed. Firstly, in Subsection 2.4.1, the role of supply side developments is discussed, focusing on the slowdown of productivity recorded since the early 2000's. In Subsection 2.4.2, the impact of the elimination of the exchange rate risk premium on the domestic interest rate and of the decline in the share of liquidity constrained households is addressed. Subsection 2.4.3 addresses the impact of globalisation and, in particular, the evolution of Portuguese exports, which exhibited a clearly distinctive dynamics in the current business cycle, particularly in what concerns exports market share developments. Finally, Subsection 2.4.4 addresses the pro-cyclical expansionary fiscal policy implemented in the late 90's, which led to a structural fiscal imbalanced situation and implied a pro-cyclical fiscal consolidation process with in-

evitable consequences on private agents expenditure decisions and, ultimately, on economic activity.

The impulse response functions depicted for each simulation represent the deviation from the initial steady-state levels, which were calibrated to broadly replicate the main features of the Portuguese economy in the 90's using *PESSOA*.

2.4.1 The productivity slowdown

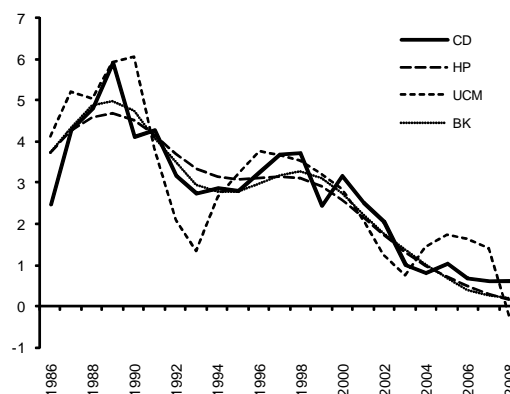
A striking feature of the first decade of the participation of Portugal in the euro area is the slowdown of real GDP to growth rates below the ones exhibited by the euro area, implying an interruption of the real convergence process. This evolution is confirmed by alternative potential output growth estimates, which after hovering around 3 per cent for almost a decade declined significantly since the early 2000 (Figure 2.7).⁸ To understand the driving forces of potential output, it is crucial to assess supply side developments and, in particular, the role played by the labour market dynamics, capital accumulation and TFP.

In what concerns labour market developments, the differences between Portugal and the euro area are substantial. In the periods corresponding to the last two business cycles of the Portuguese economy, 1986-1997 and 1998-2008, employment growth declined from 1.1 per cent to 0.8 per cent in Portugal, while in the euro area the opposite occurred with employment accelerating from a growth rate close to 0.5 per cent to 1.5 per cent (for a thorough discussion of the developments in the Portuguese labour market please refer to Chapters 3 and 4 in this volume). This evolution of employment against the background for real GDP developments previously described, implied a deceleration in output per worker from 3 growth rates around per cent to close to 1 per cent in the case of Portugal, while a deceleration from growth rates close to 2 per cent to slightly less than 1 per cent was recorded in the euro area. It should be mentioned that output per worker is commonly used as a measure of labour productivity, despite being a very crude approximation as it fully neglects the role of the capital stock and TFP.

The evolution of employment reflects the impact on labour market functioning of structural factors, which evolved differently in

⁸As mentioned in Subsection 2.2.2, alternative methods were considered to illustrate the uncertainty surrounding output-gap and potential output growth estimates, in particular in the recent years.

Figure 2.7: Potential output, Portugal
(annual growth rate, in %)



Note: the methods considered are the Hodrick-Prescott filter (HP), the Baxter-King filter (BK), the Cobb-Douglas production function approach (CD) and the methodology used in Chapter 4 in this volume based on Kalman filtering of unobserved components (UCM).

Source: BP, AMECO and authors calculations.

Portugal and in the euro area. These factors are to some extent related to the dynamics of the working-age population,⁹ participation rates and the structural unemployment rate, which have been affected *inter alia* by changes in the domestic labour market institutional framework and in the dynamics of domestic demographic variables (the main driving forces behind the evolution of the structural unemployment rate are investigated in Chapter 4 in this volume).

On the labour supply side, data reveals that working-age population grew at an annual average rate close to 0.5 per cent between 1986 and 2008, both in Portugal and in the euro area. This evolution reflects, among other factors: a significant increase in female participation rates, which nevertheless still remain at low levels by international standards in some Southern European countries; the

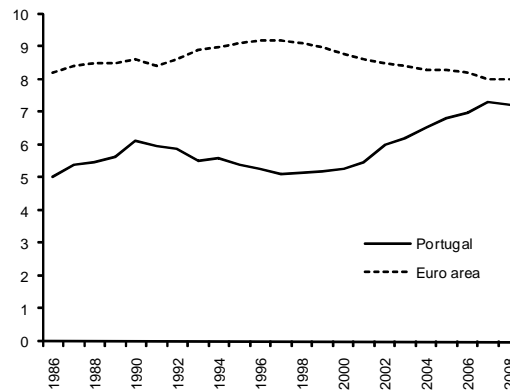
⁹By convention, working-age population is defined as population aging from 15 to 64 years. This convention can be disputed on the dimension that currently youngsters entry in the labour market is usually later than 15 years old and retirement age has increased in many European countries, due to reforms addressed at improving the financial sustainability of public pension systems in the context of the population ageing.

increase in the retirement age, in a context of social security reforms aimed at increasing the sustainability of public finances, against a background of population ageing; and the impact of immigration in some euro area economies (notably Spain). It should be pointed out that the participation rate in Portugal is high, not only in comparison with other Southern euro area economies, but also in comparison with the euro area average. Therefore, the margin for further increase is limited, particularly in a context where demographic dynamics related to ageing are expected to exert a downward pressure in the coming years.

The evolution of the natural unemployment rate can be used as a measure of the ability of the labour market to efficiently reallocate dismissed workers and newcomers to vacancies posted by employers (Figure 2.8). A high or an increasing natural unemployment rate reveals that the labour market ability to reallocate workers is low or at least has decreased. The available estimates point to a decline of the natural unemployment rate followed by a stabilisation around 8 per cent in the euro area. In Portugal, after standing in the range from 5 to 6 per cent for a protracted period, the natural unemployment rate has increased in the last decade to close to 7 per cent, according to the most recent estimates (see Chapter 4 in this volume for a detailed analysis).

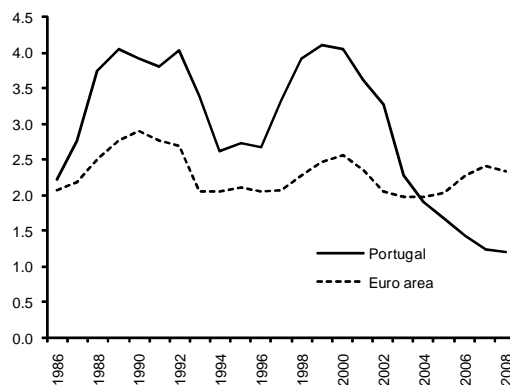
This disparate evolution reflects the fact that, while in many euro area countries several reforms have been undertaken over the last decade to improve the functioning of labour markets, in Portugal the reforms have been very recent. Moreover, in Portugal, the incidence of long-term unemployment climbed from 40 per cent in the late 90's to close to 50 per cent in recent years, reflecting a steady decline in the ability of the labour market to re-allocate unemployed workers to labour seeking industries. It should be noted that the Portuguese economy was particularly affected by the competition from emerging market economies with low production costs, which determined severe job losses in low-tech industries and limited job creation in medium high-tech industries. The reallocation of dismissed workers to new industries might be particularly difficult in a context of subdued demand conditions, given their low levels of human capital, the skill-biased technical progress and a design of unemployment benefits that tends to prolong unemployment spells. However, the recent reforms in labour market legislation may improve the functioning of the labour market.

Figure 2.8: Natural unemployment rate
(as a % of the labour force)



Source: BP, AMECO and Chapter 4 in this volume.

Figure 2.9: Capital stock
(annual growth rate, in %)



Source: BP, AMECO and authors calculations.

In what regards the capital stock, it has decelerated in Portugal over the most recent business cycle, while in the euro area it has grown in line with the average growth rate recorded in the previous cycle (Figure 2.9). However, it should not be disregarded that the aggregate capital stock results essentially from investment accumulation and, therefore, it does not account for the nature of investment goods being accumulated. The ability of the capital stock to become

Table 2.6: Growth accounting and key ratios*(average annual growth rate, in %; contribute, in pp.)*

	Portugal		Euro area	
	1986-1997	1998-2008	1986-1997	1998-2008
Potential output	3.7	1.7	2.4	1.9
contribute of:				
Employment	0.7	0.4	0.4	0.9
Capital stock	1.2	0.9	0.8	0.8
TFP	1.8	0.3	1.2	0.3
Cummulative growth of:				
Output per worker	43.7	12.0	24.5	7.5
Output per unit of capital	10.7	-8.0	1.3	-1.1
Capital per worker	28.4	21.8	22.8	8.7

Note: the growth accounting exercise is based on the Cobb-Douglas production function approach.

Source: BP, AMECO and authors calculations.

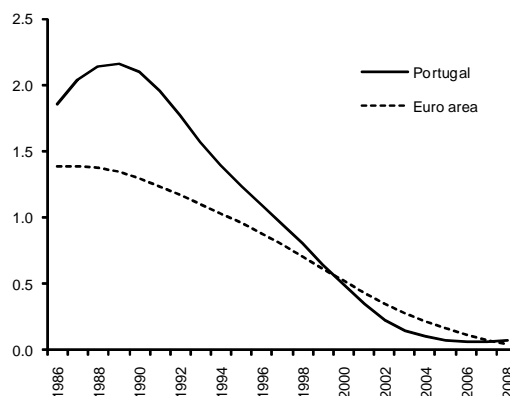
productive depends crucially on its composition and on the embedded technical progress. Since aggregate capital stock measures do not account for the quality of the capital stock, TFP captures this effect (Table 2.6).

The evolution of TFP is also key for the supply side analysis. This variable is a more accurate measure of factor productivity than output per worker and relies on the standard Cobb-Douglas production function approach to breakdown output into the contributions of primary inputs (labour and capital) and of a neutral technical progress term, the TFP.¹⁰ The outcome of this exercise reveals a substantial deceleration of TFP growth from the period 1986-1997 to the period 1998-2008 both in Portugal and in the euro area (Figure 2.10). It should be noted that this deceleration implies that the catching up of the Portuguese TFP to levels closer to the euro area was interrupted over the last cycle. The poor performance of TFP in Portugal is likely to reflect the persistence of structural fragilities related to a low quality of production factors, mainly arising from reduced formal education level of the labour force and from the cumulative decline in investment, in a context of skill-biased technical progress and increased competition in international markets.

The previous analysis suggests that the deceleration of real GDP

¹⁰For further details see Almeida and Félix (2006).

Figure 2.10: Total factor productivity
(annual growth rate, in %)



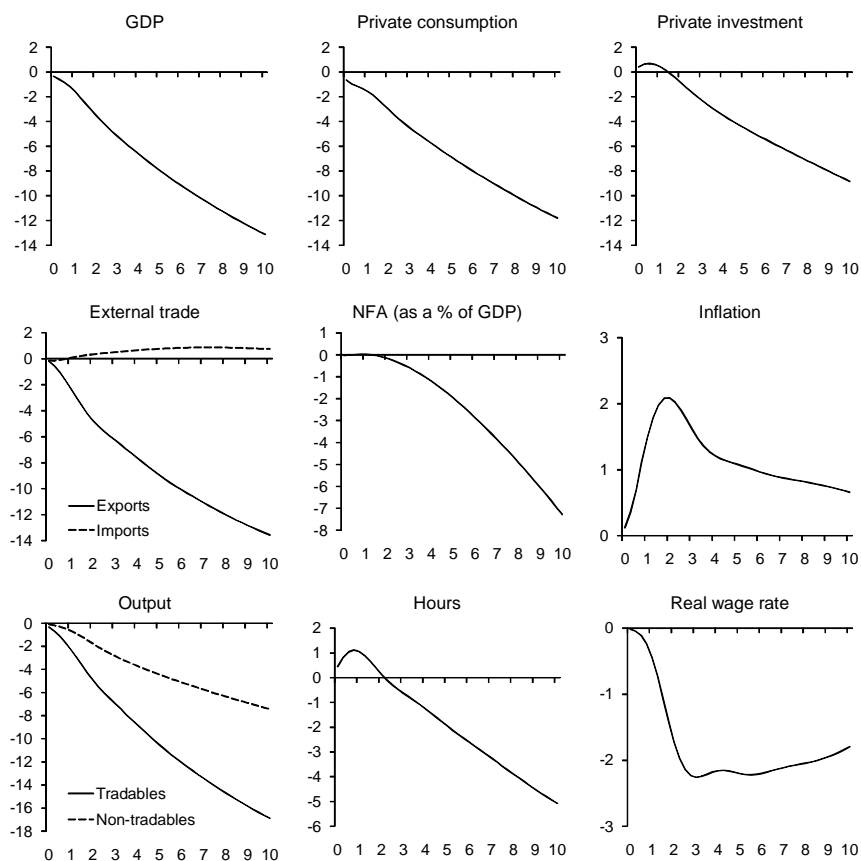
Source: BP, AMECO and authors calculations.

in Portugal in the most recent period is, to a large extent, attributable to the slowdown of TFP and, to a lesser extent, to a lower input growth, while in the case of the euro area the slowdown of TFP in the most recent cycle has been partially compensated by a higher growth of labour supply.

To assess the impact of the productivity slowdown in the Portuguese economy, the DSGE model was used. A protracted negative shock in neutral technical progress in both tradable and non-tradable goods sectors, henceforth named the negative technology shock, was simulated in the DSGE model. This shock corresponds to a protracted period of productivity growth below steady-state. The magnitude of the shock was calibrated using the fact that TFP in the most recent business cycle grew on average 1.3 pp. less than in the previous business cycle, implying a cumulative deviation close to 13 pp. in the tenth year. Since the magnitude of the shock was calibrated on the basis of the slowdown in TFP in the most recent cycle in comparison with the previous one, all results from the simulation must be interpreted accordingly. It should be noted that the shock is temporary and, therefore, its impacts dissipate over the medium-run and in the long-run all aggregates revert to the initial steady-state levels. The significant decline of real GDP induced by the shock can be understood in detail, by analysing the transmission mechanisms implied by the DSGE model (Figure 2.11).

In a small open economy participating in a monetary union, like

Figure 2.11: A protracted decline in productivity
(deviation from initial steady-state in %; inflation and NFA in pp.)



Note: the simulation results show the impact of a protracted negative shock in the neutral technical progress both in tradable and non-tradable goods sector amounting to 1.3 per cent per year during a ten years period, implying a cumulative decline of 13 per cent in the tenth year of the simulation period and a gradual return to the initial steady-state from then onwards.

Source: authors calculations using *PESOA*.

Portugal, the path of the real exchange rate is a crucial driving force of exports and imports. The negative technology shock leads to the build up of a persistent upward impact in inflation that drives a continued appreciation of the real exchange rate (approximately 10 per cent in the tenth year), implying a significant loss of competitiveness of domestic tradable goods. The inflation response es-

essentially arises from the fact that negative technology shocks imply an increase in the marginal cost of both tradable and non-tradable intermediate goods, which is passed on to final goods. The stickiness of prices implies that, in the short-run, the price adjustment is smooth and price mark-ups partially accommodate the increase in marginal costs. However, over the ten years period, the shock gradually builds up and the impact is fully passed on to final goods prices', determining a sizeable competitiveness loss of the domestic tradable goods.

The decline in competitiveness leads to a 14 per cent decline in exports after ten years (1.4 per cent per year, on average), which in a context where external demand is assumed to remain unchanged, implies market share losses of the same magnitude. In addition, imports remain virtually unchanged over the simulation period, revealing an increase in imports penetration as global demand declines. The fact that tradable goods face direct competition from imports and that Portuguese exports have a significant content of tradable and imported goods implies that the shock affects tradable goods output more significantly than non-tradable goods production. Furthermore, the non-tradable goods sector is likely to be less affected also due to the supportive impact of government consumption, which is assumed to remain unchanged and features a significant non-tradable goods content.

The profile of domestic demand is shaped by the evolution of households' consumption and private investment. The negative technology shock translates into a lower return on capital, implying a decline in the unit value of the capital stock, as measured by Tobin's-Q, the model analogue for stock market prices, and consequently a reduction of the desired capital stock. However, capital adjustment costs prevent a slump in business investment on impact, leading to a gradual downward adjustment in hours instead. This evolution is clearly dominated by developments in the tradable goods sector, reflecting the exposure to foreign competition in a context of real exchange rate appreciation and high price elasticity of exports typical from small open economy models.

Turning to households' consumption, the model predicts a 12 per cent decline in the tenth year (1.2 per cent per year). This evolution stems not only from the reduction in labour income, as a result of the decline in the marginal productivity of labour, but also from the fact that households are firms' owners, being therefore affected

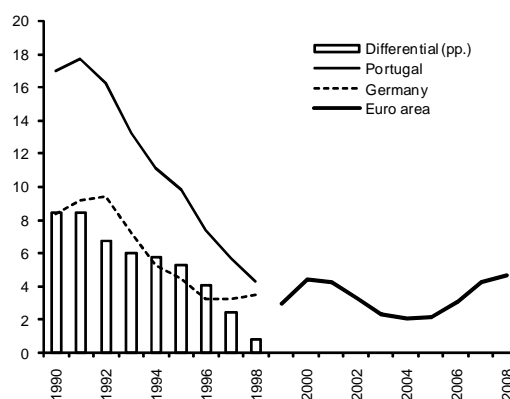
by the impact of the lower return on capital through the impact in dividend income. In addition, since the shock significantly erodes tax bases, tax revenues also decline, while government expenditures and transfers are assumed to remain unchanged, which implies a persistent deterioration of the fiscal balance. The fiscal rule implies a steady rise in the labour income tax rate, which negatively affects after-tax wage income and depresses labour supply and private consumption.

Summing up, the simulation results suggests that the slowdown in consumption, investment and exports, as well as the building of fiscal and external imbalances that marked the most recent Portuguese business cycle can to a significant extent be motivated by a protracted negative technology shock. Notwithstanding, this shock does not predict the reduction in inflation, which occurred, nor the deterioration in the net foreign asset (NFA) position in the magnitude observed in the data, suggesting that other shocks have played a prominent role in shaping the evolution of these variables. Against a background of increased competition at the global level, the negative technology shock was associated with the persistence of structural fragilities in the Portuguese economy, which became extraordinarily relevant in the last decade. These are related to the low human capital stock, in a context of skill-biased technical progress, and the soundness of the business environment, namely in what concerns goods and labour markets' regulation. Therefore, the implementation of structural reforms aimed at improving these aspects seems crucial to enhance economic growth prospects and the resumption of the real convergence with the euro area average income levels.

2.4.2 The decline in the interest rate risk premium

Before the participation in the EEC, in 1986, the Portuguese financial sector was relatively underdeveloped. The process of financial liberalisation started in the mid-80's culminated with the complete liberalisation of international capital movements in 1992. Important reforms were implemented, which implied far reaching changes in the Portuguese banking sector, promoting an increase in competition across financial institutions. Among the main reforms were the privatisation of state-owned financial institutions and the elimination of administrative controls on interest rates and credit. Furthermore, the liberalisation process and the increased competition triggered financial innovation, which gave rise to an increasing diver-

Figure 2.12: 3-month money market nominal interest rates
(in %)



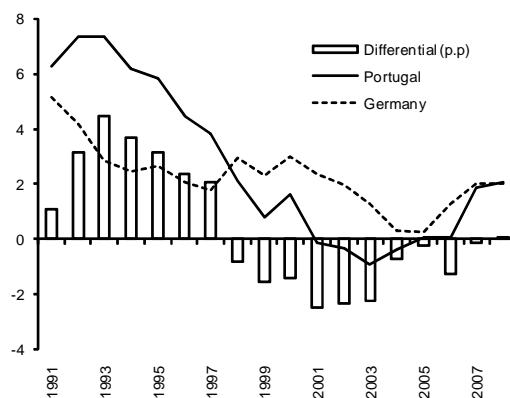
Source: Eurostat.

sity of banking products and allowed for the entry of new banking institutions and financial intermediaries in the market (for a detailed analysis on the financial liberalisation and on the evolution of the banking system in Portugal see Chapter 7 in this volume).

The process of financial integration was accompanied by the nominal convergence of the Portuguese economy, following the roadmap to the euro established by the Maastricht Treaty in 1992. The strong commitment of the Portuguese government to join the euro from its inception implied the implementation of an adequate fiscal policy and the conduct of a monetary policy aimed at maintaining exchange rate stability, as means to comply with the nominal convergence criteria imposed by the Treaty. In this context, the participation of the Portuguese escudo in the Exchange Rate Mechanism (ERM) of the European Monetary System (EMS), since 1992, and the subsequent maintenance of a broadly stable exchange rate in a context of declining inflation, enhanced the credibility of the commitment and contributed to the gradual elimination of the exchange rate risk premium on domestic interest rates.

The strong decline of nominal interest rates in Portugal in the last two decades was shaped not only by the gradual elimination of the exchange rate risk premium, but also by the easing of financing conditions at a global scale, in particular in the period 2003-2007. Short-term nominal interest rates (as measured by the 3-month money market rates) declined from more than 16 per cent in 1990 to close

Figure 2.13: 3-month money market real interest rates
(HICP deflated, in %)



Source: Eurostat.

to 3 per cent in 1999, fluctuating around this level in the 2000's. This evolution reflects the elimination of the exchange rate risk premium, but also a sizeable reduction in the benchmark money market interest rates (measured by the German 3-month money market rates) (Figure 2.12). As regards the long term interest rates (measured by 10-year government bond yields), a similar evolution was recorded. The Portuguese government bond yields exhibited a sharp decline, in particular during the second half of the 90's, converging towards the levels observed in Germany (for a detailed analysis see Chapter 7 in this volume).

It should be noticed that the decline of the nominal interest rate spreads might have also reflected the reduction of inflation differentials, implying that the evolution of the real interest rate might be more accurate to assess the evolution of the risk premium than its nominal counterpart. Ex-post Portuguese real interest rates (as measured by the gap between the short-term nominal interest rate and the consumer price inflation) also recorded a steep decline. The spread of the Portuguese real rates vis-à-vis German counterparts also declined from more than 200 basis points in early 90's to marginally negative figures in the period 1998-2006 (Figure 2.13). All in all, the evidence is qualitatively very similar to the one obtained using nominal interest rates and it applies straightforward to real long term rates.

The financial sector liberalisation and the nominal stability im-

plied more favourable financing conditions for domestic agents. In addition, these factors also had an important role in reducing credit constraints, granting to some agents previously liquidity constrained access to the credit market (for more on the role of liquidity constraints in the Portuguese economy see Castro (2006)). Moreover, the prospects of further economic and financial integration and the perspective of a steady increase in per capita income to levels closer to the euro area average, in combination with the anticipation of permanently lower financing costs and more stable financing conditions, determined an upward revision of the permanent income level of households (for a detailed analysis see Farinha (2004) and Chapter 7 in this volume).

To assess the impact of the decline in real interest rates on the Portuguese economy, a permanent decline of 200 basis points in domestic interest rates associated with the elimination of the exchange rate risk premium was simulated. This shock broadly corresponds to the differential in real interest rates vis-à-vis Germany in the years preceding the adoption of the euro. Moreover, it is also considered the loosening of financing conditions fostered by the financial liberalisation, which contributed to reduce the share of households subject to liquidity constraints. It is worth emphasising that the simulations were performed under the assumption of perfect foresight, implying that all agents in the economy know with certainty the adjustment path at the time they observe the shock, though in practice the shock was not immediately and perfectly anticipated by all agents in the economy. One should be aware that in a period of change in the economic regime, like the participation in a monetary union, agents need time to learn on the new environment and this type of process is not captured by the devices included in *PESSOA*. Therefore, the results from the simulation might reveal a more front-loaded impact than it was in practice (Figure 2.14).

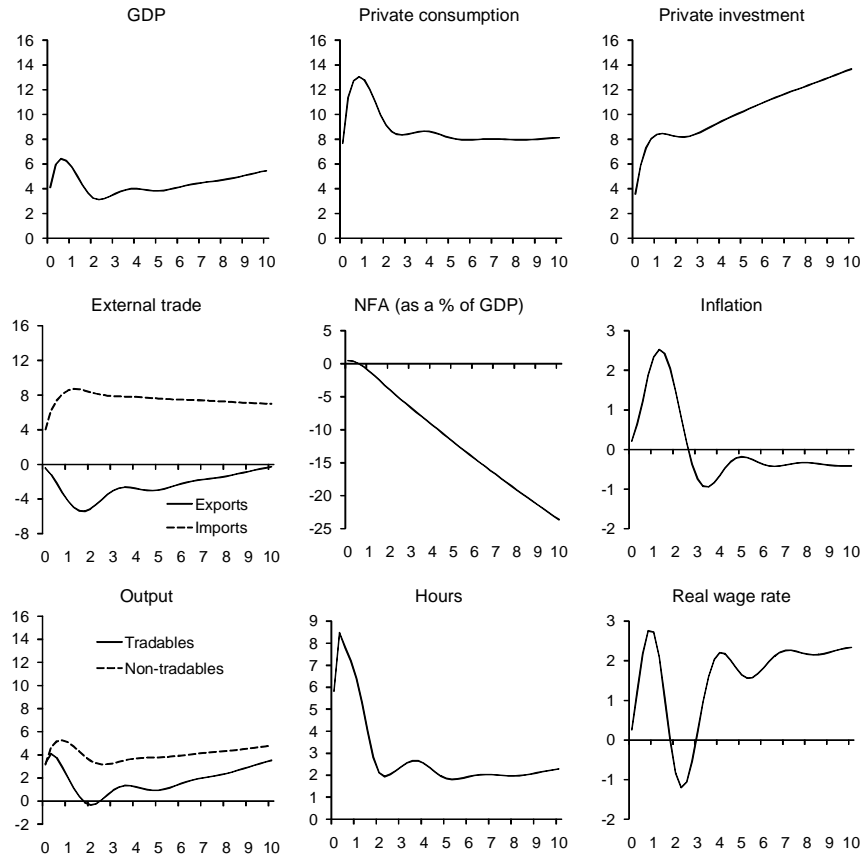
The elimination of the exchange rate risk premium implied a reduction of domestic real interest rates and led to a significant boost in domestic demand, in particular in households' consumption, reflecting the rise in the present discounted value of future labour income and dividends. Since demand conditions adjust faster than output, which is subject to a number of real rigidities, some inflationary pressures arise in the short-run, generating a temporary decline in the real interest rate (recall that the real interest rate path is determined by the response of domestic inflation, since the union's mone-

tary policy is virtually unaffected by specific disturbances in a small economy). The decline in the real interest rate reduces the relative price of households' current consumption in terms of future consumption, i.e. the return on savings as measured in terms of future consumption, creating a further incentive for households to perform inter-temporal consumption substitution (the so-called substitution effect). Furthermore, the decline in the real interest rate also reduces the cost of borrowing, increasing the discounted value of future asset payoffs (the so-called wealth effect). Thus, in a context of perfect foresight, households increase consumption expenditures on impact due to both wealth and substitution effects, which translates into a higher demand for consumer goods, financed by borrowing against future income with significant impacts on indebtedness levels.

The decline in the real interest rate also translates into a fall in the real cost of capital, which drives the desired capital-output ratio upwards, as more investment projects become profitable. This shift in the relative price of primary factors implies an increase in the demand for capital goods, which, in association with the increase in the demand for consumer goods, implies a permanent increase in the demand for imports and for intermediate goods, both tradable and non-tradable. However, capital adjustment costs prevent intermediate goods producers from adjusting the capital intensity of output immediately, implying that on impact hours worked overshoot and marginal costs increase, leading to inflationary pressures. Over the medium-run, firms adjust their capital stock upwards and the initial increase in hours worked is partially reverted, implying that marginal costs gradually stabilise and inflation reverts to the initial steady-state.

The impact of the real interest rate decline also depends on the role played by other adjustment mechanisms, related to the inflation differentials across countries. The initial inflationary pressure leads to a real exchange rate appreciation and a consequent drop in the international competitiveness of Portuguese tradable goods, which partially offsets the impact on domestic demand of the decline in the real interest rate. After the initial overshoot, real exchange rate reverts partially, though leading to a sizeable appreciation in the final steady-state. This evolution of competitiveness and the increased demand for imports, resulting from the previously mentioned increase in households' indebtedness as financing conditions ease, imply a deterioration of the trade balance, which translates into a per-

Figure 2.14: A permanent decrease in the risk premium
(deviation from the initial steady-state in %; inflation and NFA in pp.)



Note: the simulation results show the impact of a permanent decline of 200 basis points in the exchange rate risk premium on domestic interest rates.
Source: authors calculations using *PESSOA*.

manent decline in the NFA-to-GDP ratio.

Considering now the joint impact of a decline of 200 basis points on the exchange rate risk premium and a 10 pp. decline in the share of liquidity constrained households, one concludes that the reduction liquidity constraints households has a visible impact on private consumption in the short-run, since it allows a higher proportion of households to smooth consumption expenditures throughout their lifetime, reflecting their expected income developments

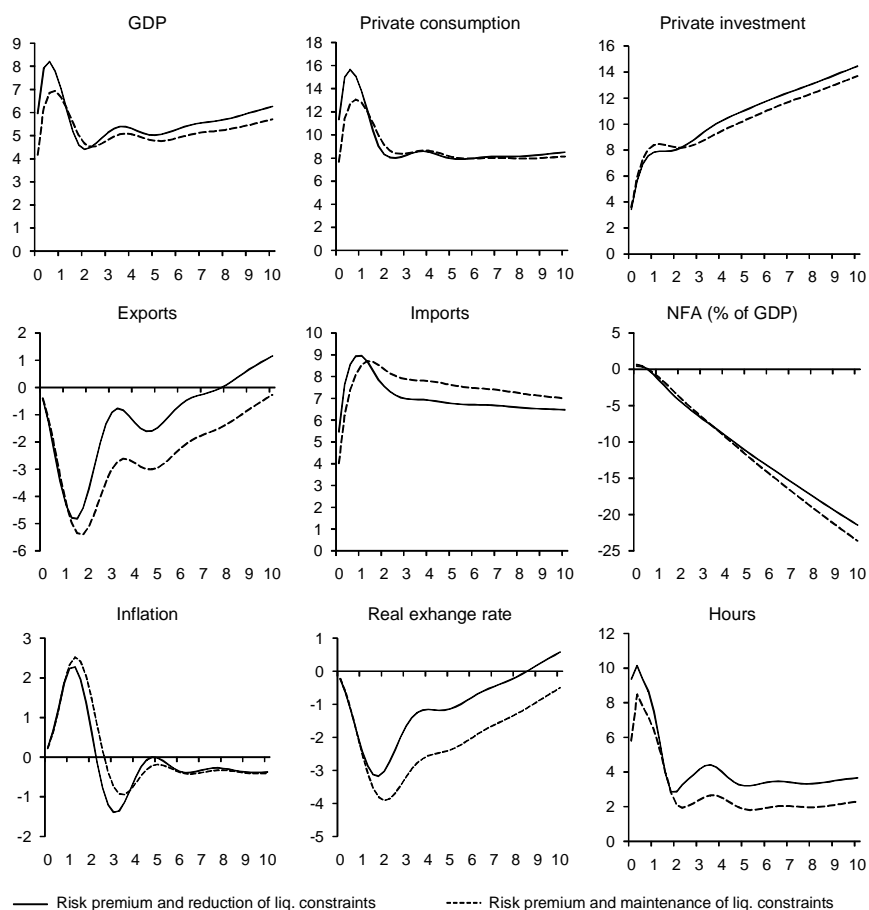
(Figure 2.15). Hence, the permanent reduction in the domestic interest rate resulting from the elimination of the exchange rate risk premium has a stronger impact on consumption in case a higher share of households is able to borrow against future income. This effect is particularly relevant in the short-run, contributing to a more pronounced response in output and to an increase in labour supply. The stronger impact on output also reflects more favourable developments in trade, with an improvement of competitiveness arising from a less marked short-run increase in domestic prices, given that the increase in marginal costs of production is weaker, as a consequence of a sharper increase in labour supply.

The simulations carried on using *PESSOA* are able to capture some salient features of the adjustment path of the Portuguese economy in the context of the financial and monetary integration process. In particular, the results suggest that against a background of increasingly favourable financing conditions and higher permanent income, private agents adjust their expenditure upwards borrowing against improved income prospects. These developments largely motivated the boom in private consumption and investment witnessed in the run up to the euro, which reflected a shift in the production capacity to meet new demand prospects.

The overshooting in private consumption suggested by the model is likely to have occurred as well. However, the observed evolution of households' consumption in the last decade is not consistent with the reversion that would be expected following the boom and the stabilisation of the saving rate. This suggests that other shocks have feed the boom in households consumption. It might be that financial liberalisation and financial integration were also transmitted through other channels, not included in *PESSOA*, which may justify the evolution of private consumption in the last decade. In fact, in the new context characterised by financial integration, competition among banks and favourable financing conditions in international markets, in particular in the period 2003-2007, households were able to finance further consumption expenditures, by resorting to new credit products (for example, by extending credit maturities), despite the downward revision in demand prospects and in the permanent income level, stemming from the slow down in productivity recorded in the 2000s. This allowed households to keep on financing additional consumption expenditures using bank loans and contributed to the decline in the saving ratio and to the steady increase

Figure 2.15: A permanent decrease in the risk premium and in liquidity constraints

(deviation from the initial steady-state in %; inflation and NFA in pp.)



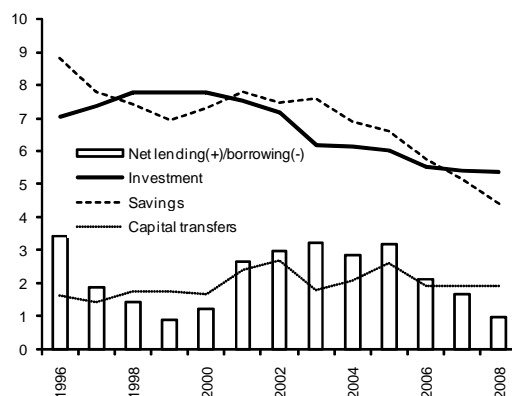
Note: the simulation results show the joint impact of a permanent decline of 200 basis points in the exchange rate risk premium on interest rates and a 10 pp. decline in the share of liquidity constrained households.

Source: authors calculations using *PESSOA*.

in indebtedness.

Furthermore, the model also predicts a significant deterioration in the NFA position of the economy in the context of the elimination of the exchange rate risk premium. In fact, the growth of private consumption, investment and government consumption in the run up and in the early years of the euro area participation were con-

Figure 2.16: Investment and saving: households
(as a % of GDP)



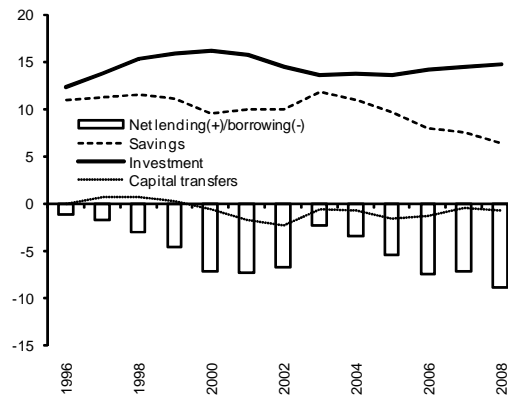
Source: BP.

siderably higher than the one of real GDP, and it has determined an imbalanced growth pattern depicted by a saving rate well below the investment rate, which have implied the maintenance of a current plus capital account deficit. The financing of this deficit largely benefitted from the increased financial integration, which allowed for the growth of the loan portfolio of Portuguese banks to outstrip the pace of domestic deposits for a protracted period, as banks were able to borrow for extended maturities from international financial markets at a low cost and without exchange rate risk (for further details see Chapter 7 in this volume). The persistent external deficits implied a continued deterioration of the external debt of the Portuguese economy, as measured by the international investment position (IIP)¹¹ (Figures 2.16, 2.17 and 2.18).

All in all, the monetary and financial integration process is a keystone to understand developments in the Portuguese economy in the run up and in the early years of the euro area. The elimination of the exchange rate risk premium on interest rates and the reduction in the share of liquidity constrained households had significant impacts on the increase of expenditure levels and in the transition to a new steady-state characterised by a higher level of external indebtedness. Although this evolution may correspond to a rational response to the change in the economic regime to a new framework

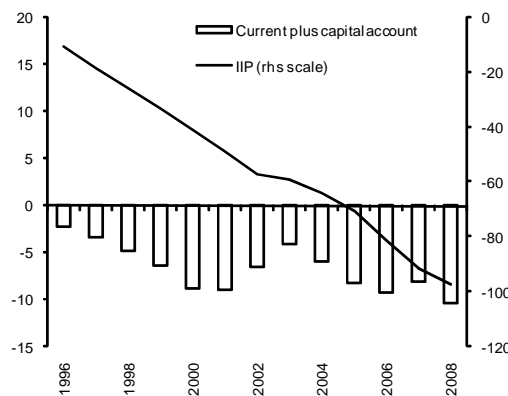
¹¹The IIP is a measure of the external asset position, which includes not only NFA but also FDI.

Figure 2.17: Investment and saving: non-financial corporations
(as a % of GDP)



Source: BP.

Figure 2.18: IIP and current and capital account
(as a % of GDP)



Source: BP.

characterised by low interest rates, more stable financing conditions and international risk sharing, the indebtedness level of the Portuguese economy is now among the highest in the euro area. However, the transition to the new steady-state, which might have not yet been completed, has occurred without symptoms of overvaluation in asset prices and, despite the increase in indebtedness, the debt service seems to be still at affordable levels. In any case, one must be aware that the current international financial situation poses the possibility

of financing conditions stabilising at levels less favourable than the ones prevailing before the outbreak of the crisis, particularly in what concerns an increase in the country's risk premium.

2.4.3 The increased competition in international trade

Since the 70's, the world has experienced an unprecedented global economic integration process, which has been intensified over the last decades, as illustrated in Denis, McMorrow and Röger (2006). This process was the result of the liberalisation in trade and capital movements, made possible by the technological progress that allowed for an unparalleled decline of transport and communication costs. Additionally, it reflects the growing openness of emerging market economies, as a result of important political and economic reforms, with special emphasis on large economies such as China, India and Central and Eastern European countries (CEEC).

The integration of emerging market economies with abundant labour supply and low production costs in international trade induced a reorganisation of productive processes worldwide to reap the benefits of the new pattern of comparative advantages, in the context of the fragmentation of international production chains (for a detailed analysis see Chapter 5 in this volume). In fact, over the last decade, a noticeable delocalisation of manufacturing industries and low-skilled services has been recorded from advanced economies to countries with abundant labour supply and reduced production costs. In addition, the important reforms and the integration in the EU of CEEC with abundant and skilled labour supply, competitive labour costs and a favourable geographical situation, also favoured the delocalisation of medium-high technology industries from advanced economies to these countries.

In this framework, the Portuguese economy has recorded a strong increase in its degree of openness,¹² from 37 per cent in 1986 to 63 per cent in 1998 and 84 per cent in 2008 (Figure 2.19). The country's participation in the EEC since 1986 was particularly important for this process, since it implied a strong expansion of

¹²The degree of openness of the economy is usually measured by the share of international trade (exports plus imports) in GDP, in nominal terms. Although this might be useful for cross-sectional analysis, for time-series analysis it seems more adequate to consider the degree of openness in real terms, since this measure is adjusted of the evolution of the relative prices of exports and imports to domestic production prices.

Table 2.7: Trade in goods and services*(average annual growth rate, in %)*

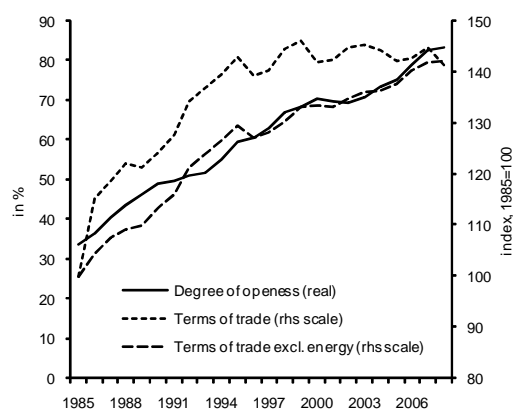
	Portugal		Euro area	
	1986-1997	1998-2008	1986-1997	1998-2008
Exports (volume)	7.6	4.4	5.9	5.7
External demand (volume)	5.5	6.6	5.3	7.3
World trade (volume)	6.8	6.8	6.8	6.8
Exports price-competitiv. ^(a)	0.2	-0.1	1.4	-0.9
Non-price competitiv. of exports ^(b)	1.7	-2.1	-1.5	-0.3
Imports (volume)	12.2	4.6	6.1	5.8
Global demand (volume)	6.2	2.6	3.1	3.1
Import penetration (volume) ^(c)	6.0	2.0	2.9	2.8

Note: ^(a)Relative growth of competitors export prices vs. export goods deflator; for the euro area: relative growth of competitors export prices vs. extra-euro export goods deflator; ^(b)Market share changes not determined by price competitiveness; ^(c)As measured by the relative growth of imports vs. global demand.

Source: BP, AMECO and authors calculations.

the exports markets of Portuguese firms, contributing to a significant rise in sales abroad. In fact, in the period 1986-1997, the volume of Portuguese exports grew at an annual average rate above 7 per cent, contributing prominently to the robust economic activity growth recorded in this period. This evolution implied sizeable exports market share gains, associated with the rise in the supply capacity of the export-oriented firms, arising in particular from FDI projects oriented to external markets. Moreover, there were important productivity gains in the tradable goods sector, stemming from the technical progress embedded in FDI inflows, which have largely contributed to the coexistence of market share gains with a significant equilibrium real exchange rate appreciation in the context of the Balassa-Samuelson effects as documented in Costa (2000) and Brito and Correia (2000).

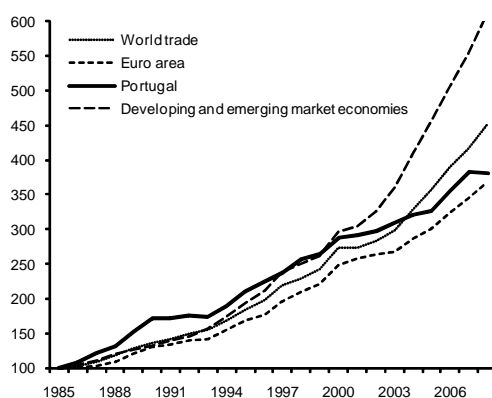
The increased integration in international trade of emerging market economies with reduced unit production costs provided advanced economies with a large supply of tradable goods at cheap prices. However, it also contributed to a decline in exports market shares, which was unevenly distributed across countries, reflecting the specialisation pattern of each economy. The Portuguese economy was particularly affected due to its relative specialisation in products which recorded a limited demand growth and a low tech-

Figure 2.19: Openness and terms of trade, Portugal

Note: the degree of openness corresponds to the share of trade (exports plus imports) as a percentage of GDP. The terms of trade index records the relative evolution of exports deflator vs. imports deflator.

Source: BP and INE.

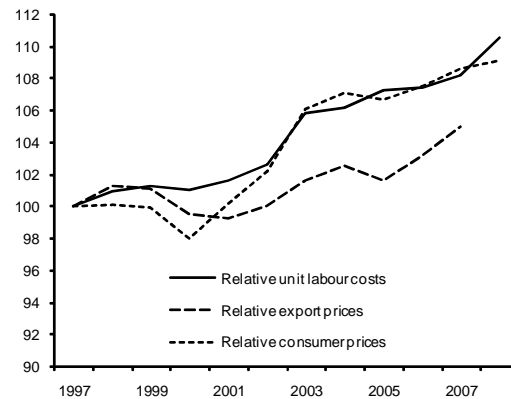
Figure 2.20: World trade and exports
(index, 1985=100)



Source: BP and IMF.

nological content and that were exposed to a strong competition from the new market players (for a detailed analysis see Chapter 5 in this volume, Cabral and Esteves (2006) and Amador and Cabral (2008)). Consequently, the Portuguese economy suffered a sharp deterioration in its competitiveness that is particularly relevant to mo-

Figure 2.21: Real effective exchange rate indices for Portugal
(index, 1997=100)



Note: the cost and prices with respect to the 13 major trading partners up to 1999 and to the 22 major trading partners from then onwards, both adjusted for changes in the nominal exchange rate. A positive change denotes an increase in relative costs or prices of Portuguese exports.

Source: BP, EC, OECD and INE.

tivate external trade developments in the period 1997-2008, which is not captured by the traditional price competitiveness indicators.

The impact in the Portuguese economy of the integration of new market economies in international trade was strengthened by the outbreak of the 1997 financial crisis, which affected some economies in Southeast Asia and subsequently expanded to Russia and to some Latin American countries. This situation implied a marked deceleration in economic activity in these countries and a strong depreciation of their nominal exchange rates, which translated into a significant loss of competitiveness in some advanced economies, including Portugal. Thus, in the period 1998-2008, Portuguese exports grew at an annual average rate close to 4 per cent, implying market share losses around 2 per cent per year, after the significant market share gains recorded in the preceding years. In the same period, emerging market and developing economies gained substantial market shares in international trade, with the average growth of exports exceeding by far the overall world imports growth (Figure 2.20).

The deterioration in price competitiveness reflected a limited real exchange rate appreciation in the period 1998-2008 (Figure

2.21). Nevertheless, the available price-competitiveness indicators are likely to underestimate it, since the impact on competitiveness of economies that are not direct destinations for Portuguese exports, but that compete with domestic exporters in third markets is not accounted for.¹³ To capture this effect, one has to resort to the non-price competitiveness indicator,¹⁴ which captures changes in market shares not induced by price competitiveness. The evolution of non-price competitiveness accounts for a large part of the evolution of Portuguese market shares in the last two decades, revealing the failure of standard price competitiveness indicators to motivate both the market share gains recorded in 1986-1997 and the losses recorded since 1998 (Table 2.7).

The analysis of the product composition of Portuguese exports further reveals that in the past two decades a gradual restructuring of the manufacturing sector has occurred, with visible changes in the specialisation pattern. There was a sensible reduction in the export share of products with low-technological content, in particular *Food products, beverages and tobacco* and *Textiles*, for which certainly contributed the liberalisation of the EU textiles market. On the contrary, during the second half of the 90s, there was a marked increase in the share of medium-high technology exports, in particular, *Motor vehicles, trailers and semi-trailers*, following the settlement of important FDI projects, which ceased to happen in the last decade. Despite the changes occurred over the last two decades, the pattern of specialisation of Portuguese exports still exhibits a relatively high share of products with low and medium-low technology content, in comparison with the world average.

In what concerns imports, their real growth has clearly outpaced overall demand over the last two decades, pointing to a steady increase in import penetration in Portugal, a feature common to many developed economies. Nevertheless, the increase in real import penetration over the period 1998-2008 in Portugal (2 per cent in annual average terms) was more limited than in the euro area (around 3 per cent per year). The increase in imports penetration in volume reflects, in part, the increasing vertical specialisation and the contin-

¹³For a detailed analysis see Esteves and Reis (2005) and Esteves (2007).

¹⁴The non-price competitiveness indicator reveals the impact of a number of structural factors. In the case of Portugal, changes in the international economic framework have played a prominent role over the last decades, not only due to the deepening of the Portuguese integration in the EU, but also due to the spill over effects from the growing integration of emerging economies in international trade.

uous reallocation of productive processes to reap full benefits from a worldwide changing pattern of comparative advantages. In contrast, the imports penetration in nominal terms did not reveal any clear trend over the last decades (if energy items are excluded), since the increase in real import content was fully offset by the decline in relative price. This evolution in the relative prices was largely associated to the stabilisation of the exchange rate of the Portuguese escudo during the 90's and, more recently, to the increasing participation in international trade of countries with reduced production costs.

The terms of trade indicator (excluding energy items) summarises the evolution of non-energy trade deflators and points to the maintenance of persistent gains since the mid-80's. This evolution reflects, among other factors, the impact of the just mentioned increased participation in international trade of economies with reduced production costs, which contributed to the decline in the non-energy goods import prices, and the gradual change in the structure of Portuguese exports towards products of higher technology content and higher prices.¹⁵ However, the strong increase in production in emerging market economies has determined a significant rise in the demand for commodities and, consequently, an increase in their prices, with a particular emphasis on oil. Since Portugal imports most of the commodities used in the production of final goods, notably oil, the overall terms of trade indicator points to moderate gains (Figure 2.19).

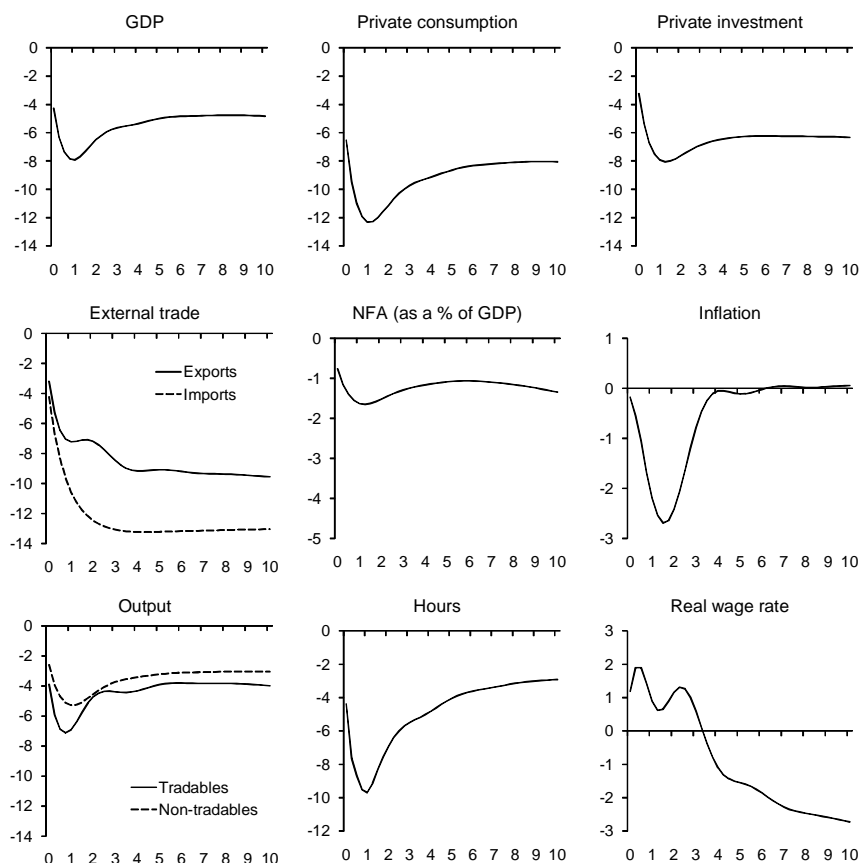
The impact on the Portuguese economy of the increasing integration of emerging market economies in international trade is simulated through a negative shock in the demand for Portuguese exports. More specifically, a permanent decrease of 20 per cent in non-price competitiveness on the exports side is considered in line with the cumulative non-price competitiveness loss recorded in the last business cycle.¹⁶

The simulation points to a cumulative decline in real GDP close to 6 per cent in the tenth year after the shock, corresponding to a

¹⁵See Cardoso and Esteves (2008a) and Cardoso and Esteves (2008b) for further details.

¹⁶Recall that in *PESSOA* the rest of the world is assumed to be exclusively composed by the euro area and is not explicitly modelled. This imposes some limitation to the simulation of shocks originated outside the euro area. For instance, the model is not able to capture directly the impact of euro exchange rate fluctuations on the evolution of terms of trade in the Portuguese economy.

Figure 2.22: A permanent decrease in non-price competitiveness
(deviation from the initial steady-state in %; inflation and NFA in pp.)



Note: the simulation results show the impact of a permanent decrease of 20 per cent in non-price competitiveness on the exports side.

Source: authors calculations using *PESSOA*.

growth rate below steady-state by 0.6 per cent per year (Figure 2.22).

The permanent decline in the demand for domestic goods directly affects the exports volume, though in a much smaller magnitude than that of the shock, as a result of a real exchange rate depreciation that boosts price competitiveness (the real exchange rate depreciation results from a temporary reduction in inflation, which will be addressed later on). The decline in exports pushes the demand for domestic intermediate goods downwards, affecting,

particularly, the demand for tradable goods, since exports are intensive in this type of intermediate good. However, the real exchange rate depreciates, inducing also a substitution of imports for domestic tradable goods in the production of final goods, partly sustaining the impact on domestic tradable goods production of the decline in demand and implying a reduction in the import content of final goods.

The decline in the demand for intermediate goods leads to a lower demand for labour and capital. However, real rigidities limit capital adjustment, implying a strong decline in hours worked in the short-run, which is partially reverted as the capital stock adjusts downwards. In turn, the decline in demand and the increase in the capital-output ratio drive the return on capital downwards, negatively affecting investment decisions and firm dividends. The decline in the demand for intermediate goods and the lower return on capital also implies a decline in marginal costs growth and, therefore, a temporary reduction in inflation prospects. In a context where the nominal interest rate is assumed to be exogenous, the temporary decline in inflation corresponds to an increase in the real interest rate that triggers an undershooting in private investment and consumption.

The permanent decline in private consumption mostly reflects the impact of the downward revision in households' permanent income prospects. This results from the already mentioned decrease in current and expected dividend income and from the decline in labour income prospects, as hours worked decline significantly and labour income tax rate increases to keep tax revenues at a level compatible with the maintenance of the public debt on a sustainable path.

Finally, the slight improvement in the fiscal and trade balances in the short-run might seem counterintuitive. However, one must highlight that *PESSOA* is a general equilibrium model, which implies that all the simulation results must be consistent with the maintenance of a sustainable path. Therefore, the slight improvement in the fiscal balance reflects the required adjustment of the fiscal policy instrument in a context where the government is aware that the shock is permanent and builds up over time. In the same vein, the temporary improvement in the trade balance and in the current account also reflects the impact of the strong reversal in private consumption and investment, as households perceive that the shock is permanent. It must be noted that in *PESSOA* households are

strongly risk averse and, therefore, smooth consumption as much as possible, which implies that in the presence of a permanent shock, the optimal response is to cut expenditures as soon as the shock occurs not only in view of the current situation, but taking into account the expected evolution.

To sum up, one can conclude that the evidence points to a poor performance of the Portuguese economy in an economic framework characterised by an increasing integration of emerging market economies in the world trade, with the shift of demand away from Portuguese goods motivating some features of the last business cycle, particularly the GDP slowdown, the evolution of consumption, investment, exports and employment and the decline in inflation.

However, it should be reinforced that the model is a limited representation of reality, suffering from some limitations that do not allow for a fully-fledged analysis of the globalisation process in all its relevant aspects. Many of these aspects are likely to be extremely positive, since trade integration brings beneficial impacts for households and firms. Concerning households, trade integration is translated into lower consumer goods' prices and an increase in product diversity. For firms, trade integration and higher competition fosters higher efficiency in resource allocation and a dissemination of new technologies and organisation practices, ultimately contributing to an increase in TFP. In parallel, firms also benefit from new investment and trade opportunities, associated with the expansion of the international market as referred in Manteu (2008). Thus, the increase in economic integration worldwide has a potentially positive impact on the overall welfare through channels that go beyond the standard trade channel included in *PESSOA* and, therefore, results from the simulation must be interpreted in light of these limitations.

Furthermore, it is important to stress the role of the structural fragilities of the Portuguese economy in shaping the impacts of the trade integration process. Countries with export patterns more similar to the new entrants tend to record stronger export market share losses, with impacts in output and income levels, in case product and labour markets are not flexible enough to accommodate the necessary adjustment. In this context, a pre-condition to reap full benefits from trade integration is the adoption of structural reforms that improve labour market flexibility and increase human capital so as to promote a reallocation of resources to activities with higher technological content and stronger demand, in particular in a context of

skill-biased technical progress (see Section 2.5).¹⁷ As discussed in Section 2.2, Portugal has severe structural fragilities and, therefore, the ability to implement the necessary reforms will be decisive to full benefit from a more efficient allocation of resources and from globalisation.

2.4.4 The fiscal imbalance and the consolidation

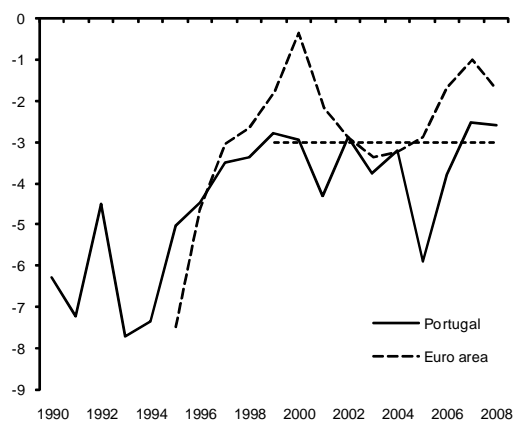
The evolution of public finances in Portugal over the last decade was characterised by the persistence of a structural imbalance. In 1999, Portugal was able to fulfil the fiscal balance and public debt criteria required by the Maastricht Treaty to qualify for the participation in the euro area from its inception. However, in the following years the fiscal situation deteriorated dramatically and between 2001 and 2006, the fiscal deficit recorded very close to or above 3 per cent of GDP and public debt surpassed 60 per cent of GDP, the reference values included in the Stability and Growth Pact (SGP) (see Figures 2.23 and 2.24). It should be highlighted that in the period 2002-2004, the fiscal deficit stayed close but below the 3 per cent of GDP threshold, however it benefited from a sizeable amount of temporary measures, implying that the structural deficit stood above 3 per cent. The temporary measures reached again a non-negligible, although smaller, amount in 2008 (see Chapter 6 in this volume for further details).

In this context, Portugal did not comply with the SGP rules in 2001 and 2005 and this led to the opening of two excessive deficit procedures by the European Commission (EC). In the period 2006-2007, the Portuguese government adopted a number of fiscal consolidation measures aimed at correcting the fiscal imbalance and managed to bring the fiscal deficit to below the 3 per cent of GDP threshold. However, in 2008, the operation of the automatic stabilisers, in the context of a strong slow down in economic activity, coupled with fiscal stimulus measures, in particular those aimed at cushioning the impact of the international financial crisis, implied an interruption of the fiscal consolidation process.

The evolution of the public sector accounts in Portugal after 1999 sharply contrasts with the one that prevailed in the euro area, as the fiscal deficit in the area ranged from 0 to 3 per cent of GDP. This

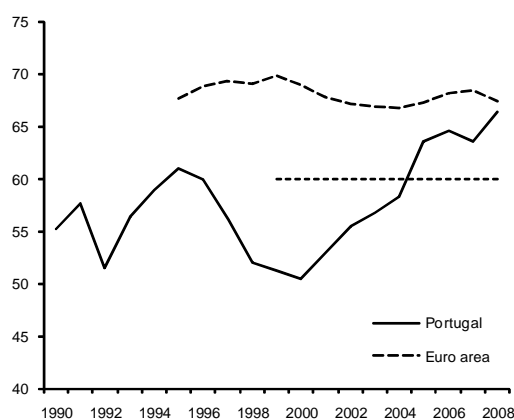
¹⁷See also Denis et al. (2006) and Jacquinot and Straub (2008) on the impacts of increasing competition.

Figure 2.23: Fiscal balance
(as a % of GDP)



Source: BP and AMECO.

Figure 2.24: Government debt
(as a % of GDP)

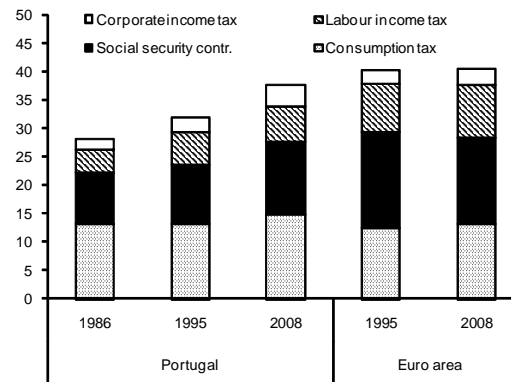


Source: BP and AMECO.

contrasting developments reflect not only rather different macro-economic developments in terms of economic growth, but also, and more importantly, a different fiscal policy stance.

Fiscal revenue as a percentage of GDP has remained broadly stable between 1995 and 2008 in the euro area (around 45 per cent of GDP), while in Portugal it has increased in the same period (from 38 to 43 per cent of GDP), reflecting, mainly, an increase in overall

Figure 2.25: Tax revenue
(as a % of GDP)



Source: BP and AMECO.

tax revenues. The share of consumption tax in the overall tax burden is higher in Portugal than in the euro area, while the opposite occurs with the labour income tax and social security contributions (see Figure 2.25). Moreover, the increase of tax revenues as a percentage of GDP in Portugal essentially reflects an increase in social security contributions (mainly from employers) and consumption taxes, while in the euro area the structure of tax revenues remained relatively stable.

A clearer picture of developments on the revenue side is provided by the evolution of the implicit tax rates, which are used as proxies for the evolution of the average tax rates charged by the Portuguese government. Moreover, it should be referred that these rates are also crucial for the assessment of the impact of the fiscal developments in the Portuguese economy *PESSOA* (see Table 2.8).¹⁸ The tax structure and the particular design and implementation of each tax have country-specific features, reflecting aspects related with the

¹⁸One should reinforce that the relevant tax bases used are mere proxies and therefore might be subject to measurement errors. In practice, tax bases are more complex and country specific. Furthermore, one should be aware that implicit tax rates reflect not only discretionary changes in the statutory tax rates, but also extra revenues arising from increased efficiency in tax collection and composition effects related with the change in the structure of the tax base, as thoroughly explained in Cunha and Braz (2006b). In any case, the computed implicit tax rates seem to be consistent with the available information on the changes in taxation schemes, suggesting that they are useful proxies for macroeconomic modelling purposes.

Table 2.8: Implicit tax rates
(as a % of the relevant tax base)

	Portugal			Euro area	
	1990	1995	2008	1995	2008
Labour income tax	29.5	29.4	34.6	39.6	46.7
Corporate income tax	17.6	20.4	30.5	15.2	17.9
Consumption tax	25.0	24.8	28.2	26.8	30.2
Social security contributions	19.7	21.5	27.7	31.6	30.9
Employer	12.6	14.5	18.5	15.3	16.4
Private sector	14.7	14.2	15.7	NA	NA
Public sector	6.3	15.4	26.2	NA	NA
Employee	6.0	6.4	7.5	10.1	8.9

Note: implicit tax rates are computed as the ratio of the revenue accruing from a specific tax to the relevant tax base. In the case of the labour income tax and of employers' social security contributions, the compensation to employees net of employers' social security payments (adjusted of compensation to self-employed workers) was used as the relevant tax base. The tax base used for corporate income taxes was the net operating surplus (adjusted of compensation to self-employed workers). Private consumption was used as the tax base for consumption tax.

Source: BP, AMECO and authors calculations.

main policy guidelines of each government. Nevertheless, EU countries share a similar tax structure and, therefore, some comparability can be ensured.

The available evidence reveals a widespread increase in implicit tax rates in Portugal from 1995 to 2008. This evolution is likely to reflect not only an increase in some statutory taxes, but also an enlargement of the tax base and an increase in the efficiency of tax administration in the collection (for further details see Chapter 6 in this volume).

The implicit labour income tax rate in Portugal stood below the euro area average, despite the sizeable increase recorded between 1995 and 2008 previously mentioned. The same applies to the employees' social security contributions, which play a role similar to labour income taxes, in the sense they represent an wedge between the firms' wage bill and the households' labour income.

Concerning the implicit corporate income tax rate, it increased from 20 per cent in 1995 to 30 per cent in 2008 in Portugal, while in the euro area it increased from 15 to 18 per cent in the same period. The sizeable increase in the implicit corporate income tax rate,

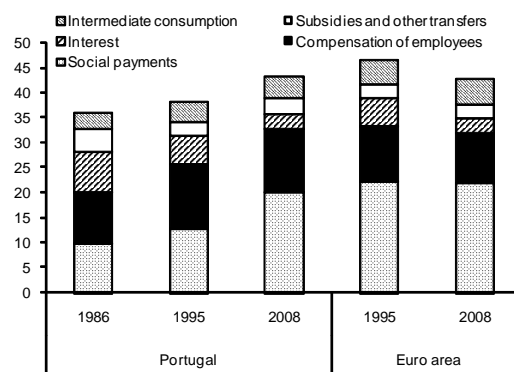
in a context where statutory rates declined from 36 to 25 per cent, reflects essentially the enlargement of the tax base due to changes in the legislation related with the taxation of small businesses profits and the stepping up of the tax administration over the last years, which contributed to increase the efficiency in tax collection. The implicit rate is clearly higher in Portugal than in the euro area and the gap has widened substantially between 1995 and 2008. Though it may suggest that Portugal has become less competitive in international terms from a purely fiscal perspective, in fact this has not been the case, since statutory tax rates, which are the relevant for larger firms, declined significantly and FDI projects are usually subject to bilateral tax agreements between the government and the foreign investors involved.

Employers' social security contributions also play an important role in terms of attractiveness of business investment and job creation. However, in the case of Portugal, it is crucial to distinguish between public and private sector social security contributions, since the public component corresponds to government transfers required to balance the public employees' pension system and do not have a direct impact in the competitiveness of domestic production.¹⁹ The increase in the employers' social security contributions tax rate occurred between 1995 and 2008 resulted mainly from the strong increase in the public sector component, since the private sector component has increased modestly. The small increase in private sector employers' implicit social security contributions rate reflects, among other factors, the enlargement of the tax base due to changes in the legislation related with the taxation of small businesses and with incentives related with the change in the initial pension calculation method.

The ratio of expenditure to GDP in Portugal increased between 1995 and 2008 (from 43 to 46 per cent of GDP, respectively), notwithstanding the substantial decline in the interest outlays (around 5 pp.), unveiling a strong increase in primary expenditure. This has not been the case in euro area, as the expenditure to GDP ratio declined between 1995 and 2008 more than interest outlays, as a result of cuts in current primary expenditure. This evolution has implied that the current primary expenditure in Portugal converged towards

¹⁹It should be mentioned that in Portugal the Government transfers in every year the funds needed to balance the public employee's social security system. The significant increase in social payments by this system has implied a strong increase in government transfers in the last decade.

Figure 2.26: Primary expenditure
(as a % of GDP)



Source: BP and AMECO.

euro area levels in this period (see Figure 2.26), mainly as a result of the strong rise in social payments, largely related with the dynamics of the old age pensions, and of the increase in compensation to employees.²⁰

In terms of the expenditure composition, social payments²¹ are the largest component of current primary expenditure, followed by compensation to employees. In comparison with the euro area, the share of compensation to employees in primary current expenditure is higher in Portugal, while the opposite occurs in what respects social payments. The interpretation of these figures should be very cautious, since it is strongly influenced by the degree of maturity of the social security system, as well as by different strategies in the production and provision of public goods like education or health services, as referred in Cunha and Braz (2006a) (for a deeper analysis on the expenditure developments refer to Chapter 6 in this volume).

The utilisation of *PESSOA* to assess the macroeconomic impacts of the fiscal shock requires the information to be translated into

²⁰It is worth mentioning that the comparison of the expenditure composition between Portugal and euro area might be affected by differences in the delimitation of the general government sector, in the tax system and in the recording of expenditures related with the public sector employees' pension systems.

²¹Social payments correspond to transfers from government to households including, among other items, old-age, disability and survival pensions, unemployment benefits, social payments in kind and public health insurance.

Table 2.9: Government consumption, investment and transfers
(average annual growth rate, in %)

	Portugal 1986-1997	Portugal 1998-2008	Euro area 1998-2008
Real GDP	4.1	1.8	2.1
Government consumption ⁽¹⁾	4.5	3.1	1.9
Government investment	7.6	-4.6	2.5
Current transfers ^(1,2)	6.6	4.1	1.9
of which: Social payments ^(1,2)	7.9	5.2	1.8

Note: ⁽¹⁾Adjusted of payments to public hospitals transformed into corporations.

⁽²⁾Deflated by private consumption deflator.

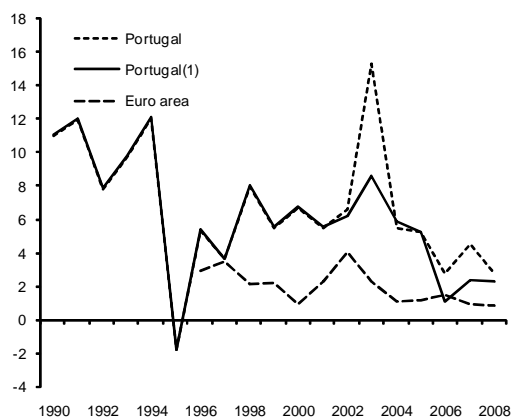
Source: BP, AMECO and authors calculations.

a multiplicity of elementary fiscal shocks that can be simulated using the model. *PESSOA* is equipped with a rich fiscal block in order to capture appropriately the transmission channels of each type of shock. Specifically, on the expenditure side, the model distinguishes between government consumption and transfers shocks; while on the tax revenue side, the model includes channels dedicated to labour income tax, consumption tax, employers' social security contributions and capital income taxes. The available data allows for the calibration of the magnitude and path of these shocks in order to reproduce the fiscal variables presented in Table 2.9.²²

The evolution of government consumption and current transfers presented in Table 2.9 reflects the already mentioned strong growth of government expenditure in Portugal, which is in sharp contrast with the evolution recorded in the euro area. It should be noted that for government consumption and investment, the real growth rates are directly available from the National Accounts data, however the same does not apply to current transfers, which largely correspond

²²The data used for this purpose is adjusted of the impact of the government programme that transformed some public hospitals into public corporations, from late 2002 onwards. In terms of public sector accounts, this change implied that government payments ceased to be recorded as compensations to employees and intermediate consumption expenditures and started being recorded as a social payments in kind. Essentially, this change in the recording of this expenditure in terms of the public sector accounts, should not affect public consumption, but leads to a decline in compensation of employees and intermediate consumption and to an increase in social payments and in sales. For further details on this programme and its impacts refer to Chapter 6 in this volume.

Figure 2.27: Consumer value of social payments
(annual growth rate, in %)



Note: ⁽¹⁾adjusted of the impact of transformation of public hospitals into corporations.

Source: BP, AMECO and authors calculations.

to social payments. To get a measure of real growth rate, denominated the consumer value of social payments, the nominal value is deflated by the private consumption deflator (Figure 2.27). The large growth of this component in Portugal in the period considered reflects, among other factors, the rise in the number of pensioners and compositional effects (see Chapter 6 in this volume for further details on the evolution of social payments in Portugal and its main determinants). As for public investment, while in the period 1986-1997 it grew faster than real GDP, in the period 1998-2008 it has declined sharply. However, in the case of Portugal, the available data for public investment might be subject to a downward bias, since a number of infrastructures were developed with recourse to public-private partnerships (PPP), implying that the corresponding expenditure is recorded in the National Accounts as business investment.

The evolution of the government primary expenditure to GDP ratio provides an important piece of information to assess the sustainability of the public finances. In the euro area, the government primary expenditure to GDP ratio has remained fairly stable, but that has not been the case for Portugal. This divergent path points to the importance of implementing reforms aimed at curbing the public expenditure growth, namely in what respects social payments and health services. These items account for a large share in overall

public expenditure and are likely to be severely affected by the ageing phenomena in the coming decades. It should be mentioned that the pension systems of both public and private sectors have been under reform since late 2005 with the aim of increasing the sustainability of the public sector accounts (for a detailed discussion on the impact of ageing in public finances sustainability see Chapter 6 in this volume).²³

The general Government accounts in Portugal and in the euro area largely benefited from the decline of interest rates in the context of the nominal convergence process. Portuguese Government interest outlays declined from 8 per cent of GDP in the mid-80's to close to 6 per cent in 1995 and then to 3 per cent from 1998 onwards, despite the 5 pp. increase in the public debt ratio. In the euro area, interest outlays also declined from more than 5 per cent of GDP in 1995 to close to 3 per cent in 2008, in a context where the public debt to GDP ratio remained broadly stable, though at a higher level than in Portugal. This evolution of the Government interest outlays, largely benefitted from the decline in inflation, which brought nominal interest rates to lower levels, but also from the elimination of the exchange rate risk premium and from the maintenance of extremely favourable financing conditions in the period before the outbreak of the current financial crisis in mid-2007.

The evolution of government expenditure and revenue and their impact on the balance sheet of the public sector is summarised by the developments of the debt to GDP ratio. In Portugal, the public debt to GDP ratio is clearly below euro area average, having declined by close to 10 pp. during the second half of the 90's, reflecting the strong growth of economic activity and the impact of revenues arising from privatisation operations legally committed to the redemption of public debt. However, the slowdown in economic activity recorded since early 2000's, the maintenance of a strong growth of primary expenditure and the end of the privatisation process unveiled a sizeable fiscal imbalance, which translated into a steady increase of the public debt ratio. In the period 2006-2007, the adoption of fiscal consolidation measures have led to a decline in the fiscal deficit and curbed the public debt rise. However, the outbreak of the financial crisis in mid-2007 led to a substantial deterioration of

²³The reform of the social security system essentially changed the rule for the update of pensions and introduced a *sustainability factor* that will automatically adjust new pensions to life expectancy developments.

the fiscal balance and to an increase of the public debt ratio in many euro area countries, including Portugal as of 2008.

The simulation results from *PESSOA* using a set of temporary fiscal policy shocks allow for a detailed assessment of the impact of the fiscal developments described above (Figure 2.28).²⁴ The calibration of the shocks takes 1998 as the reference year, meaning that it aims at replicating the cumulative difference of each fiscal aggregate with respect to 1998.

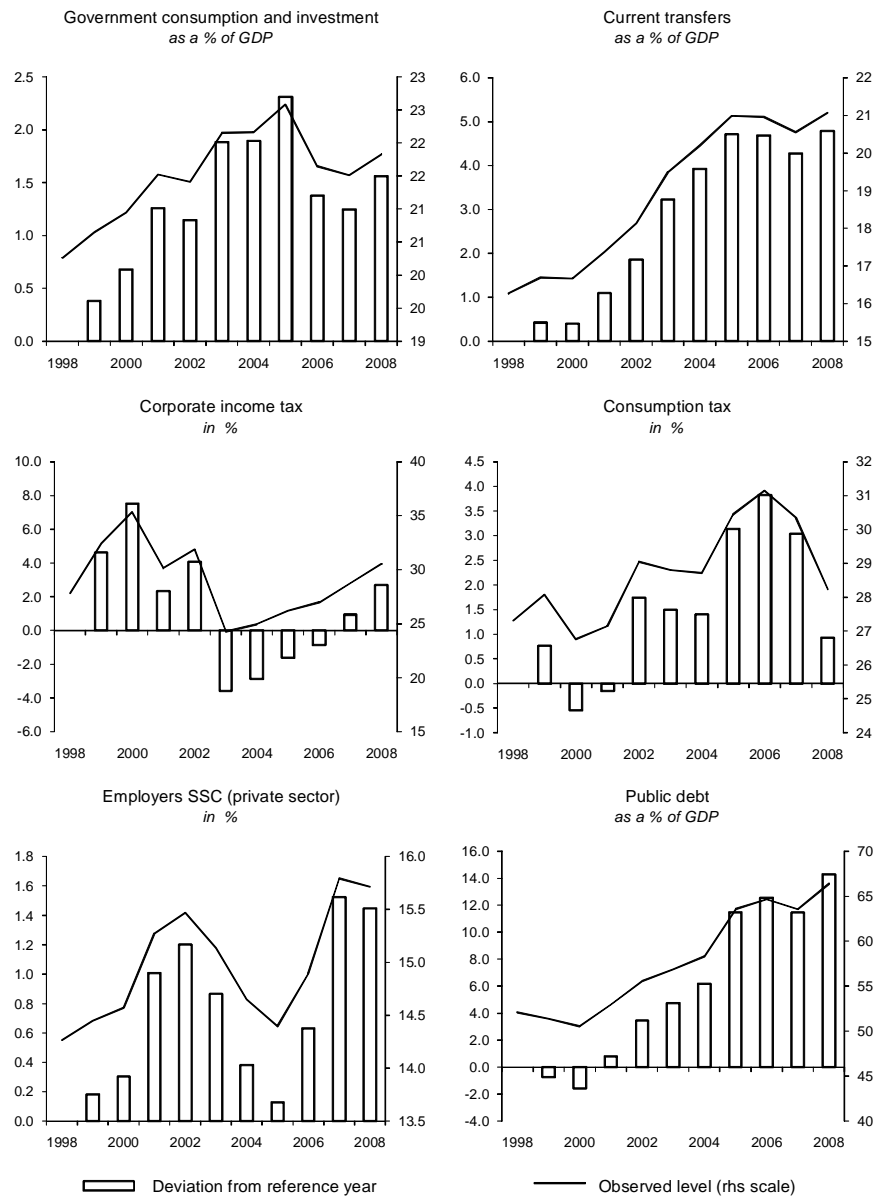
The simulation results reveal that, according to *PESSOA*, the full set of fiscal shocks implied a positive impulse in real GDP in the early years of the simulation period (broadly corresponding to 1999-2000) and a negative impact thereafter (Figure 2.29).

The model suggests that the government expenditure increase at the beginning of the simulation period boosted demand not only through the increased demand for government consumption, but also through an increased demand for private consumption goods related with the increase in transfers to households. It should be reinforced that in *PESSOA*, households' behaviour is largely non-Ricardian, implying a non-negligible part of transfers will be taken as a net wealth increase, inducing higher consumption expenditures. The boom in public and private consumption implied an increased demand for intermediate goods, which is largely concentrated on non-tradable goods and therefore generates a substantial demand side pressure on hours. In addition, in the first years of the simulation period, implicit corporate income tax rate rises, inducing some substitution of capital for labour at the firm level, which mounts on the already mentioned pressure on hours worked.

From the fifth year onwards, the overall developments in implicit tax rates determine an increase in the overall tax burden. However, the simulation results suggest that to face the increase in expenditure recorded, taking public debt developments as given, a much

²⁴It should be reminded that although *PESSOA* includes a disaggregated fiscal block, a number of simplifications had to be considered to keep the model analytically tractable. In particular, labour income taxes and employees' social security contributions are assumed to play an identical role and therefore the joint effect is considered. In addition, government consumption and investment play no particular role in the model and therefore they have trivial impacts in the economy, mounting on demand side pressures and absorbing part of the intermediate goods production, which implies a crowding-out of private expenditure. Finally, in *PESSOA*, the private consumption good is the numeraire, implying in particular that government transfers to households must be expressed in terms of consumption good units. For further details on *PESSOA* see Almeida et al. (2008).

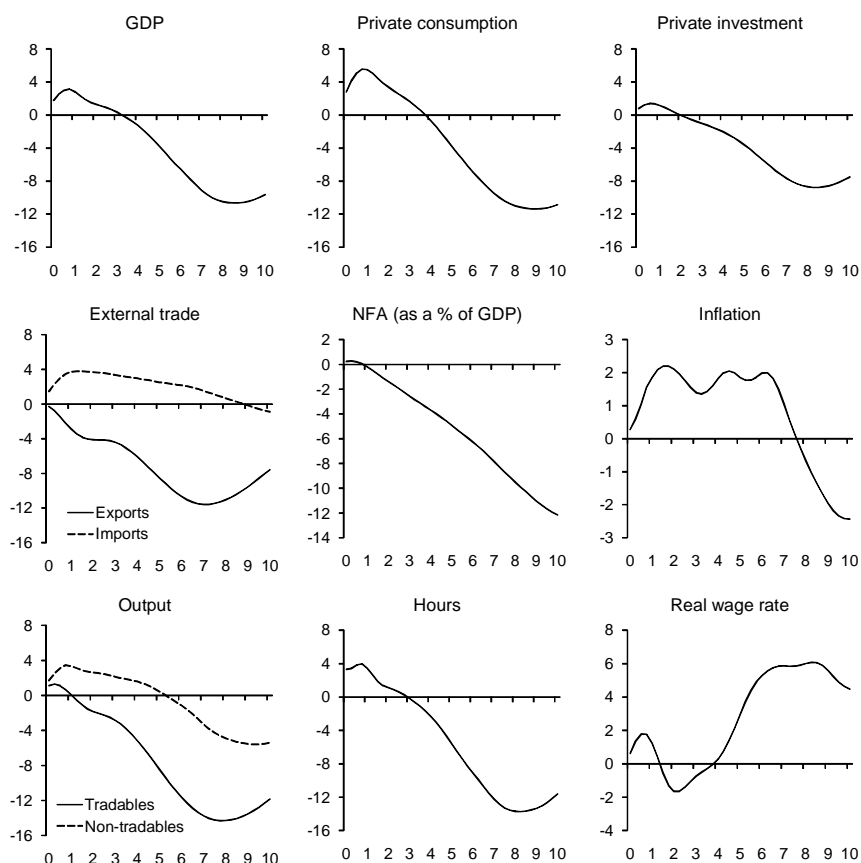
Figure 2.28: The fiscal policy shock



Source: BP, AMECO and authors calculations.

higher increase in the labour income tax would have been required. This can be a hint that other shocks have affected public sector accounts developments during this period (e.g. the permanent decline

Figure 2.29: The impact of the fiscal policy shock
 (deviation from initial steady-state in %; inflation and NFA in pp.)



Note: the simulation results show the impact of the set of temporary fiscal policy shocks presented in Figure 2.28, under the assumption that labour income tax rate adjust as much as required to keep public debt on a sustainable path.
 Source: authors calculations using *PESSOA*.

in productivity is likely to have induced additional fiscal pressure, while the elimination of the exchange rate risk premium shock on interest rates might have eased the pressure). The increase in employers' social security contributions in this period determined that labour became a more expensive production factor than capital in relative terms. Moreover, from the households point of view, the increase in labour income taxes implied that *ceteris paribus* labour was less rewarded, while the increase in consumption tax eroded the ac-

quisitive power of wages, also affecting negatively households' real income and, therefore, households' consumption expenditures. In addition, the corporate income tax declines from the middle of the simulation period onwards, implying that the return on capital increased in relative terms. This change in the relative price of production factors, contributed to reduce the pressures that mounted on the labour demand, inducing the utilisation of technologies more intensive in capital. According to the simulation results, hours worked should have declined from the middle of the simulation period onwards, after the hike that might have been recorded in the first years.

Turning to external developments, according to the simulation results, the fiscal policy shock induces a significant real exchange rate appreciation with non-negligible consequences on the competitiveness of Portuguese tradable goods both on external and domestic markets. The sizeable decline in exports and the increase in imports, in a context where the Marshall-Lerner condition holds, implies a protracted deterioration of the trade balance to GDP ratio, translating into a persistent increase in the net external borrowing requirements and into an increase in the net foreign debt position of around 12 per cent of GDP. The simulation results suggest that a small open economy integrated in a monetary union benefits from the international risk sharing possibilities, limiting crowding-out effects. Indeed, in an international framework characterised by favourable financing conditions and up to a certain threshold, new public debt issuance is in large part taken by foreign agents without a deterioration of domestic credit standards (as referred in Chapter 7 in this volume, 80 per cent of public debt is held by non-residents). However, one must be aware that this might not apply for high indebtedness levels in situations of heightened tensions in financial markets. In this circumstances, such a situation might lead to a rise in the country risk premium.

On the nominal side, the model simulation results suggest that inflation developments are largely driven by the impact on consumer prices of the increase in the implicit consumption tax rate and, to a minor extent, by the effect on marginal costs of intermediate goods production arising from the initial increase in hours required to meet non-tradable goods demand. The need to meet an increased labour demand is likely to have implied higher wage inflation in the short-run, to induce households to supply enough labour services, which translated into higher production costs and

mounted on inflationary pressures. In the medium-run, the maintenance of consumer goods inflation rate above the initial steady-state, mainly stemmed from a higher taxation on labour income and private consumption expenditures to finance the increase in government expenditure levels. *Ceteris paribus* this increase in tax rates ultimately implies that firms need to increase the nominal wage rate to hire the same amount of hours. One must recall that increases in the consumption tax as well as labour income tax implies that workers cannot maintain their initial consumption levels at the prevailing wage conditions. Therefore, wage demands increase to compensate households for foregone purchasing power, limiting the impacts on the consumption-leisure decision.

The impact on the public sector accounts is more intricate, since one must distinguish between the shocks, which are exogenous, and its impact in a number of fiscal ratios determined endogenously by the model. The model features a fiscal rule that adjusts the labour income tax rate endogenously to meet the fiscal target. Therefore, the adjustment of the labour income tax rate reveals important information on the sustainability of the public finances. The simulation results point to a cut in the labour income tax rate in the very beginning of the simulation period and an upward adjustment from the third year onwards, revealing that the gradual increase in expenditure is not fully matched by the remaining tax rates. This adjustment of the labour income tax rate is broadly in line with the evidence in the data, pointing to a decline of the labour income tax rate in 1999 and to an increase only after 2003. However, the magnitude of the increase suggested by the model is much higher than the one revealed by the available data. However, it should be noted that this is the increase in labour income tax rate required to keep the debt on a sustainable path in the absence of additional adjustment tools and shocks with opposite impact. One must recall that in the period under analysis other types of revenues were used to keep the public debt at a lower level besides tax revenues (for further details on the one-off measures considered in the period 2002-2004 see Chapter 6 in this volume); in addition, the shock induced by the financial integration and the nominal convergence process, that led to a decline in nominal interest rates, has also implied a sizeable decline in government interest outlays, which has also worked in the opposite direction, allowing for a smaller increase in labour income tax rate.

To sum up, the analysis performed in this Subsection suggests

that fiscal policy may have largely contributed to the short-lived boom experienced by the Portuguese economy. The Government conducted an expansionary fiscal policy, which largely benefitted from the decline of interest outlays, in the context of the financial integration and the nominal convergence process. In the short-run, this had an amplifying effect on domestic demand, leading to an even higher demand and output growth. However, as the convergence of interest rates was completed and the boom in economic activity moderated, it became obvious that the new current primary expenditure level was not sustainable at the prevailing tax rates, revealing a structural imbalance of the general government accounts. As a result, excessive deficits mounted implying a fiscal consolidation process with further tax increases and expenditure cuts.²⁵ The simulation results suggest that during the economic boom triggered by the participation in the euro area, it would have been more adequate to consolidate the public finances and use the surplus arising from stronger economic activity developments and lower interest outlays to repay public debt, avoiding the negative implications arising from the need to correct the imbalance created by the short-lived fiscal boom. In any case, it should be mentioned that fiscal policy hardly could have avoided the boom in demand stemming from the elimination of the exchange rate risk premium on interest rates as referred in Fagan and Gaspar (2006).

2.5 Improving competition in domestic markets: an opportunity

The appropriate functioning of domestic markets and, in particular, a high degree of competition in the labour and non-tradable goods markets, plays an important role in economic growth, being determinant for a sound business environment, which is an important factor behind firms' location at a global scale (see Blanchard and Giavazzi (2003) and Aghion, Askenazy, Bournès, Cetté and Dromel (2007)). This Section gathers evidence on the regulatory and institutional framework of product and labour markets in Portugal and

²⁵It must be highlighted that the mounting uncertainty in the early years of the decade on the type of measures that would be used to address the fiscal imbalance as well as on the timing of the correction may have induced some postponement of private investment decisions, which is not captured in *PESSOA* and that might have affected the time profile of the shock.

uses *PESSOA* to illustrate the macroeconomic impacts of increasing competition in the non-tradable goods and labour markets (for a detailed analysis on the possible impact of higher competition levels in the domestic markets in Portugal refer to Almeida et al. (2008)).

In the case of a small open economy participating in a monetary union, the appropriate functioning of domestic markets is particularly relevant to maximise the potential effects from trade integration. In this context, it is crucial that domestic markets are flexible enough to ensure a fast and correct reallocation of resources, in particular labour, to industries revealing comparative advantages. These requirements are particularly relevant for countries like Portugal, which reveal an exports' pattern more similar to the one of the new players in global markets. This might have implied a short-run impact of globalisation in output and income less benign than for countries with an export pattern marked by products with a high technological content.

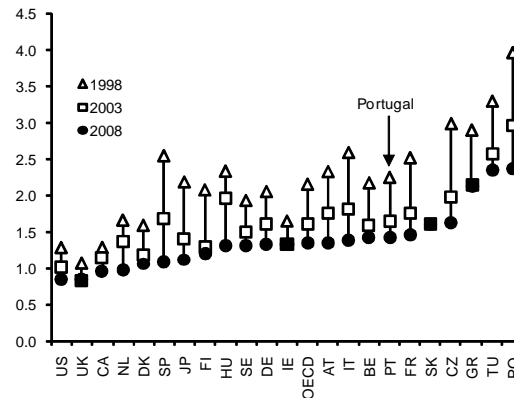
In what concerns the competitiveness of the Portuguese economy, the role of product and labour markets in providing an efficient allocation of resources is also of major importance. In particular, low competition in these markets tends to imply higher price mark-ups, harming international competitiveness of domestic tradable goods. In addition, the combination of weak competition with price and wage rigidities implies larger fluctuations in real variables, whenever the economy is hit by temporary shocks.

According to the OECD Product Market Regulation indicators (henceforth referred as PMR), the regulatory framework of the product market improved in Portugal in the period 1998-2008, but the country's relative position among OECD countries did not improve significantly (Figure 2.30). Furthermore, one should stress that the impact of the regulatory framework depends not only on the legislation, but also on its practical implementation and enforcement.

The role of the government in the economy and the control it exerts over private business activities are commonly pointed out as practices restraining competition (Figure 2.31). The evidence also suggests that the business environment can benefit substantially from reforms aimed at reducing the regulatory and administrative burden, which might be an important factor in attracting FDI projects. In addition, there is room for improving licensing processes that might translate into an easier access to the market and into higher competition levels. In this context, it must be mentioned

Figure 2.30: Product Market Regulation

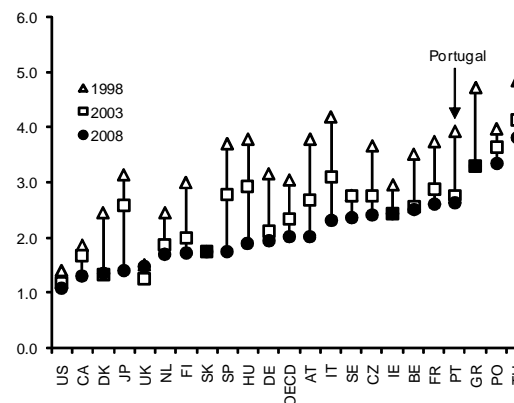
(0-6 from least to most restrictive in terms of competition)



Source: Product market regulation indicators database, OECD.

Figure 2.31: State involvement in the product market

(0-6 from least to most restrictive in terms of competition)



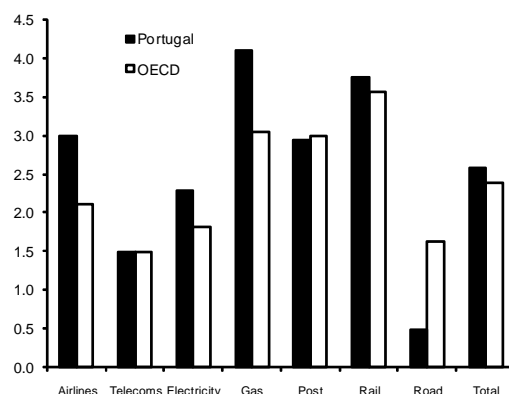
Source: Product market regulation indicators database, OECD.

that the Portuguese Government has recently adopted a number of measures addressed at reducing the administrative burden whose impact still depends, however, on its practical implementation.²⁶

The level of competition in the non-tradable goods markets is the

²⁶This evidence has been conveyed in OECD surveys on the Portuguese economy over the last few years. For a detailed analysis see OECD (2006) and OECD (2008).

Figure 2.32: Regulation in network industries, by sector
(0-6 from least to most restrictive in terms of competition)



Note: these indicators compare the regulatory framework in each industry across OECD countries, taking into account the technological specificities of each industry. Therefore, the comparability across industries is not ensured.

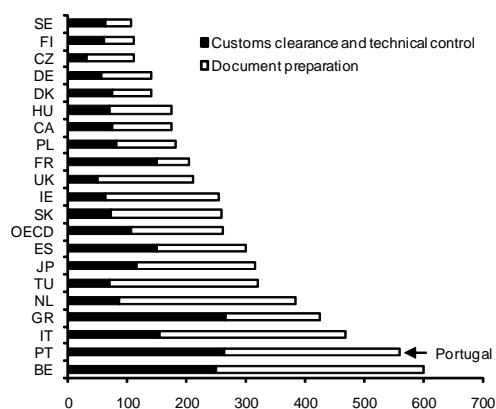
Source: Product market regulation indicators database, OECD.

one that deserves more attention, not only due to its impact on consumer's welfare, but also due to the fact that firms operating in these markets, by definition, do not face competition from abroad. In addition, one must account for the fact that non-tradable goods prices exert a significant impact on the price of final consumer goods, since they are heavily used as intermediate inputs in the production of these final goods.

In what concerns network industries, there is evidence of low competition levels, which is largely related with barriers to entry and public ownership, reflecting among other factors the already mentioned Government involvement in private business activities (Figure 2.32).²⁷ The persistence of regulatory frameworks that allow for low competition levels in these industries may induce higher price mark-ups, indirectly affecting the prices of final goods. In ad-

²⁷It should be mentioned that PMR indicators only made use of observable information and, therefore, do not account for the enforcement of the existing regulation or even the quality of the specific regulatory practices in each country. This might be an important caveat, in particular, in the countries where there is a low enforcement. For more on the importance of the enforcement of product market regulation see Høj (2007).

Figure 2.33: Costs of importing a container, 2007
(20-foot container, in \$US)



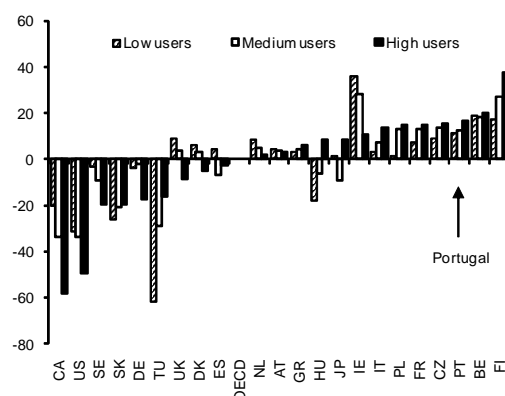
Source: OECD, Economic Surveys: Portugal, based on World Bank, Doing Business 2008.

dition, the external trade in manufacturing goods will certainly benefit from a more efficient logistics network and a better interconnection between road, rail and sea transport networks. Anecdotal evidence on port charges points to high price levels by international standards (Figure 2.33). As for telecommunications, despite the fact that PMR indicators do not point to regulations more restrictive of competition in Portugal than the average OECD, the available data reveals that ex-post fixed line telephone charges are higher than the OECD average, which might be an indication that, though the regulatory framework might be similar to other OECD countries, the practical implementation and enforcement might lead to weaker competition levels in practice (Figure 2.34).

All in all, the PMR indicator for Portugal suggests that the regulatory framework in the non-tradable goods markets has room for improvement, in particular in network industries (energy, telecommunications and transports), in order to bring Portugal closer to the best practices in terms of product markets' regulation.

As for the labour market, the most recent release of the OECD Employment Protection Legislation (EPL) overall indicator reveals that the situation in Portugal evolved favourably. The country is now closer to OECD average due to the recent implementation of labour market reforms (Figure 2.35). Nevertheless, the evidence still points towards the persistence of some aspects in which the func-

Figure 2.34: Fixed line telephone charges
(% deviation from OECD average)



Source: OECD, Economic Surveys: Portugal.

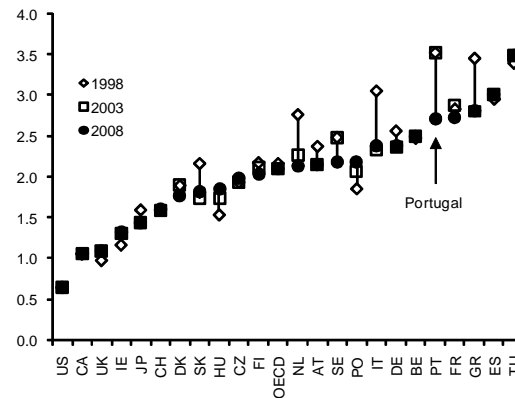
tioning of the labour market in Portugal is still lagging behind the best practices among advanced economies, in particular in what respects individual dismissal and the regulation of temporary work. Moreover, the announced minimum wage increase, in a context of lower labor productivity growth, may have an undesired impact on unemployment (see Chapter 4 in this volume).

Concerning the design of unemployment benefits, the Portuguese scheme is among the most generous, not only in terms of the replacement ratio, but mostly, and more importantly, in terms of benefits duration, which is among the highest in the OECD (Figure 2.36). The combination of a high employment protection level with generous unemployment benefits and average low skills of the workforce, among other factors, has contributed to high reservation wages, long unemployment spells and to a significant increase in the natural unemployment rate (for a detailed discussion of the evolution of the natural unemployment rate and its main driving forces refer to Chapter 4 in this volume).

Concerning the first simulation exercise (Figure 2.37), a permanent decline of 10 per cent in both the non-tradable goods price mark-up and the wage mark-up²⁸ were considered.

²⁸The wage mark-up corresponds to the wedge over the marginal rate of substitution between labour and consumption created by monopolistic competition in the labour market. This mark-up tends to widen as competition in the labour market declines.

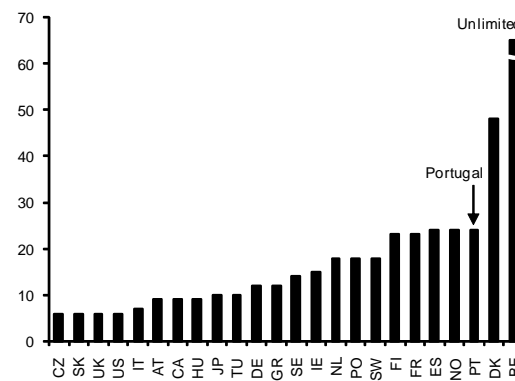
Figure 2.35: Employment protection legislation
(0-6 from least to most restrictive in terms of competition)



Note: in the cases of Portugal and France the figures already available for 2009 were used instead of 2008 figures.

Source: Employment protection legislation database, OECD.

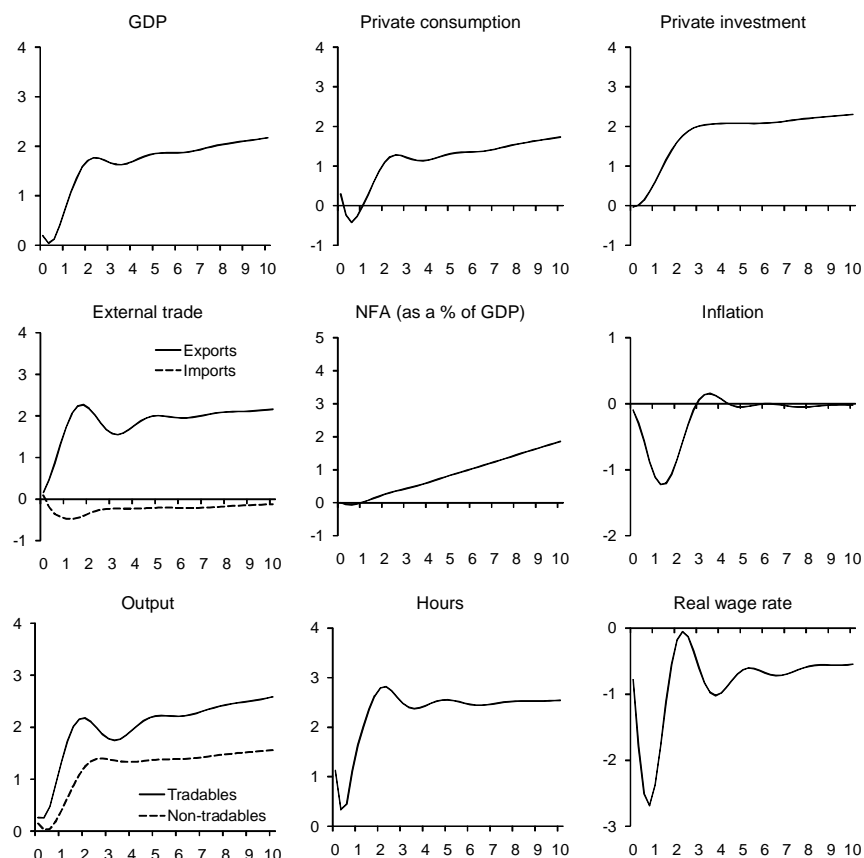
Figure 2.36: Maximum duration of unemployment benefits, 2005
(in months)



Source: Benefits and Wages 2007, OECD.

The mark-ups reduction leads to a decline in the marginal costs of production of final goods, implying a real exchange rate depreciation and a consequent increase in the competitiveness of Portuguese exports. As a result, exports demand rises and a substitution of imports by domestic tradable goods is fostered, implying a higher

Figure 2.37: An increase in competition in the domestic markets
 (% deviation from initial steady-state level; inflation and NFA in pp.)



Note: the simulation results show the impact of a permanent decline in the wage mark-up over the marginal rate of substitution between leisure and consumption from 25 per cent to 22.5 per cent and a permanent decline in the non-tradable goods price mark-up over the marginal costs from 20 per cent to 18 per cent.
 Source: authors calculations using *PESSOA*.

demand for intermediate goods.

The decline in the non-tradable goods price induces a substitution of tradable (both domestic and imported) for non-tradable goods in the production of final goods, implying a further decline in the import content. In addition, the reduction in the price of labour, due to the cut in the wage mark-ups, induces a more intensive utilisation of labour, implying a permanent increase in hours worked.

However, the decline in final goods marginal costs and prices also leads to a decline in the price of capital goods, which implies an increase in the capital stock. Therefore, the impact of these reforms in the capital/labour intensity is rather ambiguous.

The increase in demand for intermediate goods boosts demand for capital and labour services. To supply more hours, households demand higher labour income, implying an increase in households' real wage or a decline in the labour income tax rate. Results show that real wages are driven upwards by this effect, since the decline in the labour income tax is not enough to shift labour supply upwards in the required amount, partially compensating for the decline in the wage mark-up. Specifically, the decline in real wages is close to 1 per cent, while the mechanical impact arising from the cut in wage mark-ups is 2.5 per cent.

Despite some decline on impact, private consumption is significantly shifted upwards from the second year onwards as a result of the effect on households' income of a decline in the labour income tax rate, higher dividends and a limited decline in real wages. In addition, the net foreign asset position also improves due to the enhanced competitiveness conditions. An apparently puzzling result is that in a context where the non-tradable goods price mark-up declines, the demand for tradable goods increases more than the demand for non-tradable goods. There are three main motivations for this: (i) the increase in non-tradable goods intensity of final goods is limited by the low elasticity of substitution of tradable goods for non-tradable goods; (ii) in a small open economy participating in a monetary union, the real exchange rate path is crucial, with a direct effect on exports (which are tradable goods intensive) and on import contents; (iii) the most intensive final good in non-tradable goods is government consumption, which remains unchanged by assumption.

A number of issues are raised concerning the timing and implementation of the simulated reforms. Firstly, the impact of the shock is additive, meaning that the joint impact of the decrease in the mark-up in non-tradable goods prices and wages can be reasonably captured as the sum of the impact of the individual reforms. This raises the policy implication that from a purely economic perspective there are no significant gains or losses from implementing both reform packages simultaneously. However, it should be kept in mind that it is assumed that product and labour market reforms

are fully independent, which might not be very realistic, since the wage premium may reflect a share of monopoly rents generated by the lack of competition in the goods market and, therefore, higher competition in the goods market may induce by itself a decline in the wage mark-ups.²⁹

The second issue is related with the transition path. In the short-run, there is a negative impact on households' consumption, reflecting, on the one hand, the increase in the real interest rate and, on the other hand, the lower dividend income arising from the decline in non-tradable goods mark-up. The increase in the real interest rate arises from the temporary period of below initial steady-state inflation rate, implied by the reduction in mark-ups, and is a particular feature of a small open economy participating in a monetary union, since the monetary policy interest rate is not affected by developments specific to a small part of the union. The higher real interest rate translates into a decline in the present discounted value of labour and dividend income and lowers the marginal propensity to consume. Therefore, non-liquidity constrained households are induced to postpone consumption expenditures, since they get a higher real reward for saving in the current period. However, it should be clear that the negative impact on consumption is only a short-run effect and that forward looking consumers are aware that in the future these reforms will have a positive impact on their consumption. Therefore, the temporary negative effect should not raise particular discontent. Furthermore, one may derive the implication that implementing these reforms in the peak of the business cycle when inflation, consumption and economic activity stand above their steady-state level, will not only yield long-run beneficial impacts already mentioned but will also contribute to dampen the business cycle fluctuation.

In conclusion, results suggest that a 10 per cent reduction in both non-tradable goods price and wage mark-ups has non-negligible positive impacts on economic activity, households' consumption and hours worked, mainly through important international competitiveness gains arising from the real exchange rate depreciation. Therefore, reforms aimed at increasing competition can be valuable instruments to promote the necessary adjustments in the Portuguese economy, within the monetary union framework.

One should highlight that these impacts are likely to be under-

²⁹For a detailed discussion see Jean and Nicoletti (2002).

estimated, since a number of aspects that may be relevant are not featured in the model. In particular, reforms aimed at increasing competition are also likely to induce important productivity gains, stemming from the shutdown of less efficient production units, a more efficient organisation of the remaining ones and the settlement of new and more productive units. Moreover, it tends to induce FDI inflows and higher investment in R&D, which typically also leads to increased TFP (see Blanchard and Giavazzi (2003), Aghion et al. (2007) and OECD (2008)). Nevertheless, the low human capital level of the Portuguese labour force and the complementarity between human and physical capital might limit the magnitude of these impacts in the Portuguese economy. Nevertheless, one should also be aware that the improvement in human capital level is also likely to be more effective in a competitive environment that promotes a higher quality of matches in the labour market.

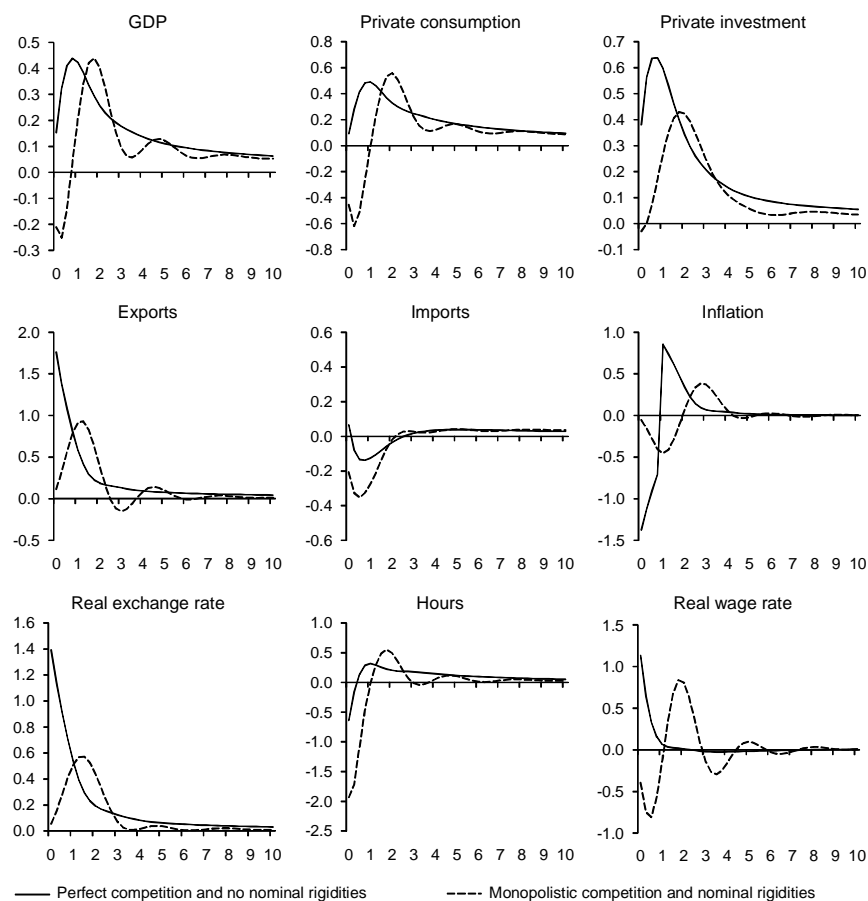
In the second simulation exercise, two alternative versions of *PESSOA* are used, differing only in the competition level in the product market: the first is the one considered in the previous simulation, with monopolistic competition and nominal rigidities (the benchmark scenario); the second features perfect competition in the product market and therefore fully flexible prices. To gather model based evidence on the impact of monopolistic competition and price rigidities, two scenario simulations are conducted: (i) a temporary 2 per cent increase in productivity (Figure 2.38); and (ii) a temporary 5 per cent decrease in non-price competitiveness on the export side (Figure 2.39).

In the perfect competition context, the decrease in marginal costs determined by the positive productivity shock is rapidly passed to final goods prices, implying a stronger and less long-lived decrease in inflation than in the base case. This results in a stronger and more short-lived depreciation of the real exchange rate, leading to a significant improvement in competitiveness on impact.

Regarding private consumption, the stronger and faster increase stems not only from wealth effects stemming from the evolution of real wages that affect positively households' income prospects, but also from the temporary reduction in prices that induces some intertemporal substitution towards current consumption. Additionally, as mentioned before, with a frictionless product market, the shock has a stronger impact on activity, which translates into an increase in fiscal revenues, implying a reduction in the labour income

Figure 2.38: A temporary increase in productivity

(% deviation from initial steady-state level, inflation in pp.)



Note: the simulation results compare the impact of a 2 per cent temporary increase in neutral technological progress in both tradable and non-tradable goods manufacturers, in the standard calibration of *PESSOA* and in a calibration in which all price mark-ups and price rigidities are eliminated.

Source: authors calculations using *PESSOA*.

tax rate to maintain the government debt on the target in the absence of other fiscal policy measures. This fiscal channel plays an important role, since it affects the after-tax wage income, inducing a shift in the consumption-leisure choice. In turn, the evolution of investment in the frictionless economy essentially reflects the impact of a faster adjustment of prices and of an increase in the demand for

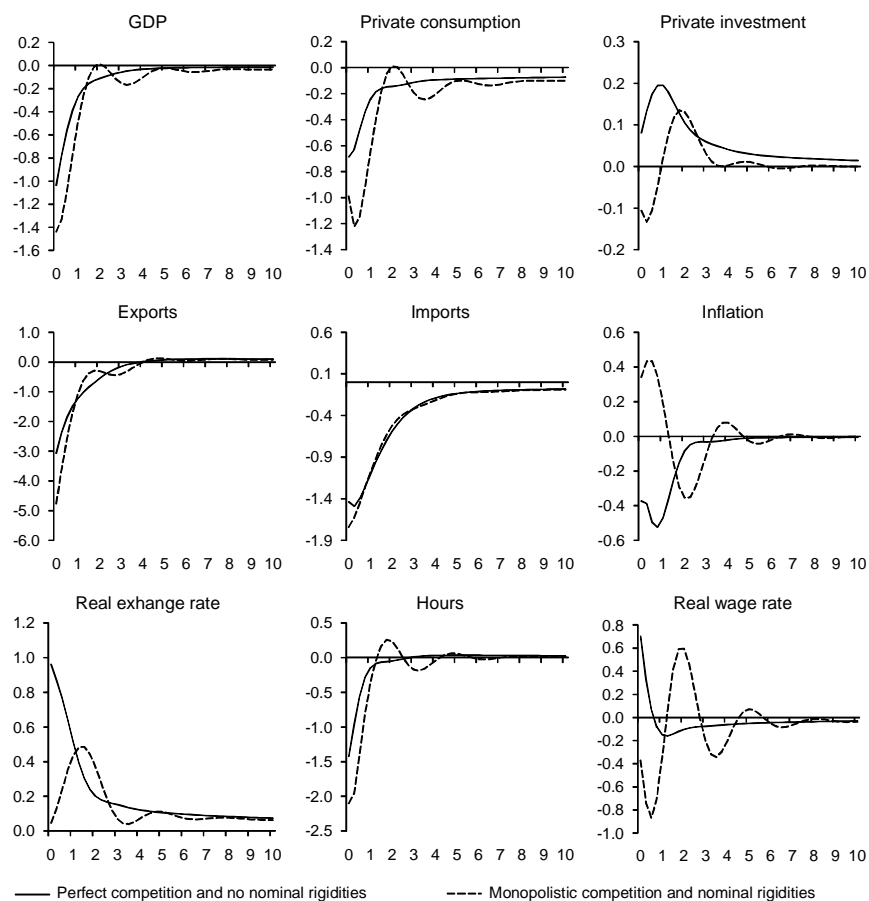
final goods, which leaves factors' demand broadly unchanged, despite the increase in productivity. Therefore, the technology shock leads to a higher return on capital, implying an increase in its price, as measured by Tobin's-Q. This implies that the value of each unit of installed capital is higher than the one of each new capital unit and, therefore, increasing the capital stock is clearly the optimal strategy for manufacturers.

The second simulation, a decrease in non-price competitiveness on the export side, yields very similar results (Figure 2.39). GDP and its components decline less and adjust faster to its steady-state level in a flexible economy, following a market share loss shock. The main driving force behind this different behaviour is again the response of inflation. In a frictionless economy, prices react faster, following the shift in external demand, which implies a stronger and faster depreciation in the real exchange rate than in monopolistic competition, partly compensating market share losses and the decline in exports. Furthermore, the smaller increase in the labour income tax rate, combined with the short-run increase in real wages motivated by the decline in inflation, contributes to a smaller decline in private consumption. Finally, in a frictionless economy, the decline in the return on capital is smaller, which implies a smaller decline in the desired capital stock level and thus a more favourable evolution of investment than in the monopolistic competition framework.

The simulation results show that a more competitive economic environment implies a higher resilience of real variables in the case of a temporary shock, since more flexible prices imply a faster return to the initial steady-state.

Summing up, the available indicators show that the Portuguese economy has a structural problem of weak competition in the non-tradable goods and labour markets, suggesting that there is room to implement reforms. In particular, an improvement of the role of the government in the economy and the promotion of higher labour mobility and an alternative design of unemployment benefit schemes seem to be important aspects in this process. The simulation results suggest the relevance of these reforms, showing that a reduction in the non-tradable goods price and wage mark-ups is able to foster economic activity, private consumption and employment, mainly through important international competitiveness gains generated by the real exchange rate depreciation. Furthermore, results point to sizeable gains in reducing the prevailing degree of rigidities

Figure 2.39: A temporary decrease in non-price competitiveness
 (% deviation from initial steady-state level, inflation in pp.)



Note: the simulation results compare the impact of a temporary 5 per cent decrease in the non-price competitiveness on the export side, in the standard calibration of *PESOA* and in a calibration in which all price mark-ups and price rigidities are eliminated.

Source: authors calculations using *PESOA*.

and monopoly power, through the enhancement of the ability of the economy to accommodate temporary shocks. Therefore, the suggested reforms could contribute to overcome some structural deficiencies, which are crucial to the resumption of the real convergence of the Portuguese economy in the near future.

2.6 Conclusion

This article investigates the main driving forces behind the Portuguese economy's evolution over the last 20 years, with particular emphasis on the last decade. This evolution was highly uneven: after a period of strong growth during the 90's, which allowed for a remarkable progress in the real convergence towards the average income levels prevailing in the euro area, the country's economic performance started to deteriorate, determining an interruption of the real convergence process.

These developments are a reflection of both structural fragilities and shocks. Concerning structural fragilities, the crucial aspect seems to be the persistence of very low productivity levels, which largely undermined the country's efficiency and international competitiveness of Portuguese firms. This situation is related to several factors, with the most crucial ones being: the maintenance of a low quality of production factors, particularly in what concerns the level of human capital, which revealed particularly harmful in a context of skill-biased technical progress; the low level of investment in R&D, which has limited innovation and prevented access to more productive technologies; and the existence of several restrictions to a sound business environment, with a focus on low competition levels in the labour and non-tradable goods markets and a heavy administrative burden.

Moreover, a number of shocks seem to have significantly affected the Portuguese economy in the last twenty years, shaping its evolution in several dimensions. Focusing on developments in the past decade, an heuristic approach was used to identify four shocks that most likely played an important role in economic developments: a slowdown in TFP; a decline in interest rates and a reduction in liquidity constraints; a reduction of exports non-price competitiveness; and the short-lived fiscal boom and subsequent fiscal consolidation process.

Taken together, these shocks have been of paramount importance in explaining developments in Portuguese real GDP, investment and exports, as well as in inflation and net foreign debt. The deceleration in TFP had a prominent role in explaining the slowdown in real GDP, highlighting the importance of implementing reforms in the education system, in markets regulation and of the simplification of administrative procedures. In turn, the financial liberalisation and the decline in liquidity constraints were of key

CONCLUSION

importance in the increase in private consumption and investment, but also in the rise of external indebtedness, which however corresponded to a rational response of economic agents in the context of an anticipation of permanently more favourable financing costs. The decrease in exports non-price competitiveness played a crucial role in preventing a more satisfying economic performance, revealing the importance of exports to maintain a sustainable economic growth pattern in a small open economy. Finally, the short-lived fiscal boom and the subsequent fiscal consolidation effort have largely contributed to expanding and then contracting private expenditure, putting in evidence the harmful impacts of the fiscal boom on economic activity in the medium-run. Notwithstanding the relevance of these results, the deceleration of private consumption observed in the data is fairly modest in comparison with the one resulting from model simulations, suggesting that the analysed shocks do not span the whole range of shocks that hit the economy in this period.

Additionally, one of the main fragilities identified in the Portuguese economic structure was the low competition levels in the non-tradable goods and labour markets. In fact, the available information points to the maintenance of improvement margins in terms of product and labour market regulation, despite some progress recorded in the last years. In particular, it must be singled out that the recent reforms in the employment regulation should contribute to improve the flexibility in the labour market and to increase competition levels. The results showed that reforms aimed at enhancing competition are likely to promote the country's international competitiveness, fostering exports and economic growth.

The analysis points to several conclusions that may be useful in designing policy reforms that are fundamental to the resumption of the real convergence process of the Portuguese economy. The adoption of reforms aimed at tackling the country's structural fragilities seems to be crucial to increase the economy's low productivity levels and international competitiveness. In particular, it is of paramount importance to redirect production towards goods with higher technological content and to fast growing destination markets. However, such a restructuring process implies a significant improvement in human capital and in R&D, especially attending to the skilled-biased technical progress and to the increasing complementarity between skilled labour and capital. Given that human capital and R&D levels are low, it seems crucial to attract FDI projects with embodied

technical progress, which may generate significant spill over effects in a shorter horizon.

To increase the attractiveness of Portugal as a FDI destination, it is also of primary importance to improve the environment for doing business by simplifying administrative processes and to improve efficiency and competition in the non-tradable goods sector, not only by regulatory reforms, but also through a higher enforcement of the existing regulation. With respect to the labour market, deepening labour market flexibility in line with the recent reforms is of extreme importance, in particular through the promotion of higher labour mobility and job creation and an alternative design of the unemployment benefit schemes aimed at decreasing the duration of unemployment.

A sound macroeconomic framework oriented to sustainable economic growth is also key to achieve these improvements. In this respect, one should note that the current international context, shaped by the financial crisis and consequent global economic slowdown, implied a significant deterioration of the public sector accounts, with a sizeable fiscal deficit, reflecting the functioning of automatic stabilisers and the implementation of a fiscal stimulus package. However, as soon as the impacts of this crisis dissipate, it will be imperative to restart a genuine fiscal consolidation process, essentially based on an increase of the efficiency of the public sector in services provision.

Finally, it is important to be aware of the fundamental role that financing conditions have played in the Portuguese economy developments and of vulnerabilities arising from the current high indebtedness levels, particularly in the context of the recent financial crisis. One should not disregard that financing conditions may stabilise at levels less favourable than the ones prevailing just before the outbreak of the crisis, particularly in what concerns country's risk premia. Hence, one should consider the possibility of some permanent increase in liquidity constraints and in the risk premium, which would imply a further deleveraging of households and firms and, consequently, a protracted period of anemic growth, which can only be avoided if adequate structural reforms are implemented.

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Chapter 3

Price and wage setting in Portugal

Carlos Robalo Marques, Fernando Martins and Pedro Portugal

3.1 Introduction

The existence of wage and price rigidities is widely recognised as a crucial issue for macroeconomics and notably for monetary policy design. On the theoretical front, recent literature - of which Erceg, Henderson and Levin (2000), Christiano, Eichenbaum and Evans (2005), Levin, Onatski, Williams and Williams (2005) and Blanchard and Galí (2007) are notable examples - has re-affirmed the importance of price and wage rigidities for the evolution of the macro economy in response to shocks. On the empirical front, there is now a large bulk of evidence on the existence of price and nominal wage rigidities, for which the economic theory provides several explanations (existence of *menu costs*, *explicit and/or implicit contracts*, *coordination failure*, etc.). This chapter brings together important empirical evidence on price and wage dynamics for the Portuguese economy based both on micro and macro data. The analysis, conducted from different but complementary standpoints, involves recent findings on price and wage setting practices, as well as evidence on persistence of real wages, and wage and price inflation. The chapter starts by documenting the main features of firms' price and wage setting

practices by bringing together evidence based on quantitative individual price data underlying official consumer (CPI) and producer (PPI) price indices, as well as qualitative information from surveys of firms. In particular, the monthly frequency of price changes, the duration of wage and price spells, the speed of price reaction to demand and cost shocks, the synchronisation of price and wage changes, and the main explanations behind infrequent wage and price adjustments are investigated. The chapter then proceeds by addressing different aspects concerning the process of wage formation in Portugal resorting to econometric evidence based on micro data. In the process of wage formation it is usually assumed that wages are determined through a bargaining process between firms and employees (or the labour unions) and that the leeway for negotiations is determined by the conditions underlying company survival and by the workers' reservation wage. In general, it is the bargaining power of the parties that ultimately determines the final outcome. But, the bargaining power depends on a variety of factors, among them risk aversion (say, with respect to income fluctuations), the capacity to inflict costs on employers (for example through strike action), the composition of the workforce (e.g., in terms of insiders and outsiders), or the existence of asymmetric information (for example on the company's economic performance). Against this background, some features of the Portuguese labour market deemed to be relevant for wage setting, such as the characteristics of the wage bargaining system, the impact of minimum wages on employment, the determinants of the wage cushion (the difference between the actual wage and the bargained wage), the consequences for wages stemming from firm closures or the threat of unemployment, and the cyclical behaviour of real wages are investigated. Finally, the chapter focuses on the dynamics of aggregate wages and prices. In the real world, the existence of price and wage rigidities is expected to translate into persistent responses of real wages, as well as of price and wage inflation to the shocks hitting the economy. Thus, this section reports the evidence on persistence of the responses of wages and prices to different types of shocks by comparing the evidence for Portugal with similar evidence for the euro area (EA) and the United States (US). The last section of the chapter lists the main conclusions concerning the processes of wage and price formation in the Portuguese economy.

3.2 Micro evidence on price and wage rigidities

This section summarises the evidence recently obtained for Portugal on price and wage setting at the micro level. We consider studies with micro data on consumer and producer prices, as well as information on price and wage setting based on survey data.

The evidence presented in this section is based mainly on two datasets. The first of these sources is the individual price data underlying the official consumer (CPI) and producer (PPI) price indices collected by the Portuguese *Instituto Nacional de Estatística* (INE). The CPI database covers the period from January 1992 to December 2001 and contains information on consumer prices at the outlet and product levels, whereas the PPI database contains information on producer prices at the firm and product level covering the period from January 1995 to August 2002. These are longitudinal datasets: firms or outlets are followed over time on a monthly or quarterly basis. The study of these data was pioneered by Dias, Dias and Neves (2008). In order to ensure the comparability of the results for Portugal, the EA and the US, the micro CPI evidence reported in this section was based on a narrowly defined sample of 50 products, which are considered to be approximately representative of the full CPI basket (see Dhyne, Alvarez, Bihan, Veronese, Dias, Hoffmann, Jonker, Lunnemann, Rumler and Vilmunen (2006)).

The second dataset contains information obtained from a survey conducted by the Banco de Portugal in 2008 in the context of its participation in the Wage Dynamics Network (WDN) - a Eurosystem research network set up in 2006 aimed at studying more in depth the features and sources of wage and labour cost dynamics in the EA and their implications for monetary policy. Details on the survey design and sample selection can be found in Martins (2009a).

3.2.1 Some stylised facts on price-setting in Portugal

This subsection describes the pattern of individual price adjustments in Portugal, summarised in a number of stylised facts¹. This evidence is compared to the extent possible to the results obtained

¹The facts presented take the micro CPI evidence as the benchmark given that the results for PPI for the EA are less representative as only six countries had that information available (see Gautier, Hernando, Vermeulen, Dias, Dossche, Sabbatini and Stahl (2007)).

with survey data even though this should be made with some caution as the nature of the latter information is very different from the micro quantitative data.

Fact 1 - Changes in consumer prices are rather infrequent. The monthly frequency of price changes in Portugal is equal to 0.21, which means that about 1 out of 5 prices is changed on average every month (Table 3.1). This figure compares to 0.15 and 0.25 in the EA and in the US, respectively². These figures translate into a median duration of price spells of 8.5 months in Portugal, 10.6 months in the EA and 4.6 months in the US. However, producer price data show that differences in the frequency of producer price changes between Portugal and the EA are much smaller (0.23 in Portugal compared to 0.21 in the EA).

Fact 2 - The frequency of price adjustments is rather heterogeneous across products and across sectors. CPI data show that price changes are very frequent for unprocessed food, while they are relatively infrequent for non-energy industrial goods, services and energy goods (Table 3.2). Unlike most of other EA countries, changes in energy prices in Portugal at the consumer level emerge as relatively infrequent (16 percent of the items change every month), but this is due to the fact that gasoline prices were administered during the sample period. On the other hand, evidence based on PPI data reveals that there is a substantial degree of heterogeneity in the frequency of price changes across industries, which can be classified in three broad classes. Price changes are very frequent for energy products, relatively frequent for food and durable products and relatively infrequent for intermediate and non-durable non-food products. Several factors may drive this heterogeneity. One important factor found both in micro quantitative and qualitative data is the variability of input costs (Altissimo, Ehrmann and Smets (2006)). In particular, prices seem to change less frequently for products with a higher labour cost share and for products with a smaller fraction of intermediate energy inputs. This suggests that wage rigidity can

²It is worth mentioning that despite the effort made to produce comparable statistics, the figures presented in Dhyne et al. (2006) do not fully account for some national specificities in the collection of price reports. One of the remaining major cross-country differences is related to the treatment of sales. For some countries, national statistical institutes report sales prices while in other countries the prices that are reported during the sales period are prices without rebates. Typically, price changes will appear to be less frequent and smaller in countries where sales prices are not reported. Therefore, this methodological difference has to be kept in mind when analysing the aggregate results for the EA.

be a cause for price stickiness. In addition, as shown in Dhyne et al. (2006) larger competition seems to reduce price stickiness.

Table 3.1

Monthly frequency of price changes and durations of price spells

		Portugal	EA	US
Monthly frequency of price changes	CPI	0.21	0.15	0.25
	PPI	0.23	0.21	–
Duration of price spells (in months)	CPI ⁽¹⁾	8.5	10.6	4.6
	Survey ⁽²⁾	10.3	9.6	8.3

Source: Álvarez et al. (2006); Bils and Klenow (2004); Blinder et al. (1998); Dhyne et al. (2006); Druant et al. (2009); and Martins (2009a).

(¹) Median; (²) Average.

Table 3.2

Monthly frequency of price changes by type of goods

CPI	Unprocessed food	Processed food	Non-energy indus. goods	Energy goods	Services
Portugal	0.55	0.25	0.14	0.16	0.14
EA	0.28	0.14	0.14	0.78	0.06
US	0.48	0.27	0.22	0.74	0.15
PPI	Food	Durable goods	Non-durable goods	Energy goods	Intermediate goods
Portugal	0.21	0.18	0.05	0.66	0.12
AE	0.27	0.10	0.11	0.72	0.22

Source: Álvarez et al. (2006); Dhyne et al. (2006); Bils and Klenow (2004) and Gautier et al. (2007).

Fact 3 - There is no evidence of widespread downward price rigidity. Indeed, even though positive price changes are more frequent than negative price changes, price decreases are far from being uncommon. On average, 40 percent of the price changes are price reductions, though in services this number stands at 20%. Results obtained with survey data are a bit lower (32 percent) even though the share of price decreases in services is virtually the same (Martins (2009b))³.

³These results are based on the information obtained from a survey conducted by the Banco de Portugal in 2004 in the context of its participation in the Inflation Persistence Network (IPN) – a Eurosystem research network which, for three years from the beginning of 2003 to the end of 2005, undertook a joint research on infla-

Table 3.3

Price increases vs. price decreases: frequency and magnitudes
by type of goods

CPI	Unprocessed food	Processed food	Non-energy indus. goods	Energy goods	Services
Portugal	0.55	0.25	0.14	0.16	0.14
EA	0.28	0.14	0.14	0.78	0.06
US	0.48	0.27	0.22	0.74	0.15
PPI	Food	Durable goods	Non-durable goods	Energy goods	Intermediate goods
Portugal	0.21	0.18	0.05	0.66	0.12
EA	0.27	0.10	0.11	0.72	0.22

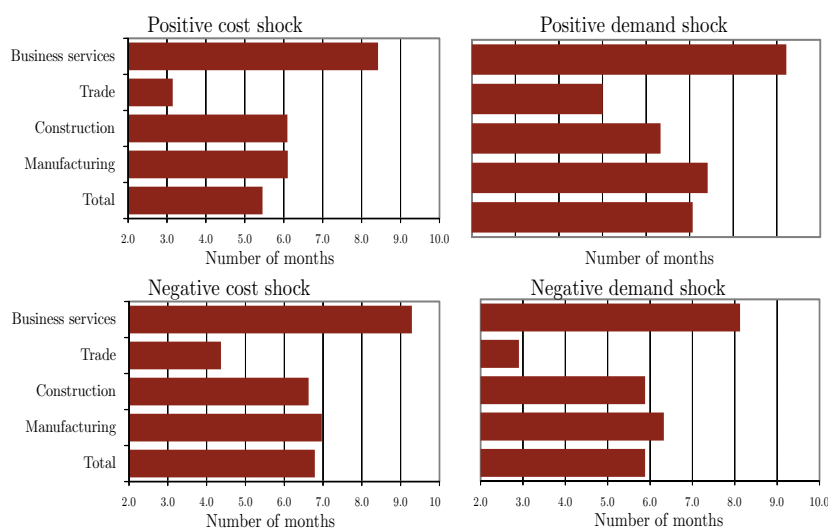
Source: Álvarez et al. (2006); Dhyne et al. (2006); Bils and Klenow (2004) and Gautier et al. (2007).

Fact 4 - Price increases and price decreases have in general the same order of magnitude but they are sizeable compared to the prevailing inflation rate during the sample period. Although price increases are on average more frequent than price decreases, which is quite natural in an economic environment of moderate inflation, this asymmetry does not carry over to the magnitude of price changes. In the common sample of 50 products, the magnitude of consumer price decreases is on average actually slightly larger than the magnitude of price increases (Table 3.3). This result is in line with findings for the EA as a whole where the magnitude of price decreases is on average two percentage points larger than that of price increases (10.0 versus 8.2 percent). With regard to the sectoral dimension, it can be observed that price changes for unprocessed food are not only very frequent (as illustrated in Table 2) but also very large in size, even though price increases and decreases tend to offset each other.

Fact 5 – Survey evidence points to the presence of asymmetries in the adjustment of prices in response to cost versus demand shocks. Survey evidence provides information not only on the relative importance of various factors driving price changes and whether there are asymmetries in price reactions to different types of shocks but also on

tion persistence in the EA and in its member countries. The main objective of that survey was to investigate the pricing behaviour of Portuguese firms with a particular emphasis on the sources and extent of price rigidities. Details on the sample and survey design as well as a discussion of the main results can be found in Martins (2009b).

Figure 3.1: Speed of price reaction to significant changes in costs and demand
(excluding firms that follow time-dependent pricing rules strictly)

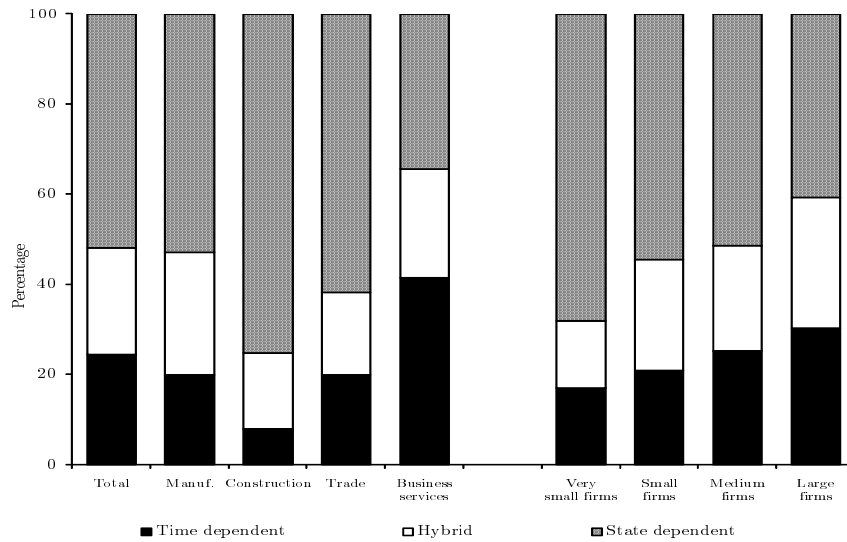


Source: Martins (2009a).

the speed of those reactions. Regarding the former, cost shocks are more relevant in driving prices upwards than downwards, while changes in market conditions (in demand and competitors' prices) matter more for price decreases. Martins (2009b) provides evidence that changes in the price of raw materials is the most important factor driving prices both upwards and downwards, whereas changes in demand and the wages costs are the second most important factors for, respectively, price decreases and price increases. Concerning the speed of price responses, survey results do not show any evidence that prices move faster upwards than downwards (Figure 3.1). However, firms seem to respond faster to positive cost and negative demand shocks (5.5 and 5.9 months on average, respectively) than to negative cost and positive demand shocks (6.8 and 7.1 months on average, respectively). These reactions tend to be faster in trade and slower in non-financial services.

Fact 6 - Survey evidence supports the existence of firms with time and state dependent pricing strategies. In contrast to the assumption made in many popular micro-founded macroeconomic models of inflation dynamics that firms only change their price as a function of time and

Figure 3.2: Price setting strategies: time vs state dependent price setting (as a share of total employment in the sample)



in a staggered fashion, survey results uncovered ample evidence of state-dependence in price setting. In the presence of shocks, state dependent pricing rules lead in principle to greater price flexibility. When asked directly, firms declaring that under normal circumstances they follow state-dependent rules account for 52 percent of total employment in the sample, whereas those that declare that they follow time-dependent pricing rules under normal circumstances but change to state dependent rules in the event of specific shocks represent 24 percent of total employment in the sample (Figure 3.2). These results are consistent with the econometric evidence in Dias, Marques and Santos Silva (2007) who, using quantitative micro data, find strong statistical evidence of state-dependent behaviour by Portuguese firms, with inflation and demand pressure emerging as relevant determinants of the frequency of price changes. Survey results also point to the presence of important differences across sectors: in business services, time-dependent rules have a clear dominance as opposed to construction, trade and manufacturing where most firms follow state-dependent rules.

3.2.2 Wage bargaining in Portugal: evidence from survey data

In this subsection, we describe some of the main institutional characteristics of the wage bargaining process in Portugal. This characterisation is important to a better understanding of the evidence presented in the remaining of the chapter concerning firms' wage setting practices and more generally the operation of the labour market.

The Portuguese Constitution provides the juridical principles of collective bargaining and grants unions the right to negotiate. The effects of the agreements are formally recognized and considered valid sources of labour law.

Concerning the bargaining mechanisms, a distinction should be made between the conventional regime and the mandatory regime. Conventional bargaining results from direct negotiation between employers' and workers' representatives. A mandatory regime, on the other hand, does not result from direct bargaining between workers and employers, being instead dictated by the Ministry of Labour. The Ministry can extend an existing collective agreement to other workers initially not covered by it or it can create a new one, if it is not viable to extend the application of an existing document. A mandatory regime is applied when workers are not covered by unions, when one of the parties involved refuses to negotiate or bargaining is obstructed in any other way.⁴ Therefore, the impact of collective bargaining goes far beyond union membership and the distinction between unionized and non-unionized workers or firms becomes unimportant.

Collective negotiations are usually conducted at the industry or occupation level. The law does not establish mechanisms of coordination between agreements reached in different negotiations. However, preference is given to vertical over horizontal agreements, and the principle of the most favourable condition to the worker generally applies.

Since most collective agreements are industry-wide, covering companies with very different sizes and economic conditions, their contents tend to be general, setting minimum working conditions, in particular the base monthly wage for each category of workers,

⁴Beyond the existence of compulsive extension mechanisms, voluntary extensions are also possible, when one economic partner (workers' representative or employer) decides to subscribe to an agreement which it had initially not signed.

overtime pay and the normal duration of work. Underlying the bargaining process there is a mandatory minimum monthly wage which sets the minimum floor for wage negotiations⁵.

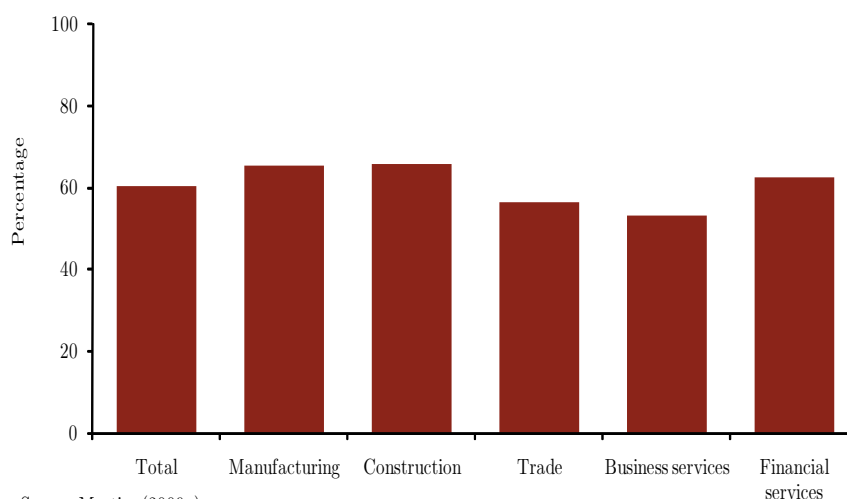
The Portuguese system of industrial relations apparently presents features of a centralized wage bargaining system⁶. Massive collective agreements, often covering a whole industry, predominate in the economy, while firm-level collective bargaining covers a low proportion (close to 10 percent) of the workforce. Moreover, trade union confederations, employers' federations and the Government meet at the national level each year to set a guideline for wage increases (the so-called social concertation). However, this guideline is not mandatory and merely guides the collective bargaining that follows.

On the other side, the fragmented nature of the trade union structure, the fragmented employers' associations and the multiplicity of bargaining units provides the system with a certain degree of decentralization. Even though collective bargaining in Portugal takes place at a sectoral level and most workers are covered by the bargaining system due to the existence of mandatory extensions, the coordination between bargaining units is rather limited. In fact, the right to negotiate is given upon every employer or employers' association and to every trade union (regardless of the number of affiliated members they represent), and the parties have the possibility of choosing the level of negotiation - regional, occupational, indus-

⁵Currently, there is a unique legal minimum wage that applies to all workers. Workers formally classified as apprentices receive just 80% of the full rate. The minimum wage is updated annually by the parliament, under government proposal. Decisions on the level of the minimum wage are taken on a discretionary basis, usually taking into account past and predicted inflation and after consulting the social partners.

⁶Caju, Gautier, Momferatou and Ward-Warmedinger (2008) perform a cluster analysis and identify three groups of countries using information collected following a questionnaire to national central banks. The first group (Austria, Denmark, France, Germany, Greece, Ireland, Italy, the Netherlands, Portugal and Sweden) mainly consists of countries with a broadly regulated system of wage bargaining. This group is characterized by the existence of extension procedures and a high level of collective agreement coverage, a dominance of sectoral wage bargaining and the general absence of coordination. The second group (Belgium, Cyprus, Finland, Luxembourg, Slovenia and Spain) exhibits the same general wage setting characteristics as the previous group, but, in addition, some form of indexation, intersectoral agreements and the role of government are all more important. Finally, the third group (Czech Republic, Estonia, Hungary, Japan, Lithuania, Poland, the UK and the US) gathers the countries where the wage bargaining system is largely deregulated.

Figure 3.3: Share of firms with wages set under sectoral collective wage agreements
(as a share of all surveyed firms)



trial or national. This leads to the existence of a diffuse and complex system of wage bargaining with negotiation fragmented and agreements multiplied.

Wage setting institutions are usually seen as playing an important role in the determination of the dynamics of wages and more generally for the operation of labour markets. For instance, Druant et al. (2009) show that bargaining institutions are correlated with the frequency and timing of wage changes whereas Babecký, Caju, Kosma, Lawless, Messina and Rõõm (2008) and Dickens, Goette, Groshen, Holden, Messina, Schweitzer, Turunen and Ward (2007) show that they are also an important determinant of the degree of downward wage rigidity. In addition, they seem to influence the reaction of firms in the aftermath of shocks, as shown in Bertola, Dabusinskas, Hoeberichts, Izquierdo, Kwapil, Montornès and Radowski (2008) or the extent to which firms use different margins of adjustment to reduce their wage bill, as documented in Babecký et al. (2008). More generally, there is a vast literature about the role of wage bargaining institutions in shaping labour market outcomes, wage levels, wage dispersion and wage flexibility. Despite the im-

portance assigned to the role of wage bargaining institutions, their measurement is far from being easy and comparable information at an international level is rather limited⁷. The survey conducted in 2008 uncovered information at the firm level on several institutional features affecting wage setting in individual firms, such as the degree of centralization, the coverage of wage bargaining and the presence of indexation mechanisms.

According to these results, in about 60 percent of the firms (52 percent of total employment in the sample) wages are set in the context of sectoral collective wage agreements, even though only 30 percent of these firms participate directly in the wage setting process (Figure 3.3). Furthermore, in 10 percent of the firms wages are set in the context of firm-level agreements: in 7 per cent firm-level and sectoral agreements coexist, whereas in 3 per cent firm-level agreements are exclusive. However, whatever the wage floor agreed upon for each category of workers at the collective bargaining table (the bargained wage), firms are free to pay higher wages, and they often deviate from that benchmark, adjusting to firm-specific conditions (see Cardoso and Portugal (2005)). To the difference between the actual wage and the bargained wage we call wage cushion⁸. Survey results confirm that a significant share of firms pays wages above the ones that were contracted (Figure 3.4). The wage cushion is remarkably high in financial services and generally decreases with firm size.

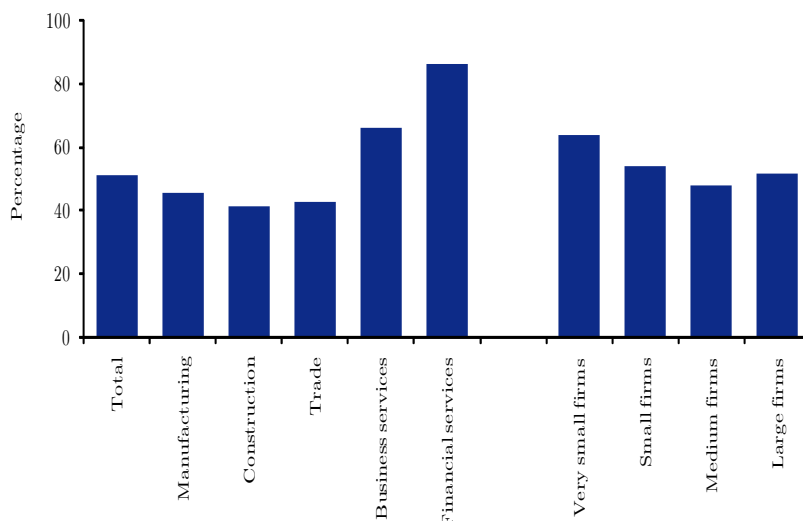
3.2.3 Wage rigidity and price rigidity: a comparative analysis

As mentioned before, one important result from the analysis with micro data is that those sectors with higher labour cost share tend to exhibit higher price rigidity which, in turn, could reflect wage rigidity. This evidence is also supported by the survey results (see Martins (2009a)). In an attempt to complement these findings, this sub-section presents additional evidence based on how firms set and adjust their wages and on the relationship between wage and pricing policies. In particular, based on the information collected from

⁷The most comprehensive time series of quantitative information on union density, minimum wages, and indices of union coverage, coordination and corporatism for a number of OECD countries is available from the OECD (see for example Elmeskov, Martin and Scarpetta (1998)).

⁸This is distinct from the notion of wage drift, which is usually employed for differences in wage variations, rather than levels.

Figure 3.4: Share of workers with base wages above the wage scale
(as a share of workers in the sample covered by collective wage agreements)



Source: Martins (2009a).

the survey analysis, the aim is to provide answers to the following questions: (i) What is the frequency of wage changes in Portugal? ii) Are prices and wage changes synchronized or not; iii) Do they tend to take place in specific months of the year? iv) Are there significant differences across firms and sectors regarding the frequency and timing of wage and price changes? The frequency of wage changes was investigated through three separate questions: those due to factors unrelated to tenure and/or inflation, those due to tenure and those due to inflation. A synthetic variable for the frequency of wage changes for any of the three listed reasons was also computed, defined as the highest frequency of wage change at the firm level independently of the reason behind it⁹¹⁰.

Table 3.4 shows that financial services, construction and trade tend to have shorter price spells than those of manufacturing and

⁹In order to make comparisons easier, frequencies of price and wage changes were converted into average durations of price and wage spells by simple multiplying each category (defined in terms of months) by its relative frequency. For those categories expressed in terms of time intervals the mid-point was assumed.

¹⁰All the results are weighted according to the number of employees in each firm. Results were also rescaled for non-responses.

business services. However, it should be noted that when interpreting the results concerning financial services, a note of caution has to be made not only because the concept of price might be difficult to capture, but also because the interviews were carried out in a period of exceptional turbulence in international financial markets¹¹. As regards wages, there is little variation across sectors: wage spells tend to vary between 12 and 14 months, with business services and construction being the sectors where wages seem to be more rigid. Moreover, the average wage spell in Portugal is two months shorter than the average wage spell in the EA. All in all, most of the firms (85 percent) change their wages only annually (the corresponding figure for prices is 67 percent). Druant et al. (2009) show that cross-country variation is substantial in the case of wage changes but almost irrelevant in terms of price changes while, in contrast, cross-sector variation is significant in terms of price changes but little relevant in terms of wage changes.

Table 3.4

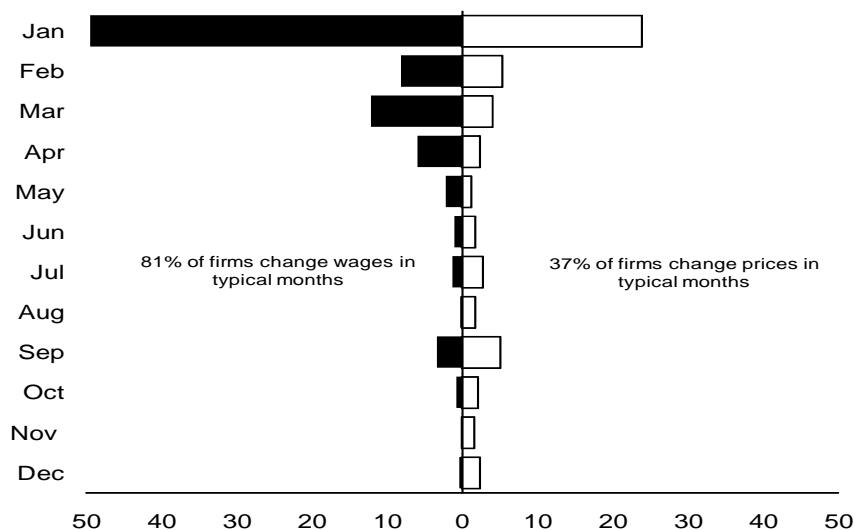
Average duration of price and wage spells (in months)		
	Prices	Wages
Total	10.3	12.8
Manufacturing	10.1	12.6
Construction	7.4	13.7
Trade	8.4	12.5
Business services	11.4	13.2
Financial services	6.8	12.1
Very small firms	9.6	14.6
Small firms	10.0	14.3
Medium firms	9.4	13.8
Large firms	10.5	12.5
Memo:		
EA	9.6	14.7

Source: Druant et al. (2009) and Martins (2009a).
Results weighted by employment.

Besides the frequency of adjustments, the degree of price and wage synchronisation is another factor affecting the degree of firms' flexibility to changes in their economic environment. With a view

¹¹The questionnaire sent to the banking institutions contained some changes compared to the main questionnaire. In particular, in the price-setting section firms were asked to take as their reference price the interest rate applied to the main credit product assuming a medium-risk customer.

Figure 3.5: Concentration of price and wage changes
(as a share of all surveyed firms with valid responses)



Source: Martins (2009a)

to obtain empirical evidence on this issue, firms were asked to specify whether their price and wage changes take place with no predefined time pattern or are concentrated in particular month(s). As far as prices are concerned, this latter option was chosen by about 37 percent of the firms (Figure 3.5), which is somewhat lower than the share of firms following time-dependent pricing strategies under normal circumstances reported before (48 percent). Looking at the month in which adjustments typically take place, there appears to be a considerable degree of synchronisation among firms, as about 65 percent of those reporting the presence of some time regularity change their prices (not necessarily only but also) in January. However, the degree of concentration of wage changes is much higher than that of price changes as 81 percent of firms seem to change their wages in particular month(s), with January being the month with the highest frequency. The large concentration of wage changes may reflect institutional arrangements at the sectoral or firm levels, in the form of collective bargaining agreements. Finally, another important issue to investigate is the relationship between price and wage changes, i.e. whether firms' wage and price adjustments are related

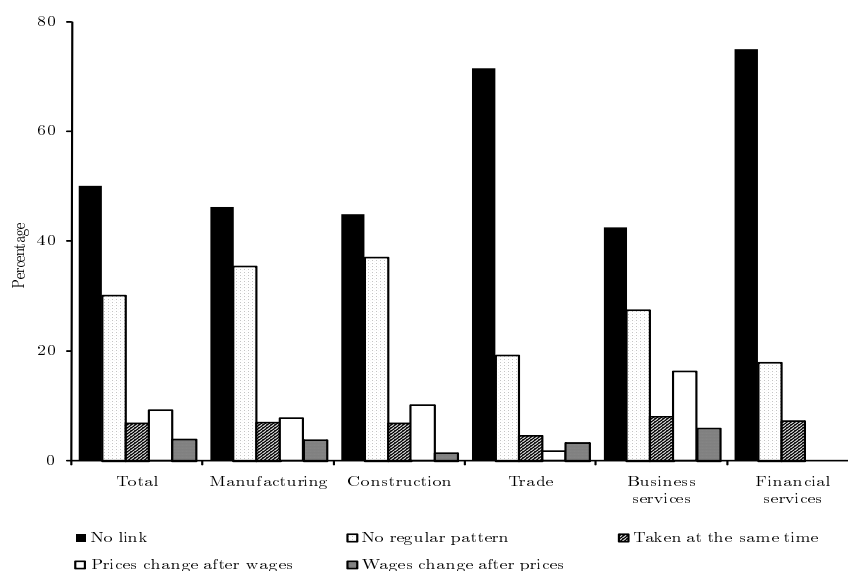
and the extent to which inflation feeds into wage adjustments. In order to assess the existence and direction of a link between wage and price changes, firms were asked about the link between the timing of price changes and the timing of wage changes. The intensity, as well as the direction of the relationship between the two strategies is summarized in Figure 3.6. Results point to the presence of some synchronisation between price and wage changes at the firm level as around 50 percent of firms, when asked directly, acknowledge the existence of some relationship between the timing of price and wage revisions within their company. However, only 20 percent state that this relationship is quite strong: decisions are taken simultaneously for 7 percent of the firms, prices follow wages in 9 percent of the cases and wages follow prices in the remaining 4 percent. In contrast, for about 50 percent of the firms, no link exists between the timing of price and wage changes. This figure is particularly high in financial services and trade. However, it is worth mentioning that the lack of synchronization in many firms in terms of price and wages changes does not necessarily mean that the general inflationary outlook is disregarded in wage setting decisions. One important source of information available from the survey on how inflation developments may affect firms' wage decisions is the frequency of wage adjustments due to inflation. Figure 3.7 shows that inflation indeed stands out as the most important factor triggering frequent wage adjustment (at an annual or infra-annual frequency).

3.2.4 What could drive price and wage rigidities

Whereas the preceding subsections have analysed the stylised facts of price and wage setting, this subsection focuses on the potential reasons why prices and wages are sluggish. The most direct evidence on this issue can be obtained from the survey information. The survey conducted in 2004 on firms' price setting (see footnote 3) contained a question which directly addressed the reasons for price stickiness: If there are reasons for changing the price of your main product, which of the following factors may well prevent an immediate price adjustment? The list following this question offered a series of statements, expressed in simple terms, based on different economic theories of price rigidities. The respondents could indicate their degree of agreement with each statement, choosing among four categories: unimportant (1), of minor importance (2), important (3) and very important (4), where the numbers in brackets indicate the

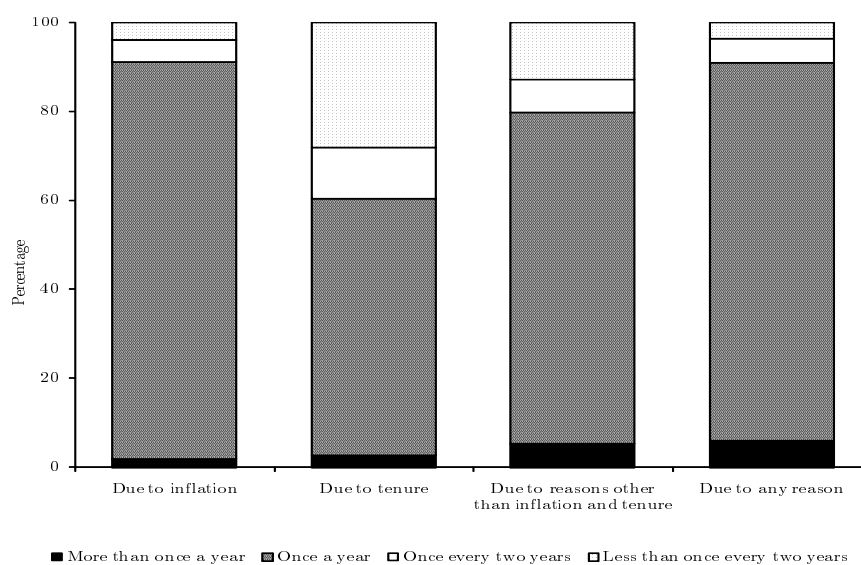
MICRO EVIDENCE ON PRICE AND WAGE RIGIDITIES

Figure 3.6: Synchronisation between price and wage setting decisions
(as a share of all surveyed firms)



Source: Martins (2009a)

Figure 3.7: Frequency of wage changes
(as a percentage of total employment in the sample)



Source: Martins (2009a)

scores attached to each category. Implicit and explicit contracts, cost-based pricing and co-ordination failure are the most relevant explanations for sticky prices, while menu costs, pricing thresholds and costly information are not recognised as important by the respondents (Table 3.5). The theory of implicit contracts, which emerges as the most important explanation for sticky prices, is based on the idea that firms establish long-run relationships with customers in order to make future sales more predictable; in other words, they try to win customer loyalty simply by changing prices as little as possible. Co-ordination failure as an explanation for sticky prices is the second most important factor, with an average score of 2.8. The idea is that firms prefer not to change their prices unless one of their competitors moves first. Cost-based pricing, which assumes that prices do not change if costs do not change, and explicit contracts (firms have to re-negotiate their contracts to change their prices) are third and fourth in the ranking of explanations, with an average score of 2.7 and 2.6, respectively.

Table 3.5
What explains price stickiness?

Most important factors		Less important factors	
Factors	Average score	Factors	Average score
Implicit contracts	3.14	Judging quality by price	2.28
Coordination failures	2.84	Menu costs	1.89
Cost-based pricing	2.70	Pricing thresholds	1.78
Explicit (formal) contracts	2.63	Information costs	1.70

Source: Martins (2009a).

Inspired by the analysis made for prices in 2004, the survey conducted in 2008 contained a question which tried to obtain information about the main reasons that may prevent firms from cutting or freezing their wages in a context where they need to reduce labour costs. The list following this question offered a series of possible reasons, expressed in simple terms, based on different economic theories of wage rigidities. Once again, respondents could indicate their degree of agreement with each statement, choosing among four categories: unimportant (1), of minor importance (2), important (3) and very important (4).

Table 3.6

What could prevent firms from cutting or freezing wages?

Reasons	Average score	Reasons	Average score
Wage agreements and legislation ⁽¹⁾	3.58	Impact on firm's reputation	2.93
Impact on workers' motivation	3.44	Wages could become non competitive	2.92
Impact on workers' performance	3.39	Difficulties in attracting workers in the future	2.83
Impact from unpredictable changes in wages	3.37	Hiring and training costs of new workers	2.73
Risk of losing the best workers	3.29		

Source: Martins (2009a); Results weighted by employment.

⁽¹⁾This is only applicable to wage cuts.

Table 3.6 shows that legislation stands as the most important factor preventing firms from cutting their wages. However, internal factors such as the impact on workers' motivation and performance also play an important role as obstacles to wage cuts or freezes. This result is in line with the evidence in other empirical studies (see for instance Blinder and Choi (1990) or Franz and Pfeiffer (2006)). Martins (2009a) shows that a very small share of the firms included in the survey report that, in the absence of legal or contractual constraints, they would consider the possibility of cutting their workers' base wages in 2006 (the reference year of the survey). These firms account for 1.6 percent of total employment in the sample. In addition, those firms that would consider the possibility of increasing their base wages in 2006 below the inflation rate in the absence of legal or contractual constraints account for 4.4 percent of total employment in the sample.

3.3 Wage Formation

The debate about the Portuguese economy frequently ignores the essential fact that the formation of wages plays a fundamental role in determining unemployment. The few studies available on the estimation of labour demand function point to high wage elasticities of labour demand (Varejão and Portugal (2007b)). Here, we report

investigations on how exogenous changes in minimum wages impact on worker flows and how exogenous wage fluctuations affect firm closures and, thus, worker displacement. In a labour market with Portugal's level of sclerosis, where the likelihood of finding a suitable job is very low, being unemployed is an extremely dramatic event (Blanchard and Portugal (2001)). Hence, painful unemployment decreases the bargaining power of workers. This link from unemployment rates to wages is also very relevant and is explored in a number of studies of wage formation by Carneiro and Portugal. In this section, the cyclical nature of real wages will also be discussed below in a novel way, one which isolates the compositional bias arising from (permanent) worker and firm heterogeneity.

3.3.1 The Conspicuous Nature of the Portuguese Labour Market

The Portuguese labour market is disfunctional, with very weak flows between employment and unemployment. The explanation given by Blanchard and Portugal (2001) for this conspicuous characteristic labour mobility is that it stems from the strong protection of employment embedded in Portuguese labour legislation, above all in terms of the legal framework for firings. Fundamentally, very long unemployment spells – a painful way of experiencing unemployment – are the counterpart of job protection.

There is abundant empirical evidence that there is a greater prevalence of long unemployment spells in countries with greater job protection (Blanchard and Portugal (2001)). Fundamentally, the high costs of firings increase production costs, bringing down feasible wages (the wage that guarantees zero profits). Job protection in turn increases workers' bargaining power, and this means higher bargaining wage (the wage to which the worker aspires). In this model, the equilibrium is re-established by making unemployment more painful, that is, by reducing the arrival rate of job offers. This brings down the transition rate from unemployment to employment, and increases the expected duration of unemployment¹².

There is direct and indirect evidence on the job arrivals rate in the European Household Panel, where Portugal has the lowest arrival rate of job offers among all the countries represented on the

¹²In this setting, unemployment protection will tend to cushion the penalty associated with the joblessness experience, and generate an ever steeper fall in the transition from unemployment to employment.

panel (Jolivet, Postel-Vinay and Robin (2006)). Franco and Torres (2008) calculated the probability of a worker leaving a job and finding a new one, using data from the Employment Survey¹³. They concluded that those probabilities are very low, and show that job separations are almost acyclical and that the finding probabilities are strongly cyclical. In the work of Varejão and Portugal (2007a) there is documented evidence that only 25% of establishments change the composition of their work force. Ejarque and Portugal (2007) solve a dynamic model of labour demand, using relevant sample moments of the Portuguese labour market, to show that the presence of adjustment costs can lead to a significant reduction in the flow of jobs.

3.3.2 The Impact of Minimum Wages on Employment

Changes in the legislation effective in 1987 in Portugal provide remarkably good conditions for analysis of the employment effects of mandatory minimum wages, as the minimum wage increased sharply for a very specific group of workers. Relying on a matched employer-employee panel data set from Quadros de Pessoal, Portugal and Cardoso (2006) modeled gross worker flows —accessions and separations —in continuing firms, as well as in new firms and those going out of business, using a count regression model applied to proportions. Employment trends for teenagers, the affected group, are contrasted to those of older workers, before and after the raise in the youth minimum wage. Decomposition of the changes in employment by its sources can help reconcile some of the evidence that has previously been presented in the literature as contradictory, helping to disentangle the minimum wage puzzle. The results provided in Table 3.7 show that the share of teenagers among newly hired workers, both in continuing firms and in new firms, decreased, following the increase in the youth minimum wage. These flows would thus point towards the reduction of the relative demand for teenagers. On the other hand, the share of teenagers in job separations in continuing firms decreased sharply following the rise in their minimum wage.

¹³Elsby, Hobijn and Sahin (2008) offer a revealing international comparison based upon the computation of job finding and job separating probabilities from suitable Employment surveys.

Table 3.7: Employment Effects of Increasing
Poisson Regression with random effects
Dependent variable: Share of employed teenagers

	Coefficient	Standard error
Hires by continuing firms (n=99 608 firms)		
year 1988	-0.036	0.010
year 1989	-0.043	0.010
Separations by continuing firms (n=125 397)		
year 1988	-0.150	0.010
year 1989	-0.140	0.010
Hires by new firms (n=38 138)		
year 1988	-0.042	0.018
year 1989	-0.041	0.018
Separations by closing firms (n=19 203)		
year 1988	0.050	0.023
year 1989	0.025	0.023

Note: Firm size, market concentration and a set of industry dummies were also included.

From a worker perspective, the authors found that teenagers subject to a high wage increase resulting from the change in the minimum wage are more prone to keep their job than comparable groups of workers. This result points to the relevance of supply side factors, as job attachment for low-wage youngsters may rise following an increase in their minimum wage, reducing the high job turnover that is characteristic of low-wage workers. In synthesis, in Portugal, the main short-term impact of the 1987 minimum wage change was the reduction of separations from the employer, which compensated for the reduction of job accessions. It should be noticed, however, that these results reflect solely the short-run response to a minimum wage hike. In competitive labour markets, long-run employment effects are likely to be negative. Cardoso (2009) investigates long-run wage effects and shows tenure-wage profiles are flatter for individuals that benefit from the minimum wage increase.

3.3.3 The Wage Cushion

Which are the determinants of the contractual wages agreed upon with trade unions, and how do these differ from the determinants of the actual wage that is paid? Do collective bargaining outcomes reflect the bargaining power of the partners involved, whereas wage cushion reflects market conditions? In the study of Portugal and Cardoso (2006) the information contained in the Quadros de Pessoal dataset is explored to analyse, at the microeconomic level, the wage bargaining process in the Portuguese labour market. The regressions presented in Table 3.8 explore the impact of worker attributes, firm attributes and the collective bargaining system on bargained wages and on the wage cushion. On the worker and employer side, the usual determinants of wages have been considered: the worker gender, schooling, age and tenure; the firm size, age, average gross labour productivity and gross job flow. Controls for the industry and the region have been included in every regression. The variables that characterize the institutional setting are less often found in the empirical literature. The degree of coordination of employers in wage bargaining and the degree of trade union power will deserve particular attention in the interpretation of the results. The degree of coordination of employers results simply from the definition of the types of collective agreements existing in Portugal: single-firm agreement; multi-firm agreement, signed by several employers, though not organized into a formal association; sector agreement, signed between employers' association(s) and trade union(s), often covering an economic sector. Also, the government can impose a mandatory regime.

The degree of union bargaining power is captured by the concentration of bargaining within an occupation, firm or region. These proxies are based on the idea that, if the labour force is more united in the bargaining process, it will have stronger bargaining power. The Herfindhal index was used to evaluate the degree of concentration of bargaining within an occupation, firm or region. If one single collective agreement covers the entire workforce in the occupation, the firm or the region, the index reaches the value one, interpreted as a high degree of union power within that occupation, firm or region. On the contrary, a fragmented bargaining process, with workers represented by several trade unions bargaining separately, leads to a low value on the Herfindhal index and suggests less union strength. We have estimated Tobit models on the wage bargained, the wage

cushion and, a result of the two previous forces, the actual wages paid. This choice is justified by the fact that contract wages cannot fall below the national minimum wage and actual wages cannot fall below the contract wage defined for the worker category.

Table 3.8

Determinants of bargained wages and the wage cushion						
	wage bargained		wage cushion		wage actual	
	(coef.)	(marg.)	(coef.)	(marg.)	(coef.)	(marg.)
gender	-.109	-.062	-0.128	-0.79	-0.204	-.177
schooling	0.027	.016	0.030	.019	0.053	.047
age	0.034	.020	0.018	.011	0.038	.034
agesquared	-0.0003	-.0002	-0.0002	-.0001	-0.0004	-.0003
tenure	0.007	.004	0.002	.001	0.007	.006
tenurelessly	-0.033	-.019	-0.038	-.024	-0.058	-.051
firm.size(log)	0.048	.028	0.012	.008	0.041	.036
firm age	-0.0004	-.0003	-0.0002	-.0001	-0.0005	-.0005
log.product.	0.044	0.026	0.033	.021	0.064	.057
firm gross job						
flow rate	0.002	.001	0.012	.007	0.016	.014
ag.multi-firm	0.093	.058	-0.025	-.016	-0.017	-.015
ag.sectoral	-0.036	-.022	-0.024	-.016	-0.145	-.132
ag. mandat.						
regime	-0.150	-.078	0.179	.127	-0.023	-.020
conc.ag.within						
occup.	0.112	.065	-0.092	-.058	-0.025	-.022
conc.ag.within						
firm	0.263	.153	-0.214	-.135	-0.013	-.011
conc.ag.within						
region.	-0.032	-.019	-0.063	-.040	-0.183	-.161
geog.scope	-0.005	-.003	0.010	.006	0.002	.002
sizecol.agr(log)	-0.035	-.021	0.008	.005	-0.008	-.007
Obs.	1134427		1134427		1134427	
R ²	0.54		0.30		0.59	

It is interesting to note, first of all, that wage cushion reinforces the impact of worker and firm attributes on wages. Note that the signs of those coefficients are the same, in the bargained wage and the wage cushion regressions. In other words, wage cushion stretches the returns to education, gender, age, tenure, firm size, firm

productivity or firm-level worker turnover (rate of job creation or destruction). On the contrary, variables that capture the bargaining power of trade unions have a high impact on bargained wages, but that impact is partly offset by wage cushion. In fact, the concentration of bargaining within an occupation or within a firm becomes less relevant in the determination of actual wages than it was in the determination of bargained wages. In other words, wage cushion shrinks the returns to union bargaining power.

The previous results lend support to the hypothesis that wage cushion works as a mechanism to overcome the constraints imposed by collective bargaining, allowing firms wide scope for action in their wage policy. The impact of the extent of union power deserves further comment. Higher coordination on the side of the workers along occupation or firm lines is associated with higher wages. If the degree of concentration of bargaining within an occupation increases by ten percentage points, the bargained wage increases by about 0.65 percent. Similarly, a more united labour force bargaining within the firm raises bargained wages: an increase of ten percentage points in the degree of concentration of bargaining within a firm raises bargained wages by 1.53 percent. These results suggest that the fragmentation of bargaining reduces union capacity to extract rents. However, as mentioned before, these returns on union bargaining power are offset by firm-specific wage arrangements, in the form of wage cushion. In the end, the concentration of bargaining within the occupation or the firm has a very low impact on the actual wages paid. On the employer side, higher coordination when bargaining over wages is associated with lower wages. Single-firm or multi-firm agreements yield higher bargained wages than sector-level agreements. Even though the rank of the type of agreement changes after wage cushion operates, it is still the case that single-firm and multi-firm agreements yield higher wages than sector agreements. The positive impact of the firm's gross job creation rate and its average labour productivity on the bargained wage is consistent with the results by Christofides and Oswald (1992) who analyzed the impact of industry and regional variables on wages bargained in a sample of labour contracts in Canada and found evidence that wage determination is a rent-sharing mechanism. Their work found that higher profits in the industry enable unions to extract a higher rent in the form of higher bargained wages, whereas a depressed labour market, with a higher regional unemployment rate, decreases bargained wages.

3.3.4 Insider Power and Insider Forces

A considerable branch of the literature focuses on the internal factors of the company in setting wages. Again we must consider the situation of monopolistic competition which allows for the generation of rents that will be shared between owners and workers, modified by the negotiating power of the two sides. In this theoretical framework, it makes sense to tie wages to company performance indicators (profits, productivity, cash flow, etc). Once the distinction between insider and outsider factors in a company is established, there is scope for an interesting analysis of the distinction between insider and outsider workers. The idea is that wages are fundamentally set by incumbent workers (insiders) while those not on contract (outsiders) have a relatively minor role to play. There are costs associated with selection, recruitment and training of insiders, making it economically inviable to replace them with jobless at lower wages. The rent associated with replacement costs guarantees insider bargaining power in wage negotiations. The insider-outsider theory of wage setting allows us to put forward an explanation for setting wages above the market equilibrium level. Wage insensitivity to labour market conditions, and above all unemployment, can entail hysteresis caused by the power of insiders. In this case, contemporary unemployment depends on past unemployment, leading to a negative relation between contemporary wage levels and past employment levels. In this section, we summarize the study by Carneiro and Portugal (2008a) who employed longitudinal data from large firms collected in the *Balanço Social* dataset, to analyse the role of insider and outsider forces in the process of wage formation. The main results are exhibited in Table 3.9. The Generalized Method of Moments (GMM) results report a value of the insider weight of 18%, estimated with precision. The long-run value of the insider weight is calculated by dividing the nominal productivity coefficient (the short-run coefficient) by one minus the coefficient on the lagged wages. This value is considerably higher than those obtained for other European Countries such as Spain and the U.K. using firm-level data. In fact, the short-run effect of nominal productivity on wages is strong and significant, suggesting that in Portugal wages are highly responsive to the firm's performance. This is also consistent with one of the predictions of the insider-outsider theory that the greater the hiring and firing costs, the more the insider wage will depend on the "inside factors" relative to the "outside factors".

Other evidence is revealed by the results. First, market share exerts a positive and significant impact on wages, suggesting that monopoly power generates monopoly rents that are captured by the employees in the form of higher wages. Second, with respect to the dismissal threat variables, we obtain the expected signs for the coefficients on both the labour utilization rate and on the layoff rate. Hence, workers in firms with higher labour utilization rates have higher insider power and, thus, earn more. An increase in the layoff rate decreases significantly wages, in the short-run. This finding seems to suggest that when the employment perspectives of employed workers worsen, they tend to restrain wage demands. Another interpretation is possible if the layoff rate is viewed as a proxy for labour adjustment costs. In firms with high (low) adjustment costs the risk of being fired is lower (higher) and thus insider workers are in a better position to extract rents in the form of higher wages. In fact, besides the high dismissal costs that Portuguese employers have to bear, conditions in which a termination of contract is admissible are also regulated quite strictly. These factors appear to work together to strengthen the bargaining position of incumbent workers and their power to claim for higher wages. Third, the regional unemployment rate has a negative and significant impact on wages. This result reveals that outsiders' forces have an important role in wage determination in the sense that they affect the alternative options to the bargaining parties.

Finally, a small negative effect of the proportion of temporary employees on average wages was found, although not statistically different from zero. On balance, the results presented in this subsection show that firms where insider workers have more labour market power tend to pay higher wages, *ceteris paribus*. In particular, in firms with low layoff rates and high rates of labour utilization within the firm, workers seem to extract rents in the form of higher wages.

Table 3.9: Measuring Insider Power and Insider Forces
 SYS-GMM Estimates of Wage Equation (1994-99)
 Dependent variable: Wages ($w_{it} - \bar{w}_{jt}$)

Explanatory Variables	
Wages lagged	0.227 (7.4)
Nominal productivity	0.143 (6.1)
Growth permanent employment	-0.096 (-5.8)
Proportion of temporary employees	-0.019 (-0.6)
Layoff rate	-0.022 (-5.3)
Labour utilization rate	0.318 (2.5)
Market share	0.018 (4.3)
Regional unemployment rate	-0.123 (-5.9)

Notes:
 Education, qualification, and time dummies were also included.
 t-statistics in parenthesis.

3.3.5 Wages and the Risk of Displacement

The extent of job destruction and, in particular, firm closing and job loss due to sector reallocation, has been a matter of great concern in recent years, with empirical research on gross job flows experiencing a tremendous growth in the past decade. The studies on the decomposition of net employment flows emphasize the importance of job creation and job destruction through the entry and exit of firms. In Portugal, annual job flows produced by both plant births and plant deaths account for almost half of total gross employment flows (Blanchard and Portugal (2001)). However, the literature on flows of jobs is mostly employment accounting, without any direct information about the magnitude of the wage or output elasticities of employment changes through the births and deaths of establishments, or growth or contraction in existing establishments. Few studies have yet analyzed how that wage variation affects the probability of displacement. In fact, the theoretical and empirical research on the role of wages on plant closings is remarkably sparse. Most

of the empirical literature on plant closings has been concentrated on the effect of unions in the probability that a firm (plant) shuts down. Based on the theoretical framework of Hamermesh's model, Carneiro and Portugal (2008b), using panel data from *Quadros de Pessoal* for workers displaced between 1994 and 1996, estimate a simultaneous failure-wage model to show how wages adjust to a negative demand shock that raises the risk of displacement through firm closing and to what extent a wage change affects the exit likelihood. The role of a mandatory minimum wage on the firm's exit decision was also analyzed. The parameter estimates of the simultaneous probit-tobit regression model of firm closing and wage formation are presented in Tables 3.10 (structural failure equation) and 3.11 (structural wage equation). The estimation strategy consists of having, as far as possible, a complete set of controls to examine whether a robust association between wages and the probability of firm closing (and *vice-versa*) can be identified. Table 3.10 report results (coefficients estimates and marginal effects, respectively) for a specification in which the probability of firm closing depends on an extensive set of firm characteristics, the regional unemployment rate, monthly reservation wage (predicted) and the estimated probability of being a minimum wage earner. A set of dummy variables for industries, regions and years are also included. Past sales growth, firm size, age, market share, multi-plant firm, proportion of foreign capital and sales per worker are significantly correlated with the probability of firm closing. In particular, the results reveal that firms experiencing a decline in sales growth are clearly more likely to close. This seems to imply that sales contraction can be used as a strong predictor of firm failure. Indeed, the fact that a firm has grown in the past signals that it has been performing well. Moreover, the estimates reported in Table 3.10 show that small firms are clearly more likely to close than large firms. This result is conventional enough and, in particular, is in line with the one obtained for Portugal in the study of Mata, Portugal and Guimarães (1995) using a sample of newly born manufacturing plants.

Table 3.10: Failure Equation
Two-step Probit Results (N=266,024 workers)
Dependent variable: displaced=1

Variables	Coefficient	Marginal Effect
Past sales growth	-0.327 (-31.1)	-0.049
Firm size	-0.242 (-77.2)	-0.037
Market share	-1.436 (-29.0)	-0.217
Multi-plant firm	-0.066 (-6.9)	-0.010
Proportion of foreign capital	-0.206 (-11.4)	-0.031
Sales per worker	-0.055 (-13.8)	-0.008
Regional unemployment rate	0.055 (7.3)	0.008
Predicted monthly reservation wage	0.063 (3.2)	0.010
Probability of being a minimum wage earner	0.192 (5.9)	0.029
Constant	0.741 (3.4)	0.112
Log-likelihood	-88628.6	

Notes: A set of firm age, industry, regional and time dummies are included. t-ratios are in parentheses.

The variable market share has a strong negative effect on the probability of closing, suggesting that monopoly power generates rents that may function as a buffer that cushions against negative shocks. Workers that are part of a multi-plant firm are less likely to be displaced due to firm closing than workers that are part of a single-plant firm. The same is true for workers that are part of firms with a large proportion of foreign-owned capital. Sales per worker, a proxy for productivity, have a negative impact on the probability of firm closing. Thus, low productivity firms, all else being equal, are more likely to close down. The coefficient estimate of the regional unemployment rate is positive and statistically significant, suggesting that local economic conditions may affect the viability of some types of firms. High-wage paying firms face higher hazard rates

than low-paying firms. After controlling for an extensive set of employers' characteristics and for local labour market conditions, the results reveal that firms that pay higher entry-level wages, holding revenue per employee fixed, are less likely to survive. A 1 percent wage increase is associated with a 0.16 percent increase in the probability of job displacement through firm closing. Finally, the two-step probit results report a positive and significant effect of the probability of receiving the minimum wage on the failure rate, suggesting that firms with a higher incidence of minimum wage workers face higher exit rates than those with a smaller incidence. A 10 percent increase in the proportion of minimum wage earners increases the probability of displacement through firm closing by 0.6 percent. In fact, the possibility of wage concessions is precluded if workers are paid legal minimum wages. Thus, firms with a higher proportion of minimum wage earners may have lower chances of survival due to their inability to adjust wages downward in the face of a negative demand shock. Table 3.11 reports the two-step tobit results of the wage equation. The basic specification includes a set of controls for workers' characteristics, the regional unemployment rate and the instrumented probability of displacement due to firm closing. A set of industry, regional and time dummies are also included in the specification. All the exogenous variables (excluding tenure squared) are statistically significant at the 1 percent level of significance and have the expected signs. The effect of the probability of closing on monthly wages is negative and also statistically significant. This implies that a worker employed in a firm that will close earns less in the year prior to displacement than a similar worker employed in a non-closing firm. Workers in a firm that has the average probability of failure in the population (6.3 percent), earn (one year prior to closing) 5.6 percent less than workers in a firm with zero probability of failure (a useful artificial benchmark). This empirical result indicates that average wages grow less rapidly in firms that will soon close, suggesting that firms' adjustment to negative shocks are partially absorbed into wages.

Table 3.11: Wage Equation

Two-step Tobit Results (N=266,024 workers)		
Dependent variable: log of real monthly wage		
Variables	Coefficient	Marginal Effect
Female	-0.170 (-86.5)	-0.162
Education	0.054 (118.4)	0.051
Age/100	2.873 (44.0)	2.745
Age/100 squared	-2.712 (-33.8)	-2.592
Tenure/100	0.331 (7.9)	0.317
Tenure/100 squared	-0.093 (43.9)	-0.088
Regional unemployment Rate	-0.058 (-25.1)	-0.056
Predicted probability of displacement	-0.933 (-75.7)	-0.892
Log-likelihood	-82468.0	
$\hat{\sigma}$	0.32	

Notes: A set of firm age, industry, regional and time dummies are included. t-ratios are in parentheses.

3.3.6 Measuring Post-Displacement Earnings Losses

Do displaced workers in Portugal suffer pre- and post-displacement wage losses? If so, what are the magnitude and persistence of these losses? What are the main sources of earnings losses? The main goal of the study by Carneiro and Portugal (2006) is to analyze the costs of worker displacement in terms of earnings losses in the Portuguese labour market. Two main objectives drive their investigation. The first objective is to analyze the long-term impact of a displacement on the earnings evolution of displaced workers in Portugal. The possibility to link workers with their employers constitutes a tremendous advantage of the Quadros de Pessoal data set, reinforced by the fact that recent empirical work on wage determination has been

showing that employers' characteristics are an important determinant of workers' wages. The second objective is to decompose the earnings losses according to their sources/causes.

Wage loss equations, estimated from a comparison between displaced and non-displaced workers in the *Quadros de Pessoal* dataset are given in Tables 3.12 and 3.13. The first column in Tables 3.12 and 3.13 provides results for a parsimonious specification in which average real hourly earnings depend on the displacement dummies and a set of individual characteristics that do not change with the job, such as age (and its square) and education. Education is defined as the number of years of schooling completed. Two dummy variables were added to the model. One that takes the value one if the worker has a part-time job in the post-displacement period and the other that takes the value one for displaced workers who left the firm one or two years before closing - the early-leavers (zero otherwise). A set of time dummies is also included in order to account for aggregate shocks.

Table 3.12
Weighted least squares regressions: men (N=773 104)

Dependent variable: log of average real hourly earnings				
	(1)		(2)	
Variables	Coefficient.	t-ratio	Coefficient.	t-ratio
Disp ₋₃	-0.126	(-14.0)	0.011	(1.5)
Disp ₋₂	-0.151	(-17.7)	-0.006	(-0.9)
Disp ₋₁	-0.193	(-22.9)	-0.029	(-4.1)
Disp ₀	-0.203	(-10.8)	-0.073	(-4.6)
Disp ₊₁	-0.234	(-15.6)	-0.087	(-7.0)
Disp ₊₂	-0.248	(-17.8)	-0.109	(-9.4)
Disp ₊₃	-0.254	(-16.2)	-0.114	(-8.7)
Disp ₊₄	-0.252	(-12.6)	-0.113	(-6.7)
Age	0.066	(195.3)	0.046	(161.8)
Age squared ^a	-0.059	(-141.1)	-0.042	(-120.1)
Education	0.103	(679.4)	0.069	(479.1)
Part-time job	0.101	(27.7)	0.091	(29.9)
Early-leaver	-0.012	(-1.4)	-0.025	(-3.4)
Size			0.063	(254.5)
Sales per worker			0.113	(254.9)
\overline{R}^2	0.44		0.61	

Notes:

^a variables divided by 100.

All specifications include a set of time dummies.

Men displaced in year zero earn, three years before separation, 12.6 percent less than their non-displaced counterparts, conditional on age, education, and macroeconomic conditions. In these same conditions women earn 8.7 percent less. This gap increases for both male and female with the approximation of the displacement event. Two years after the displacement year, Portuguese men earn 24.8 percent less than their non-displaced counterparts, and women earn 19.2 percent less. Only in the latter years does a slower recovery in earnings seems to emerge. In any event, three years after displacement men's earnings differential has risen by around 12.8 percentage points (p.p.) and women's differential by around 10.4 p.p., when compared to the earnings differential three years before displacement. The coefficient estimates of the early-leaver dummy variable are negative but not statistically different from zero. Differences in earnings between displaced and similar non-displaced workers may be explained by differences in employer characteristics where the individuals work (see column 2). The first variable is size, which is measured as the natural log of total employment in the firm. Sales per worker is defined as the ratio of annual real sales and total employment (in logs). Finally, eight industry (one-digit level) and six regional dummies were added to the model.

The effects of size and sales per worker on average hourly earnings are positive and highly significant. The results reveal that a large part of the relative annual earnings differential may be explained by differences in employers observed characteristics. Three years before separation the earnings gap between displaced workers and the reference group is almost negligible and not statistically different from zero (+1.1% for men and +1.2% for women). Indeed, after controlling for firms' characteristics, it is still possible to observe a very similar pattern on earnings evolution over the entire period of analysis. A pre-displacement dip in earnings is observed, followed by a drop in earnings in the displacement year. Not surprisingly, three years after displacement the relative earnings differential (the earning loss) has risen by around 12.5 p.p. for men and 10.1 p.p. for women. Overall, the results for the male sample reveal that the increase (three years after displacement) in the earnings gap of 12.5 p.p. is mainly due to the loss of tenure in the job and to joblessness. According to our calculations, tenure accounts for around 40-46 percent to the deepening in the earnings gap and joblessness for around 33-43 percent. Changing industry explains only 14 to 24 percent of the increase in the earnings gap. For female workers, the

increase in the earnings gap of 10.1 p.p. is mainly due to the loss of accumulated returns to tenure (45-52 percent), joblessness accounts for 16 to 34 percent of that increase and changing industry accounts for 16-31 percent.

Table 3.13

Weighted least squares regressions: women (n=501494)

Dependent variable: log of average real hourly earnings

	(1)		(2)	
Variables	Coefficient	t-ratio	Coefficient.	t-ratio
Disp ₋₃	-0.087	(-9.7)	0.012	(1.7)
Disp ₋₂	-0.103	(-12.2)	0.004	(0.6)
Disp ₋₁	-0.130	(-15.8)	-0.006	(-0.9)
Disp ₀	-0.151	(-7.5)	-0.044	(-2.7)
Disp ₊₁	-0.174	(-11.4)	-0.056	(-4.5)
Disp ₊₂	-0.192	(-13.5)	-0.084	(-7.2)
Disp ₊₃	-0.191	(-12.1)	-0.089	(-6.9)
Disp ₊₄	-0.185	(-9.4)	-0.083	(-5.1)
Age	0.040	(108.2)	0.026	(85.8)
Age squared ^a	-0.031	(-63.4)	-0.020	(-50.2)
Education	0.102	(587.8)	0.069	(408.4)
Part-time job	0.144	(41.8)	0.108	(38.0)
Early-leaver	-0.011	(-1.2)	-0.026	(-3.5)
Size			0.059	(231.3)
Sales per worker			0.098	(200.4)
\overline{R}^2	0.46		0.63	

Notes:

^a variable divided by 100.

All specifications include a set of time dummies.

3.3.7 The Falling Cyclicality of Real Wages

The Portuguese Labour market was for decades conspicuous for its low and strongly counter-cyclical rates of unemployment, with clear evidence of a very weak mobility in the labour factor. Researchers pointed quite naturally to the flexibility of real wages as the main reason for this. Throughout this period, convincing evidence was gathered suggesting strong cyclical sensitivity of aggregate wages in the behaviour of the unemployment rate (Luz and Pinheiro (1993), Gaspar and Luz (1997), Dias, Esteves and Félix (2004) and Marques (2008)). One decade on from the change in the monetary regime, with the emergence of the EA, in the presence of historically high

rates of unemployment, it is important to revisit the relationship between wages and the unemployment rate. One important dimension of flexibility in wages is rooted in the way that real wages react to changes in economic activity. Either adjustments to employment along the aggregate labour demand curve will trigger a counter-cyclical reaction in real wages; or, the intertemporal substitution of leisure for labour along the dynamic labour supply curve will lead to real wages synchronized with the economic cycle (see also section 3.4). A description of the cyclical behaviour of wages may, however, be partly obscured by changes in the composition of the labour force over the economic cycle. Indeed, the use of aggregate wage indicators causes intractable confusion as to the effect of changes in wage dispersion, in the distribution of hours worked and in the composition of the workforce. There is an additional factor in the use of aggregate data, with the implicit assumption that the relationship between real wages and the economic cycle is common to all workers or groups of workers. In this context there is an array of evidence on the bias introduced by the greater tendency to retain qualified workers during the recession (and recruit unskilled workers during periods of expansion). In the absence of any control over this type of heterogeneity of workers, there is the illusion of counter-cyclical behaviour in wages. In turn, the emergence of better-paid jobs during the expansionist phase of the cycle will tend to create an artificial impression that wage behavior is adjusted to the economic cycle. The aim of this inquiry is to reassess the cyclical behaviour of real wages in Portugal, bearing in mind the heterogeneity of the work force, of jobs and of pay practices. This endeavour requires access to longitudinal data bases with an unusually rich content and the use of estimation techniques that are specifically suitable to cope with the presence of various types of heterogeneity (Carneiro, Guimarães and Portugal (2009)). With this in mind, use was made of the individual records in the *Quadros de Pessoal* from 1986 to 2005. This involved 23,234,558 workers/year and 521,563 enterprises/year. The treatment of heterogeneity was complex. Firstly, the sampling procedure involved separating the workers by type. Secondly, a distinction was established between workers joining and staying on at the enterprise. This meant taking into account the sorting process emphasised in economic theory between the behaviour of wages for newly-arrived workers and for the job stayers. Thirdly, the analysis was undertaken in such a way as to allow for conditional in-

terference in the observed characteristics of individuals (specifically age, schooling and qualifications). Finally, the estimation technique used made it possible to isolate the effect of features of workers that were unknown but remained constant over time (such as motivation, discipline, creativity or leadership) and those of the enterprise (such as technological intensity, entrepreneurial skill, organisational structure, market position or product specialisation). To this end, an algorithm was specially devised to ensure an accurate solution to the estimation problem in a regression model with two types of fixed effects (Guimarães and Portugal (2009)).

Table 3.14

Sensitivity of real wages to the unemployment rate

OLS				
Period	1986-1995		1996-2005	
	Stayers	New hires	Stayers	New hires
Men	-2.19	-2.81	-0.81	-2.11
Women	-1.44	-2.68	-0.61	-2.10

Source: Quadros de Pessoal (1986-2005).

The cyclical sensitivity of real wages can be condensed into the reaction of wages to the unemployment rate. Table 3.14 exhibits the semi-elasticities of real wages in relation to the unemployment rate, with control exercised only on the observed heterogeneity. Given this, a one percentage point increase in the unemployment rate will lead to a 2.19 percent fall in the real wages of male workers who stay in the same enterprise in consecutive years (between 1986 and 1995). The estimates presented in Table 3.14 show generic evidence of wage flexibility in the period between 1986 and 1995, above all for recently recruited workers. There is, however, a clear indication that the cyclical sensitivity of wages has fallen off significantly over the past decade.

Table 3.15

Sensitivity of real wages to the unemployment rate

Worker fixed effects				
Period	1986-1995		1996-2005	
	Stayers	New hires	Stayers	New hires
Men	-1.91	-2.94	-1.22	-2.29
Women	-1.35	-2.71	-1.12	-2.27

Source: Quadros de Pessoal (1986-2005)

Table 3.16

Sensitivity of real wages to the unemployment rate

Worker and firm fixed effects				
Period	1986-1995		1996-2005	
	Stayers	New hires	Stayers	New hires
Men	-1.77	-2.67	-1.30	-2.44
Women	-1.39	-2.51	-1.13	-2.25

Source: Quadros de Pessôal (1986-2005)

This development may, of course, stem from a change in the composition of employment, either from the modification of unemployment or from modification of wage reaction when a homogeneous labour force is taken for the whole of the period under consideration. If account is taken of the effects associated with the persistent characteristics of workers, it is possible to show that a significant part of the loss of cyclical sensitivity in real wages is in fact associated to changes in the composition of employment (Table 3.15). There remains, however, a clear indication of the fall in cyclical sensitivity of wages even when the findings are filtered for the presence of individual permanent heterogeneity.

A comparison between the two tables also shows that the dynamics of labour force recomposition along the economic cycle led to pro-cyclical bias during the period from 1986 to 1995 (above all for men) and a counter-cyclical bias for 1996 to 2005. Curiously, with inclusion of the worker effects, the behaviour of men and women is very similar.

Nothing essential changes with the additional control for firm constant heterogeneity (Table 3.16). Interestingly, the same happens when control of the heterogeneity of workers is added to control of the heterogeneity of enterprises. This finding seems to indicate that the fixed component of job recomposition follows a cyclical path identical to the one of the workforce recomposition component.

The indication of a fall in the cyclical sensitivity of wages may be associated to the inadequate nature of the mechanisms for wage determination in low-inflation environments, in particular the severe downward nominal rigidity of wages and the widespread use of extension mechanisms applied to collective agreements. In turn, the growing generosity of the unemployment benefit system, especially with respect to the potential duration of the benefit, made unemployment less painful, favouring the emergence of reservation wages less sensitive to the rise in unemployment rates. Under

these circumstances, one may assist to higher unemployment rate increases in order to overcome the macroeconomic imbalances in the Portuguese economy (Blanchard (2007)).

3.4 Aggregate wage and price dynamics

The existence of wage and price rigidities, as documented in section 3.2, is widely recognised as a crucial issue for macroeconomics and notably for monetary policy. In the real world, the existence of price and nominal wage rigidities is expected to translate into persistent responses of wages and prices to shocks hitting the economy so that evaluating the degree of persistence of such responses is an issue of paramount importance.

In this section we investigate the wage and price dynamics in Portugal with a special focus on the persistence of real wages, wage and price inflation, and compare the results with similar evidence for the US and the EA.

More specifically, in this section we will try to give an answer to the following questions: 1) how do wages and prices react to different shocks that may hit the Portuguese economy? 2) how persistent are the responses of real wages, wage and price inflation to those shocks and how they compare with similar evidence for the US and the EA? and 3) how important were the different shocks in accounting for wages and prices fluctuations in the Portuguese economy in the 1995-2007 period?

The analysis draws on previous work for the Portuguese economy (see Marques (2008)), the US and the EA (see Duarte and Marques (2009))¹⁴. The approach is conducted within a structural error-correction model which allows comparing the persistence of real wages, wage and price inflation across shocks for different economies.

The rest of this section is organized as follows. Sub-section 3.4.1 presents a simple theoretical model of wages and prices, which will

¹⁴The results for the US and the EA used here for comparison purposes are taken from Duarte and Marques (2009), but the results for the Portuguese economy differ significantly from the ones presented in Marques (2008). The differences stem from three main sources: 1) The sample period was updated to include data for 2007; ii) there was a major revision of the data on labour productivity which implied important changes on the coefficients, as well as on some properties of the estimated model and iii) a different assumption underlying the identification of some of the shocks was introduced in order to ensure full comparability with the results for the US and the EA, reported in Duarte and Marques (2009).

be used to identify the long-run wage and price equations, as well as the permanent structural shocks. Sub-section 3.4.2 presents the econometric analysis with a special emphasis on the estimation and identification of the long-run wage and price equations. Sub-section 3.4.3 focus on the identification of the structural shocks and sub-section 3.4.4 on the dynamic response of wages and prices to these shocks, including some measures of short and long-run persistence. Sub-section 3.4.5 discusses the main sources of wages and prices fluctuations.

3.4.1 A macroeconomic model for wages and prices in an open economy

This sub-section presents a simple model for the determination of wages and prices, which will be used further below to identify the long-run wage and price equations, as well as the permanent structural shocks. The model consists of a production function, a wage setting equation, an equation describing price formation, an equation for the unemployment rate and an equation for the import prices in domestic currency. The equations contain a minimum of dynamics in order to simplify the discussion about the long-run properties of the model¹⁵.

We assume that production in the economy may be described by a constant returns to scale Cobb-Douglas function (with lower case letters denoting logs):

$$y - e = \eta + (1 - \gamma)(k - e) \quad (3.1)$$

where y is output, e is employment, k is the stock of capital and η a stochastic technology variable. We may further simplify the production function and simply write:

$$h = y - e = \xi_h \quad (3.2)$$

where h stands for labour productivity and ξ_h for a stochastic technology trend (technical progress and capital accumulation) that shifts labour productivity in the long-run. It is assumed that technology is exogenous and follows a stochastic random-walk process, i.e., $\xi_h = \xi_{h-1} + \phi_h$ where ϕ_h is a pure technology innovation.

¹⁵For further details on the model presented in this section, see Duarte and Marques (2009) and the references therein.

As regards the wage formation, we assume that wages are determined through a bargaining process between firms and employees (or the labour unions). This type of models predicts that the bargaining solution will depend on the real producer wage and productivity on the firm side, and on the real consumer wage on the workers side. A simple log-linear form of the wage equation corresponding to the bargaining solution can be written as:

$$w - q = k_1 + \mu(p - q) + \delta h - \theta u, \quad 0 \leq \mu, \delta \leq 1, \theta \geq 0, \quad (3.3)$$

where w is the nominal wage rate, q is the producer price level, p is the consumer price level and u is the unemployment rate.

According to (3.3), the real wage faced by firms (real producer wage) is affected by $(p - q)$, h and u . The relative price $(p - q)$, which measures the difference between the producer real wage and the consumer real wage, is usually referred to as the *price wedge*, and plays an important role in theoretical wage bargaining models. Its coefficient, μ , can be interpreted as a measure of "real wage resistance", which measures the unions ability to obtain higher wages to compensate for exogenous changes in workers' living standards (increases in p brought about, for example, by increases in indirect taxes). The bargaining solution (3.3) also implies that an increase in labour productivity, h , will increase wages, since higher productivity increases the profitability of firms, making them more likely to accept higher wage claims from the unions. The unemployment rate, u , represents the degree of tightness in the labour market, which influences the outcome of the bargaining process through the relative bargaining power of the labour unions and employers organizations.

For the process of price formation we assume an economy with imperfect competition where producers target their prices, q , as a mark up, ω , over marginal costs. If there are constant returns to scale, marginal costs are constant and therefore prices are set as a mark-up over unit labour costs:

$$q = \omega + (w - h). \quad (3.4)$$

The mark-up is not necessarily constant and, in an open-economy, it may be a function of the level of international competitiveness. Here, we assume that the mark-up may be written as:

$$\omega = k_2 + \lambda(z - q), \quad k_2, \lambda \geq 0, \quad (3.5)$$

where z is the domestic currency price of imports and λ reflects the exposure of domestic firms to international competition. The smaller is λ the smaller is the pass-through from foreign price or exchange rate shocks to domestic producer prices.

If we further assume that consumer prices are a weighted average of producer and import prices:

$$p = (1 - \rho)q + \rho z, \quad 0 < \rho < 1, \quad (3.6)$$

we may solve the model for wages and consumer prices obtaining the so-called long-run wage and price equations (ignoring the constants for simplicity):

$$w = (1 + \alpha)p - \alpha z + \delta h - \theta u + \tau_w, \quad (3.7)$$

$$p = \beta(w - h) + (1 - \beta)z + \tau_p, \quad (3.8)$$

where $\alpha = \rho(1 - \mu)/(1 - \rho)$ and $\beta = (1 - \rho)/(1 + \lambda)$. Under the assumption that the two relations are stationary, the stochastic variables τ_w and τ_p can interpreted as exogenous wage and price shocks that follow stationary stochastic processes, i.e., $\tau_i = \sigma_i \tau_{i-1} + \epsilon_i$ with $0 \leq \sigma_i < 1$ ($i = w, p$).

For the unemployment rate, we assume that it is the result of the difference between the labour supply and labour demand, so that in the long run unemployment may be affected both by real wages, $(w - p)$, and productivity, h :

$$u = \pi_1(w - p) + \pi_2 h + \xi_u, \quad (3.9)$$

where ξ_u is an exogenous stochastic variable. Equation (3.9), being a reduced form equation, has the implication that ξ_u is a combination of labour supply and demand shocks. If equation (3.9) turns out to be a cointegrating relation, ξ_u would be interpreted as a stationary shock, while in the absence of cointegration, ξ_u would be seen as stochastic random-walk process, i.e., $\xi_u = \xi_{u-1} + \phi_u$ where ϕ_u is a pure unemployment shock.

Finally, we assume that import prices in domestic currency may depend on unemployment, as well as on productivity:

$$z = \gamma_1 u + \gamma_2 h + \xi_z \quad (3.10)$$

This way we allow for the possibility of unemployment and productivity/technology shocks to have long-run impacts on import

prices through changes in the exchange rate¹⁶. The stochastic variable ξ_z would be a stationary process if equation (3.10) is a cointegrating relationship. In the absence of cointegration, it will be assumed to follow a random-walk process, i.e., $\xi_z = \xi_{z-1} + \phi_z$ where ϕ_z is a pure exogenous import price shock.

Thus, our theoretical model expressed in terms of the variables we consider in the empirical analysis (w, p, u, h, z) is composed of equations (3.2),(3.7),(3.8),(3.9) and (3.10).

3.4.2 Econometric Analysis

To estimate the model above for the Portuguese economy we use quarterly seasonally adjusted data for wages (w), labour productivity (h), the unemployment rate (u) and consumer (p) and import prices (z), for the period 1992q2 to 2007q4. Wages refer to nominal compensation per employee for the whole economy, whereas labour productivity is measured as real GDP per employed person. Consumer prices are measured by the consumer price index (CPI) and import prices, are measured by the total imports deflator. For the analysis that follows we assume that w, p, h, z and u are all integrated of order one, $I(1)$. This assumption seems to be broadly supported by the Augmented Dickey-Fuller (ADF) unit-root tests (see Marques (2008)). According to the model outlined in sub-section 3.4.1, we expect two stationary relationships or, in other words, two cointegrating vectors, one corresponding to the wage equation and the other to the price equation. Even though the model also allows for some endogeneity of unemployment and import prices, we do not expect these two equations to give rise to additional cointegration relations because the model does not include all the variables we believe might help explain unemployment or import prices long-run behaviour. In order to investigate whether this assumption is consistent with the data we start by estimating a full-system unrestricted VAR model in the five variables w, p, u, h , and z and test for

¹⁶The emergence of the EA in 1999, with the introduction of a single currency, implied a significant change in the monetary policy regime at the country level, as the possibility of an independent monetary policy was lost. As a consequence the reaction of the nominal exchange rate to some of the shocks that hit the Portuguese economy during the sample period is likely to be different for the periods before and after the emergence of the EA. In particular, this is the case of idiosyncratic shocks (the ones that hit the Portuguese economy and not the EA as whole), which are not expected to bring about significant changes in the nominal exchange rate in the period after the emergence of the EA.

the existence of cointegration¹⁷.

Based on the evidence from the cointegration tests for the model without the dummy variables (see Table 3.17), the hypothesis of two cointegrating vectors emerges as the natural choice that reconciles the empirical evidence with the theoretical features of the model.

Table 3.17: Cointegration Trace Tests

Rank	Corrected trace test ^a	Corrected trace test ^b	90% quantile	95% quantile	99% quantile
0	78.27***	70.67**	64.74	68.68	76.37
1	48.42**	42.36	43.84	47.21	53.91
2	26.38	22.29	26.70	29.38	34.87
3	11.49	5.44	13.31	15.34	19.69
4	0.20	0.10	2.71	3.84	6.64

Note: *** and ** mark significance at 1% and 5% respectively;

(a) Small sample corrected trace test using the Reinsel-Ahn correction (Cheung and Lai (1993);

(b) Small sample corrected trace test using the Bartlett correction factors (Johansen (2002)).

As the unrestricted cointegrating vectors are hardly given any economically meaningful interpretation, we proceed by using information derived from the underlying theoretical model developed in sub-section 3.4.1 to identify the two cointegrating relationships. In our framework, the identification of the long-run wage and price equations depends on the number of cointegrating vectors of the system. Under the assumption of two cointegrating vectors, it can be shown that the order condition for identification of the wage and price equations (3.7) and (3.8) is met, but the rank condition does not hold. In order to overcome this problem, we impose $\alpha = 0$ in equation (3.7) such that z drops from the wage equation. In this case it is possible to show that the two equations do meet the necessary and sufficient condition for identification, so that the system becomes over-identified with three over-identifying testable restrictions.

Once we estimate the model imposing these three over-identifying restrictions we realise that the coefficient of productivity, δ , becomes close to one. If we further impose this restriction we get

¹⁷Since the data are trending the VAR includes an unrestricted constant. In addition, four dummy variables (one step and three impulse dummies) are introduced to allow for special events (namely VAT rate changes) occurred during the sample period.

the following two long-run relationships (with asymptotic standard errors in parenthesis):

$$w = p + h - \frac{0.097u}{(0.008)} \quad (3.11)$$

$$p = \frac{0.499(w - h)}{(0.049)} + \frac{0.501z}{(0.049)} \quad (3.12)$$

where it is worth noticing that the wage equation is such that it implies cointegration between unemployment and the wage share (or real unit labour cost, $w - p - h$), which is a result often found in the empirical literature.

As regards the coefficient of the unemployment rate we note that the estimate -0.097 , is in line with the standard elasticity estimates obtained in the literature for other countries, which usually stand close to -0.10 (see, for instance, Blanchflower and Oswald (1994)). The estimate for Portugal is significantly lower than the ones obtained in Duarte and Marques (2009) for the US (-0.327 , for 1993q1-2007q4) and the EA (-0.157 , for 1989q1-2007q4), but close to the estimate obtained in Carneiro and Portugal (2008a), as shown in section 3.

The estimated coefficients for the price equation suggest that the long-run coefficients on unit labour costs ($w - h$) and import prices z are basically similar. The estimate for the coefficient on import prices (-0.501) is significantly higher than the corresponding estimates obtained in Duarte and Marques (2009) for the US (0.128) and the EA (0.374).

3.4.3 Identification of the structural shocks

In a VAR model with $I(1)$ variables it is known that cointegration imposes restrictions on the matrix of the long-run effects of the shocks to the system, which must be taken into account for the identification of the structural innovations. Our system has five variables and two cointegrating vectors and this has the implication that there must be three structural shocks with permanent effects and two structural shocks with transitory effects. It can be shown that the identification of the three permanent shocks may be achieved by imposing three restrictions on the long-run impact matrix and the identification of the two transitory shocks may be obtained by imposing one restriction on the matrix of the contemporaneous effects¹⁸.

¹⁸For further details on the econometric identification of the structural shocks, see Marques (2008) and Duarte and Marques (2009) and the references therein.

To discuss further the economic identification of the permanent shocks in the context of our theoretical model, we may express the endogenous variables as a function of the exogenous shocks. Ignoring the two transitory shocks, the general solution of the economic model presented in sub-section 3.4.1, under the assumption of $\alpha = 0$, is given by

$$\begin{bmatrix} w \\ p \\ u \\ h \\ z \end{bmatrix} = \begin{bmatrix} \Omega_{11} & \Omega_{12} & 1 \\ \Omega_{21} & \Omega_{22} & 1 \\ \Omega_{31} & \Omega_{32} & 0 \\ 0 & 1 & 0 \\ \Omega_{51} & \Omega_{52} & 1 \end{bmatrix} \begin{bmatrix} \xi_u \\ \xi_h \\ \xi_z \end{bmatrix} \quad (3.13)$$

where the Ω_{ij} are functions of the model parameters: $\beta, \gamma_1, \gamma_2, \delta, \theta, \pi_1, \pi_2$. From equation (3.13) we see that an import price shock, ξ_z , has a zero long-run impact on unemployment and productivity and that an unemployment shock, ξ_u , has a zero long-run impact on productivity. On the other hand, productivity or technology shocks, ξ_h , may have a non-zero long-run impact on all the variables of the model. According to the discussion above, these three zero restrictions allow the exact identification of the three permanent shocks.

In terms of our theoretical model, the permanent import price shock is expected to have an equal long-run impact on nominal wages and prices, thus leaving the real wage unchanged in the long run and having no long-run impact on unemployment or productivity. Such a shock may stem from an unexpected change in the prices of imported goods or from an unexpected change in the nominal exchange rate. The permanent unemployment shock is identified by the condition that it has a zero long-run effect on productivity and is interpreted as a shock that may stem from an unexpected increase in labour supply or labour demand. The permanent productivity shock is interpreted as a technology shock (technical progress and capital accumulation) and is allowed to have permanent effects on all the variables of the system. Notice that this identification conforms to the restriction satisfied by a broad range of models, where only technology shocks have a permanent effect on labour productivity (see, for instance, Galí (1999)).

Finally, to identify the two transitory shocks we impose the restriction on the matrix of the contemporaneous impacts that the transitory price shock is not allowed to have a contemporaneous effect

on wages. Thus, the transitory wage shock is the shock that may have contemporaneous effects on both wages and prices. The interpretation of the transitory shocks is not as intuitive as that of the permanent shocks, as in the context of our model they may stem from a variety of alternative sources with different implications for the dynamics of the model. For this reason, the discussion below focus mainly on the three permanent shocks.

3.4.4 Impulse responses

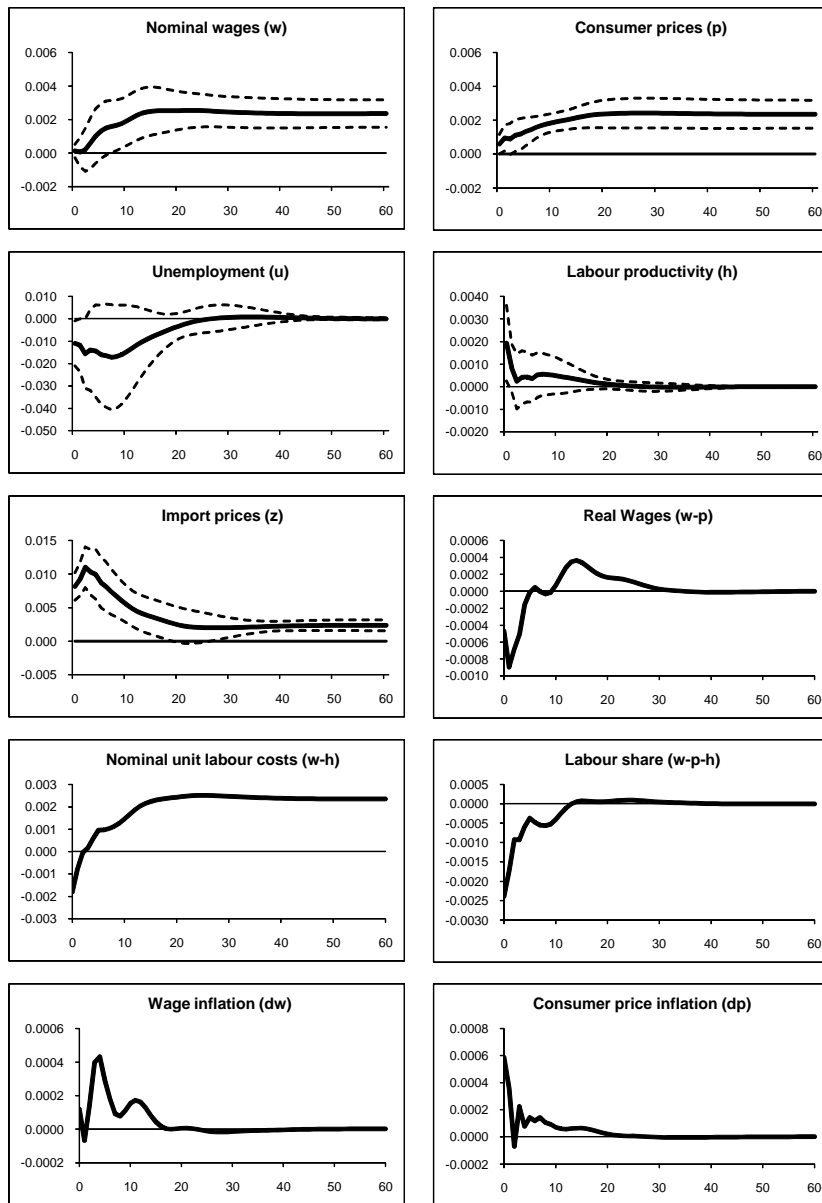
The impulse response functions of model variables, as well as the responses of real wages, the labour share and wage and price inflation to the three permanent shocks are depicted in Figures 3.4 to 3.6¹⁹. Table 3.18 presents two measures of persistence for real wages, wage and price inflation for Portugal, the US and the EA²⁰. The two measures of persistence are defined as the proportion of the total disequilibrium that dissipates in the two years after the shock, and the number of periods required for 99 percent of the total disequilibrium to dissipate. We see the first measure as a simple way of quantifying the speed of reaction in the short-term, so that we will loosely denote it as "short-term persistence" and the second as a way to measure "long-run persistence". When the speed of adjustment to the new equilibrium varies throughout the convergence period, we will need to look at both measures to better characterize the adjustment process. Figure 3.8 depicts the impulse responses to a permanent positive import price shock. As expected, given the property of long-run nominal homogeneity of the estimated model, an unexpected import price shock brings about a permanent increase in nominal wages and prices of the same magnitude in the long run. As a result, real wages, as well as the labour share remain unchanged in the long run. However, in the short run prices increase faster than nominal wages so that real wages decrease during the first year or so, and the labour share decreases during the first three years, after the shock. A noteworthy result is that the adjustment of real wages displays a hump-shaped response type to this shock, before starting to return to the previous equilibrium level²¹. While the largest im-

¹⁹The impulse response functions for the five original variables of the system are depicted together with 80 percent confidence bands.

²⁰The figures for the US and the EA are from Duarte and Marques (2009).

²¹Interestingly, the same pattern is displayed by real wages in the US and the EA, following an import price shock. See Duarte and Marques (2009).

Figure 3.8: Responses to a permanent import price shock



Source: Martins (2009a)

pact on inflation occurs contemporaneously, the largest impact on wage changes only occurs after one year. From Table 3.18 we can see that after two years (8 quarters) only 42 percent, 62 percent and 70 percent of the total disequilibrium has dissipated for real wages, wage inflation and price inflation, respectively. The larger short-term persistence of wages following an import price shock comes hardly as a surprise. On the one hand, the import price shock is expected to impact directly on prices and only indirectly on wages. On the other hand, as we have seen in section 3.2, wages in Portugal are adjusted once a year on average, while prices change more frequently, thus allowing a much faster short-term response of consumer prices to an import price shock.

Table 3.18: Persistence of real wages, wage and price inflation

	Δw			Δp			$w - p$		
	PT	US	EA	PT	US	EA	PT	US	EA
Share of total disequilibrium dissipated after 8 quarters									
Permanent shock									
Imp. prices	0.62	0.80	0.42	0.70	0.80	0.55	0.42	0.28	0.60
Unemploy.	0.58	0.58	0.25	0.52	0.65	0.40	0.75	0.50	0.64
Productiv.	0.66	0.54	0.63	0.72	0.58	0.64	0.69	0.55	0.44
Transitory shock									
Wage	0.82	0.90	0.87	0.74	0.83	0.59	0.72	0.73	0.72
Prices	0.54	0.57	0.48	0.81	0.85	0.75	0.72	0.34	0.51
Number of quarters required for 99 % of the total disequilibrium to dissipate									
Permanent shock									
Imp. prices	39	42	44	39	40	43	45	43	40
Unemploy.	40	41	48	43	37	47	35	35	41
Productiv.	39	39	42	39	35	42	35	41	47
Transitory shock									
Wage	31	29	34	37	40	41	35	44	38
Prices	36	45	44	27	36	40	33	38	46

As regards long-run persistence, we conclude that real wages emerge as somewhat more persistent in Portugal compared to the US and the EA, while wage and price inflation emerge as somewhat less persistent than in those two economies.

Figure 3.9 displays the impulse responses to an unexpected permanent positive unemployment shock. The shock seems to affect mainly wages with no significant impact on consumer prices in the

long run. The explanation for this result may be found in the response of import prices. This variable increases permanently in the long run (eventually following a currency depreciation induced by higher unemployment) and, therefore, partly offsets the expected effect of higher unemployment on prices through lower wages²². As a result of the shock, real wages and the labour share decrease permanently to a lower equilibrium level.

Two years after the shock 75 percent of the total disequilibrium in real wages has already dissipated, which means that these are less persistent in face of an unemployment shock than in face of an import price shock. In the short-run, real wages also emerge as somewhat less persistent in Portugal than in the US or in the EA (where only 50 and 64 percent of the disequilibrium dissipates in the two first years after the shock). This accords with the idea that in Portugal real wages react very quickly and significantly to negative news coming from the labour market. Thus, if anything, real wages emerge as adjusting very quickly to shocks to unemployment, suggesting that wage flexibility, understood as the reaction of real wages to changes in unemployment, is very high in the Portuguese labour market. In the long-run the speed of adjustment of real wages in Portugal is similar to that of the US but faster than in the EA.

As regards wage and price inflation, both variables emerge as more persistent in the EA than in Portugal or the US, regardless whether one looks at the short or the long-term adjustment. The speed of adjustment of wage inflation is basically the same in Portugal and the US, but significantly faster than in the EA. Price inflation is also less persistent in Portugal than in the EA, but somewhat more persistent than in the US.

Figure 3.10 depicts the impulse responses to a permanent positive technology shock that shifts productivity in the long run and, by definition, may impact on the long-run level of all the variables of the model.

In the context of our estimated model all productivity gains are absorbed by nominal wages in the long run ($\delta = 1$ in equation (3.7)). Thus, in the long run, under a *ceteris paribus* assumption, we could expect nominal wages to increase in line with productivity and the

²²This result should be interpreted very cautiously, as the emergence of the EA is likely to have brought about significant changes in the reaction of the nominal exchange rate to unemployment shocks. See also the comments to equation (3.10) above.

Figure 3.9: Responses to a permanent unemployment shock

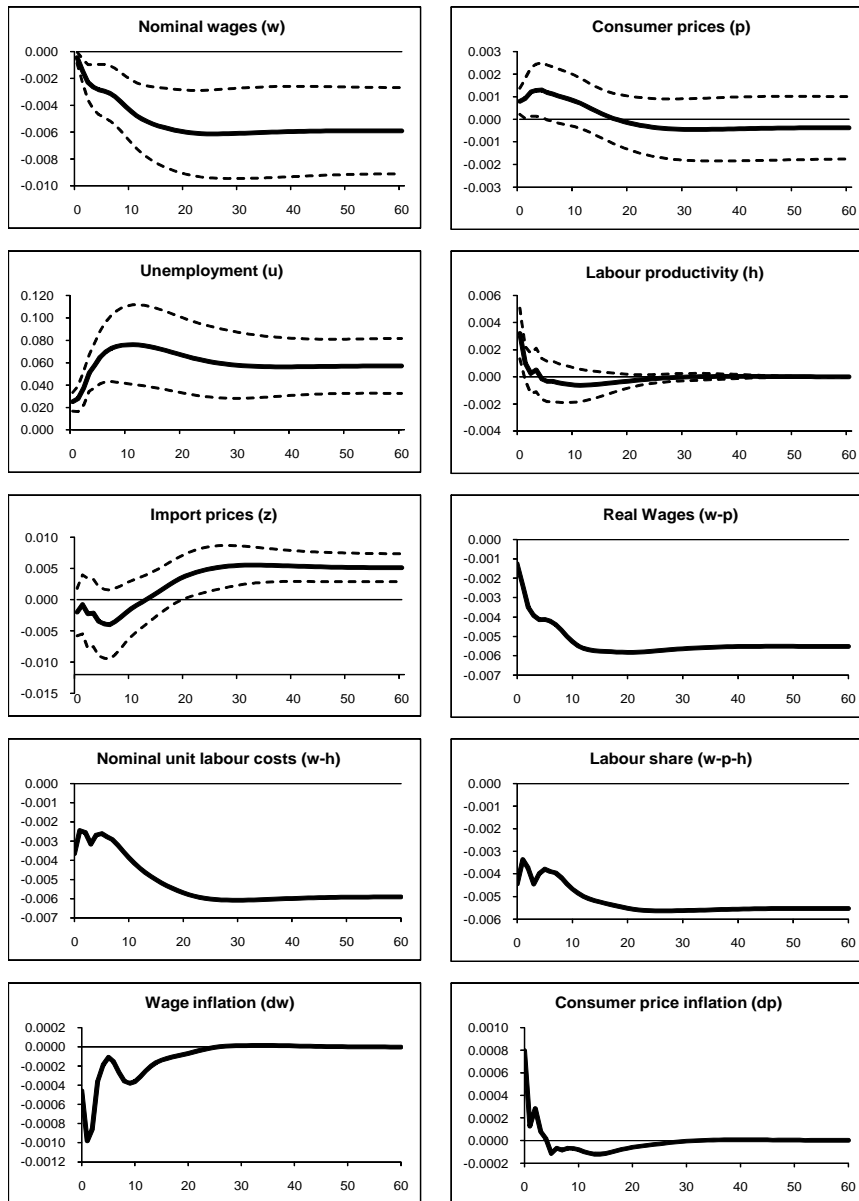
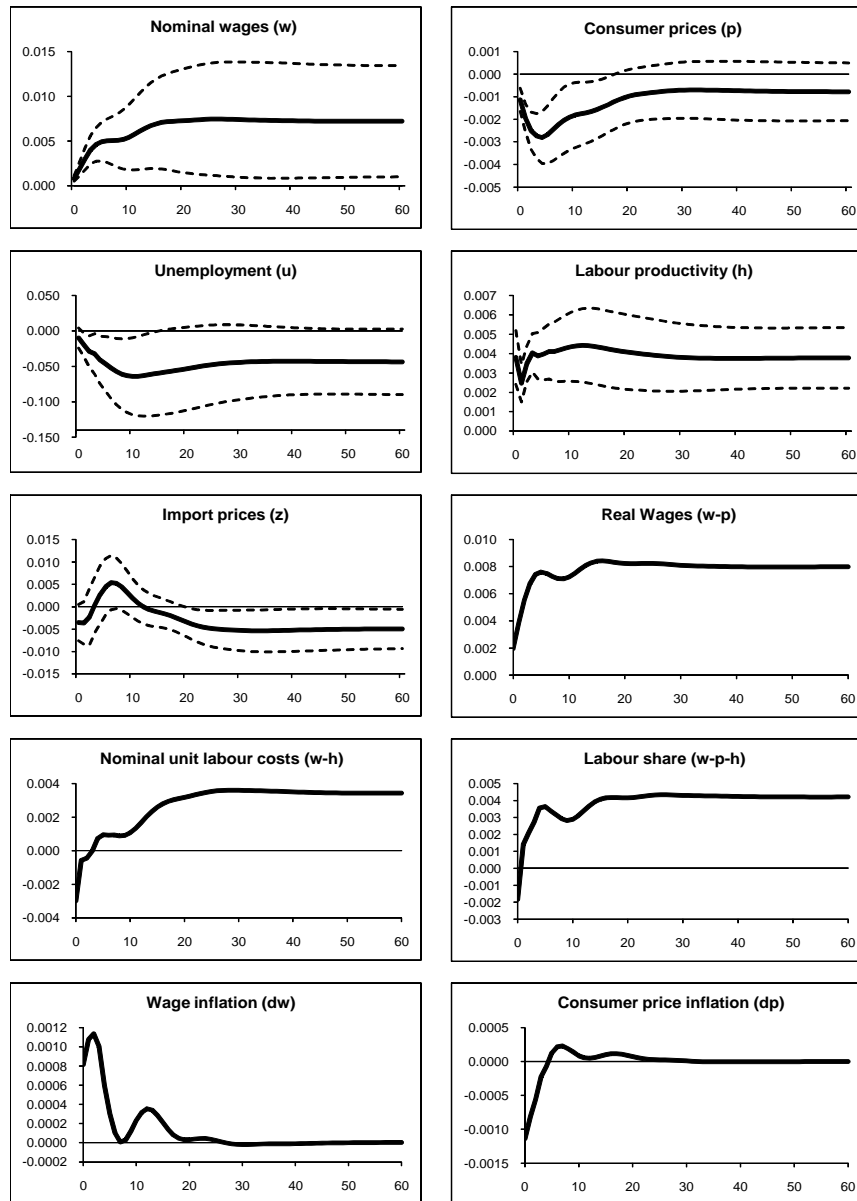


Figure 3.10: Responses to a permanent productivity shock



labour share to remain constant. However, in our model the productivity shock causes a decline of import prices and of unemployment, which translate into an additional increase in wages implying a permanent increase not only in real wages, but also in the unit labour costs and the labour share²³. Consumer prices are negatively affected, but not significantly so.

In line with the behaviour of nominal wages and consumer prices, an unexpected positive shock in productivity has a temporary positive impact on wage inflation and a negative impact on price inflation. In either case, the short-term response of wage and price changes is rather fast given that after two years more than 60 percent of the disequilibrium has already dissipated.

As regards long-run persistence, real wages display the same persistence as in the case of the permanent unemployment shock, but emerge as clearly less persistent than in the case of the permanent import price shock. Wage and price inflation display the same long-run persistence as in the case of the import price shock, but somewhat lower than in the case of the permanent unemployment shock.

Compared to the US and the EA real wages appear as less persistent in Portugal (it takes between 8 and 9 years in Portugal, compared to about 10 years in the US, and almost 12 years in the EA, for the full adjustment to take place). Persistence of wage and price inflation in Portugal is similar to that in US and somewhat smaller than in the EA.

3.4.5 Sources of wage and prices fluctuations

We now investigate how important were the different shocks in accounting for the observed fluctuations in wages and prices, by looking at the forecast-error variance decompositions for the variables of the model. As expected, the two transitory wage and price shocks explain a significant amount of the variation in the corresponding variables forecast errors in the very short run (up to 2 or 3 quarters), whereas permanent shocks play a more predominant role at longer horizons (see Table 3.19).

²³Interestingly, a similar result for the technology shock is obtained for the US (see Duarte and Marques (2009)).

Table 3.19: Forecast error variance decomposition at the business cycle frequencies^(a)

Shocks	Wages			Prices		
	PT	US	EA	PT	US	EA
Permanent import price shock	0.06	0.15	0.24	0.32	0.15	0.57
Permanent unemployment shock	0.33	0.41	0.40	0.11	0.17	0.26
Permanent productivity shock	0.59	0.31	0.12	0.54	0.63	0.10
Transitory wage shock	0.01	0.10	0.20	0.02	0.01	0.01
Transitory price shock	0.01	0.03	0.03	0.02	0.04	0.07

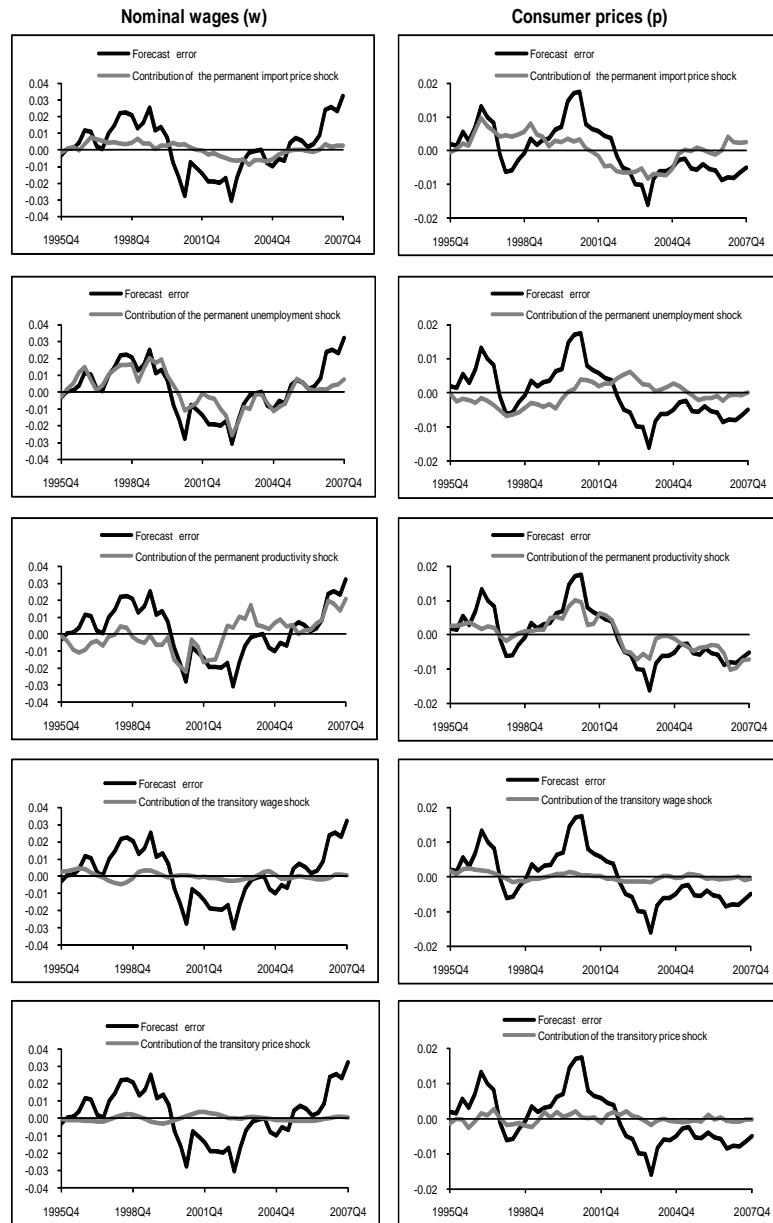
^(a) Average contribution of each shock in the 12th, 16th and 20th quarter.

Permanent productivity shocks are the main driver of price and wage developments, being responsible for approximately 60 percent of the variation of wages' and 54 percent of the variation of prices' forecast errors, at the business cycle horizons (3-5 years). Shocks to import prices are not important for wage developments but are very important for price developments. For those periods, on average around 30 percent of the variation in the forecast errors in prices is attributable to import price shocks. Unemployment shocks play an important role in explaining wage fluctuations at the business cycle horizon, accounting for 33 percent of the variation in wages' forecast errors, but a minor role in explaining price dynamics (only 11 percent of the variation in the corresponding forecast errors is attributable to this kind of shocks). The reason for this minor role stems from the fact that the effect on lower prices through lower wages is partly offset by the effect of higher import prices.

Figure 3.11 illustrates the roles played by the different shocks during the sample period, by plotting the forecast-error at the three-year horizon (12 quarters) and the portion attributable to each shock for wages and prices. Looking at specific episodes, we see that the forecast errors in wages are mainly attributable to permanent unemployment shocks for most of the sample period, but productivity/technology shocks emerge as playing an important role in the most recent years of the sample (from late 2006 onwards). As regards price developments, import price shocks emerge as very important at the beginning of the sample (1995-1997) while productivity shocks seem to play the prominent role afterwards. Finally, the comparison of the main sources of wage and price fluctuations between Portugal, the US and the EA show that the results for Portugal are closer to the ones for the US. Productivity/technology shocks

AGGREGATE WAGE AND PRICE DYNAMICS

Figure 3.11: Historical decompositions of 12 quarter ahead forecast errors in w and p



are the main driver of prices in Portugal and the US, while in the EA price developments are mostly explained by import price shocks. Wage developments are mostly explained by unemployment and productivity shocks in Portugal and the US, but in the EA productivity shocks do not play a significant role (see Duarte and Marques (2009)).

3.5 Conclusions

This chapter documents the main features of price and wage setting practices in the Portuguese economy, investigates the salient features of wage formation, and evaluates the consequences for the persistence of real wages, wage and price inflation stemming from wage and price rigidities.

As regards firms' pricing behaviour the most noticeable finding is that, in the Portuguese economy, prices are somewhat less flexible than in the US but more flexible than in the EA. The evidence from the distribution of price changes gathered from micro data indicates that about 1 out of 5 prices is changed on average every month and that the median duration of a price spell is about 8.5 months (10.6 months in the EA and 4.6 months in the US). There is no evidence of general downward rigidity, as price decreases are not uncommon. Reassuringly, the evidence on both producer and consumer prices is quite similar.

Regarding firms' wage setting practices, we uncovered evidence favouring the hypothesis of aggregate and idiosyncratic wage flexibility. Changes in wages occur with less frequency than changes in prices though. If frequency is converted into duration, it can be seen that the average duration of wages is 13 months – 2.5 months longer than the average duration of prices, but about 2 months less than in the EA. Most wages are defined with the behaviour of inflation borne in mind, above all expected inflation, though the relationship is not a formal one.

Despite the rigidity imposed by the existence of mandatory minimum wages, the presence of binding wage floors determined by collective agreements, and the general use of extension mechanisms, the firms still retain the ability to circumvent wage agreements via the mechanism of the wage cushion. The wage cushion can serve as a buffer against the negative product demand shocks to provide firms room to adjust to both internal and external factors. In the Portuguese case, rent sharing between employers and workers gives a

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relatively high importance to internal factors, in comparison with other European countries. But wages also react strongly to local labour market conditions. In a sclerotic labour market, where the loss of a job can be a dramatic event because of the low arrival rate of job offers, wages are conditioned by fears of dismissal (among these the possibility of displacement due to firm closure). The sensitivity of real wages to the unemployment rate is fairly high in the Portuguese labour market.

The evidence provided by macroeconomic models confirms the indication that Portuguese wages behave in a fashion consistent with the Wage Curve literature. In its static interpretation, a 10 percent increase in the unemployment rate generates a 1 percent decrease in real wage. The relative persistence of real wages, wage and price inflation varies with the type of shock hitting the economy. Real wages emerge as specially persistent following an import price shock, while wage inflation displays similar persistence in the face of import price, unemployment or productivity shocks. In turn, price inflation appears somewhat more persistent in the case of unemployment shocks. Overall, in terms of long-run persistence, wage and price inflation emerge as less persistent in Portugal and the US than in the EA, consistently with the micro evidence on the frequency of price adjustments.

Recent evidence from both aggregate and disaggregate wage data, however, suggests that the responsiveness of real wages to unemployment changes may have declined over the last decade. The indication of a fall in the cyclical sensitivity of wages may be associated to the nature of the current mechanisms for wage determination in a low-inflation environment (in particular under severe nominal downward rigidity of wages). Furthermore, the generosity of the unemployment benefit system, in particular with respect to the maximum potential duration of the benefits, by making unemployment less painful, favours reservation wages which are less sensitive to the rise in unemployment rates. In this setup, the weaker the effect of unemployment, the smaller will be the decrease in wages for a given unemployment gap, and the higher will be the level of unemployment needed to overcome the macroeconomic imbalances.

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Chapter 4

Unemployment: Supply, demand, and institutions

Mário Centeno, José R. Maria and Álvaro A. Novo

4.1 Introduction

The dramatic surge in unemployment in Portugal – the unemployment rate more than doubled from an historical low of 3.8 percent in the second quarter of 2001 to 9.1 percent in the second quarter of 2009 – placed the labor market and, in general, the structural features of the economy, at the forefront of the economic policy debate. Simple explanations for these dramatic changes are difficult to get. In the literature, macroeconomists started thinking about unemployment within the classical model, with flexible wages allowing for demand to adjust, but this approach proved to be at best incomplete, since it cannot generate, for instance, involuntary unemployment. The alternative Keynesian approach, allowing for nominal wages to be rigid in the short-run, generates a trade-off between inflation and unemployment. Known as the Phillips curve, it implies a role for demand policies to reduce unemployment in the short-run. However, in the long-run these policies are inefficient and the structural features of the economy are the sole determinants of unemployment.

The structural interpretation of the unemployment phenomenon draws heavily on the work by Friedman (1968) and Phelps (1968).

This analytical framework postulates that each economy can be characterized by a “natural unemployment rate”. The economy cannot remain indefinitely above or below the natural rate of unemployment but it may fluctuate around it. Thus, one must separate the cyclical fluctuations of the unemployment rate from the structural movements in the natural rate. In the words of Friedman (1968, p. 8): *“The natural rate of unemployment is the level which would be ground out by the Walrasian system of general equilibrium equations, provided that there is imbedded in them the actual structural characteristics of the labor and commodity markets, including market imperfections, stochastic variability in demand and supplies, the cost of gathering information about job vacancies and labor availabilities, the costs of mobility, and so on”*.

This Chapter does not distinguish between the natural rate and the “non-accelerating inflation rate of unemployment” (NAIRU). This is a common practice in the literature (Layard, Nickell and Jackman 1991, Staiger, Stock and Watson 1997b, Katz 1998, Laubach 2001, Gordon 2008), but taking the second as a simple empirical counterpart of the first may not be warranted. While the natural rate concept can be associated to a latent variable that needs to be computed from an economy operating in equilibrium, in which all markets clear (Friedman 1968), the NAIRU can be considered an outcome in which excess demand counterbalances excess supply (Tobin 1997).

The approach that is followed in this Chapter is based on the ideas of Friedman and Phelps and complements the simple macroeconomic framework of Keynesian Phillips Curves and “new classical macroeconomics” of rational expectations. These theories do not allow a precise diagnosis of the reasons why the natural rate should change over time. We base our analysis in a set of theories that describe the behavior of agents when explaining the labor market functioning. This framework considers the effect of supply and demand features as determinants of the natural rate of unemployment and adds the institutional setting that characterizes other structural features of the economy. As suggested by Katz (1998), this supply, demand and institutions (SDI) approach constitutes an unifying framework of the four main theories of the natural rate, which emphasize different aspects of the wage-setting process: the competitive approach; the efficiency-wage approach; the matching approach; and the union wage-bargaining approach.

INTRODUCTION

Previous empirical studies of the Portuguese economy held the case that the natural rate of unemployment was constant or relatively stable over the 80s and 90s. It was argued that wage flexibility, either at the macro or micro levels, helped the economy to adjust in the face of shocks (in this volume, Chapter 3 presents recent evidence of the significant degree of wage flexibility in Portugal). The empirical literature seems to have placed the natural rate estimates between 5.5 and 6.0 percent over that period. We reassess these results by using a system of equations that simultaneously accounts for the Phillips curve and the relationship between unemployment and output, the Okun's law. The estimates, based on a time-varying approach, are consistent with a relatively stable natural rate in the 80s and 90s, but show a clear upward movement since the early 2000s.

The SDI framework allows us to identify a set of factors that are associated with the long-term behavior of the natural rate, well in the spirit of Friedman's assertion. Over the last two decades, the Portuguese labor market witnessed significant changes to several of its most important structures: (i) the labor force increased significantly through important demographic changes, such as the maturation of the population ageing process, with the arrival of the baby boom generation of the late 60s and early 70s, the increase in female participation, and significant migration flows; (ii) new contractual arrangements introduced flexibility into the job matching process, probably at the cost of segmentation. Fixed-term contracts became the largest, at times the sole, contributor to employment growth, and the share of self-employed is large and had a pro-cyclical behavior. Note that the incidence of fixed-term contracts is particularly high for some groups of workers, such as the young, who have less stable job trajectories and are more exposed to labor market fluctuations; (iii) new labor market policies were characterized by more generous unemployment benefits, although with a large fraction of the working population still uninsured, and by the extensive introduction of active labor market policies, which showed little impact on unemployment duration. This shift towards more secure job transitions and the implementation of other social safety nets was not coupled with an adequate adjustment in other dimensions of labor regulations, leading to longer unemployment spells, which tend to have a more structural nature; (iv) several macroeconomic variables were also potential structural sources of changes in the natural rate, for in-

stance the fall of the real interest rate in the 90s and the productivity slowdown in the last decade (see Chapter 2 in this volume).

At this stage, it is our evaluation that something fundamental is taking place in the Portuguese labor market. The ageing population, the increases in labor supply, sectoral shifts arising from negative demand shocks, employment protection and its ubiquitous piece-meal reform, and the lack of consistent active and passive labor market policies, all contribute, in one way or another, to the unemployment pattern in Portugal. The following sections present estimates of the natural rate of unemployment and study the factors that contributed to its evolution over time.

4.2 A theoretical framework for the natural rate of unemployment

The macroeconomic analysis of the unemployment rate has been greatly influenced by the seminal works of Friedman (1968) and Phelps (1968). Working independently, both economists highlighted that the natural rate of unemployment was a relevant concept to policymakers. At each moment in time, this latent, but binding variable, is determined by structural factors.

The natural rate of unemployment can be assessed as a long-run or steady-state concept, around which the actual unemployment rate fluctuates. The existence of a natural rate has clear policy implications. Expansionary demand shocks can push only temporarily the observed unemployment rate below the natural rate, at a cost of accelerating prices. Conversely, shocks that raise unemployment above the natural level are associated with falling inflation. Achieving lower unemployment rates with stable inflation may require a lower natural rate, which in turn implies shifting the policy focus towards cost-push factors, including unemployment benefits, employment legislation, social security features, labor taxes, and wage-setting institutions.

The unemployment gap, defined as the difference between the actual and the natural rate, is closely related with the output gap, defined as the difference between actual and potential output. This implies that cyclical unemployment is associated with cyclical movements of output. Potential output is an estimate of the level of output when the economy is operating at a high rate of resource use, without inflationary pressures (Arnold 2009).

The theoretical framework of this chapter consists in two blocks. The first focuses on standard backgrounds of the natural rate and draws from two well-known macroeconomic relationships: the Phillips curve and Okun's law. The second block focuses on drivers of the natural rate within the SDI setup suggested by Katz (1998). This setup combines features from four different approaches to labor market equilibrium: the competitive approach, the efficiency-wage approach, the matching approach, and the union wage-bargaining approach.

4.2.1 The natural rate concept

Inflation, unemployment, and output are macroeconomic variables that embody relatively well-accepted relationships from which the natural rate of unemployment (\tilde{U}), as well as potential output (\tilde{y}), can be computed. An appealing approach combines two well-known relationships in a system of equations in order to identify the mutual dependency between \tilde{U} and \tilde{y} . These are a Phillips curve, linking inflation and unemployment, and Okun's law, linking output and unemployment. In this framework, both \tilde{U} and \tilde{y} are treated as unobserved variables that will be estimated by taking into account price developments. The link between Okun's law and inflation can be traced back to Okun (1962), who stated that *"full employment must be understood as striving for maximum production without inflationary pressures"*.

The use of a system of equations draws on the work of Apel and Jansson (1999a, 1999b). An application with euro area data can be found in Fabiani and Mestre (2004). The natural rate can be defined in this setup as the unemployment rate *"grounded out"*, using the expression of Friedman (1968), from the microeconomic features of the economy, at which inflationary and disinflationary pressures offset themselves. Additionally, the use of the system approach generates a natural rate estimate in which demand pressures with an impact on inflation are consistent with the behavior of the output gap. Notice that this relationship may be influenced by the degree of openness of the economy (Romer 1993).

Phillips curve

In a Phillips curve framework, if the unemployment rate decreases to levels below the natural rate, inflationary pressures from a tight

labor market are expected to mount and higher inflation will emerge in the future. The converse also applies. In the long run, inflation should stabilize with the observed unemployment rate standing at the natural rate level.

The Phillips curve formulation used herein is based on the well-known “Triangle model” (Gordon 2008). The vertices of the triangle are “generalized inertia”, “demand pressures”, and “supply shocks”. Formally,

$$\pi_t - \pi_t^e = A(L)(\pi_{t-1} - \pi_{t-1}^e) + \gamma(L)(U_{t-1} - \tilde{U}_{t-1}) + \delta(L)z_t + \epsilon_t, \quad (4.1)$$

where π and π^e stand for actual and expected inflation rates, respectively, U and \tilde{U} stand for the actual unemployment rate and the natural rate, while z is a vector of variables capturing supply shocks (which typically includes exogenous variables such as import prices). $A(L)$, $\gamma(L)$ and $\delta(L)$ are polynomials in the lag operators. Finally, ϵ is an *i.i.d.* error term. Equation (4.1) assumes that the unemployment gap ($U - \tilde{U}$) is lagged relatively to the dependent variable $\pi - \pi^e$, as in Laubach (2001) and Llaudes (2005), and not contemporaneous, as in the work of Gordon (2008).

“Generalized inertia” is presumably capturing the formulation of expectations and the impact of several microeconomic features of the economy such as the impact of existing contracts or input-output supply chains. Gordon (2008) suggests that it may be necessary to assume very long lags on past inflation rates to capture this inertia. Equation (4.1) is commonly implemented under the assumption that expected inflation π_t^e equals lagged inflation π_{t-1} . This makes the estimation of the Phillips curve rather straightforward, given that the focus shifts to estimating changes in the inflation rate. More precisely, the dependent variable becomes $\pi_t - \pi_{t-1}$. In the long-run, without supply shocks, inflation converges to a stable value (although undefined), with the unemployment rate converging to the natural rate (i.e. without “demand pressures”).

The explicit treatment of “supply shocks” is another relevant feature of equation (4.1). If these shocks were not explicitly included in z , they would be subsumed in the error term (Katz and Krueger 1999), and the natural rate would inherit, to some degree, the evolution and volatility of z . Moreover, it may not be possible to explain higher inflation without excess demand. On the contrary, if z is included, it could capture the sources of higher inflation even with a receding demand (see, for example, Layard et al. (1991)).

Okun's law

Okun's law can be simply stated as a rule in which output and unemployment evolve in the opposite directions. According to Mankiw (2003, p. 35) "*Because employed workers help to produce (...) and unemployed workers do not, increases in the unemployment rate should be associated with decreases in real GDP*".

Okun's law can also be analyzed in more complex frameworks, using for instance a production function (Prachowny 1993), and may be rationalized in terms of output and unemployment gaps. In this case, if the unemployment rate decreases to levels below the natural rate, this would be associated with output increasing above potential. A simple set-up linking the two gaps may be obtained by assuming that observed output (y) can be decomposed into potential output (\tilde{y}), a cyclical component (y^C), and an error term (ν_1). More precisely,

$$y = \tilde{y} + y^C + \nu_1. \quad (4.2)$$

Assuming that the cyclical component is well-captured by the unemployment gap, $y^C \equiv \theta(U - \tilde{U})$, where $\theta < 0$ is a scalar, equation (4.2) can be expressed in the well-known form that links the two gaps:

$$(y - \tilde{y}) = \theta(U - \tilde{U}) + \nu_1. \quad (4.3)$$

The interpretation of this equation is straightforward: any excessive strain placed in the nation's resources creates a negative unemployment gap and increases output above its potential level.

Laws of motion

The economic relationships behind equations (4.1) and (4.3) do not include any information regarding the stochastic processes defining the behavior of the natural rate of unemployment \tilde{U}_t , or potential output \tilde{y}_t . Following established standards, the atheoretical laws of motion used to close the system are:

$$\tilde{U}_t = \tilde{U}_{t-1} + \zeta_{1t}, \quad (4.4)$$

$$\tilde{y}_t = \tilde{y}_{t-1} + \Delta_t, \quad (4.5)$$

$$\Delta_t = \Delta_{t-1} + \zeta_{2t}, \quad (4.6)$$

where $\zeta_{1t} \sim N(0, \sigma_{\tilde{U}})$ and $\zeta_{2t} \sim N(0, \sigma_{\Delta})$.

The law of motion for the natural rate is defined in equation (4.4) as a pure random walk (without any drift). This may be seen as an acceptable approximation to capture the presence of frequent permanent shocks (King and Morley 2007). Note that the natural rate is highly conditioned by the values of the standard deviation, $\sigma_{\tilde{U}}$. On the one hand, the natural rate is a constant if $\sigma_{\tilde{U}} = 0$ and, therefore, changes in the unemployment gap are solely determined by changes in the actual unemployment rate. On the other hand, an unconstrained estimation of $\sigma_{\tilde{U}}$ may imply highly volatile estimates. In line with the view of Friedman (1968), it will be assumed that the natural rate varies over time, and therefore $\sigma_{\tilde{U}}$ is allowed to be different from 0. Potential output is defined in equations (4.5) and (4.6) as a “local linear trend” model (Harvey 1990). Note, however, that these equations define a restricted version of the model, given the absence of an error term in equation (4.5). The objective is to estimate a smoother potential output. The interpretation of σ_{Δ} is similar to that of $\sigma_{\tilde{U}}$, but now applies to the change of potential output (given by Δ_t). For instance, the trend would be exactly linear if $\sigma_{\Delta} = 0$.

4.2.2 Controversies over the natural rate

The natural rate of unemployment is often a controversial concept, both on theoretical and on empirical grounds. The range of options to estimate it goes from extracting a trend component of the unemployment rate by simply using an Hodrick-Prescott filter, to multivariate backgrounds where the natural rate is a latent variable derived from economic structures (Staiger, Stock and Watson 1997a, Fabiani and Mestre 2000). Alternative frameworks to the ones adopted in this chapter have also been suggested, for instance, considering different demand pressures indicators as short- and long-run unemployment rates or vacancies (Røed 2002, Llaudes 2005, Dickens 2008), or different law of motions for the natural rate (Laubach 2001).

The assumption behind the volatility of the natural rate of unemployment is crucial. The time-invariant assumption has recently re-emerged in estimations of some versions of the so-called “New Keynesian Phillips Curve” (NKPC) (Gordon 2008). Alternatively, one may allow for a highly volatile natural rate, which could be implemented in the current framework with an unconstrained estimation of $\sigma_{\tilde{U}}$. Using a vector autoregression model of aggregate out-

put, inflation, and the unemployment rate, King and Morley (2007) compute estimates of \tilde{U} that follow closely the actual unemployment rate.

A second source of controversy stems from the definitions of π_t^e and \tilde{y} . In this chapter, $\pi_t^e = \pi_{t-1}$ and \tilde{y} is given by the law of motions (4.5) and (4.6). These options are, to a large extent, at odds with the NKPC. This is due to its severe macroeconomic modelling discipline, in which inflation dynamics are derived from first order conditions in an environment of dynamically optimizing agents, and potential output should probably be defined as the frictionless optimal level of output. Nevertheless, some of the current methods to estimate the NKPC seem far from fully satisfactory.

In the NKPC framework, the estimation options may be specially troublesome if one uses single equation methods, where the forward-looking inflation expectations term only differ from the backward looking models in the restrictions of the coefficients of the latter (Gordon 2008). Moreover, there have been some doubts on how the definition of the output gap of the NKPC can be exploited empirically (Fabiani and Mestre 2004). Using the frictionless optimal level of output may produce, for instance, highly volatile estimates. Finally, it should be emphasized that a large majority of the dynamic stochastic general equilibrium models do not treat unemployment as a formal outcome of the (market-clearing) economy, and in most of them, including the ones used in this Volume, individuals cannot be unemployed. In practice, the Phillips curve environment along some variant of the “Triangle model” and the assumption that $\pi_t^e = \pi_{t-1}$ continue to be widely used in the literature (Estrada, Hernando and López-Salido 2000, Greenslade, Pierse and Saleheen 2003, Llaudes 2005, Gianella, Koske, Rusticelli and Chantal 2008).

Another matter of concern is the perimeter of the supply shocks, z , in equation (4.1). Given that both the natural rate and z represent “*shifts in the inflation-unemployment trade-off*” (Ball and Mankiw 2002), this implies that what distinguishes the natural rate from z may be blurred and an eventual source of controversy.

4.2.3 A supply, demand, and institutions approach

Blanchard and Katz (1997) suggested that it is possible to unify, under a common analytical framework, the different strands that the literature has perused since Friedman (1968) and Phelps (1968). We

follow Katz (1998) in the remaining of this section.

A simple framework

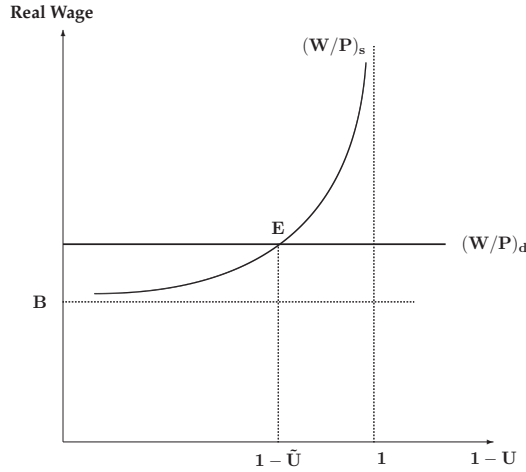
We can identify in the literature four main approaches, which explore different wage-settings to model the natural rate of unemployment. In the competitive approach, Juhn, Murphy and Topel (1991) explore the heterogeneity in reservation wages to explain variations in the natural rate. In particular, workers at the bottom end of the wage distribution shift back and forth between employment and non-employment as the labor market conditions affect the real wages relatively to their reservation wages. The remaining approaches in the literature explore deviations from the competitive wage-setting.

The efficiency-wage approach points out that firms may wish to pay workers more than their reservation wage in order to attract better workers, reduce turnover costs, or to induce more effort (Katz 1986). Furthermore, firms and workers have some form of bargaining power; workers' bargaining power arises because firms cannot replace them costlessly and firms' bargaining power arise because workers cannot costlessly find an equivalent job.

The matching approach (Diamond 1982, Pissarides 1990) emphasizes the importance of large labor market flows in determining the natural rate of unemployment. The exit rate from unemployment, more than the unemployment rate, is likely to be the correct measure of tightness. What is important to the unemployed is not only how many there are, but also how firms are hiring. Thus, the ratio of new hires to the unemployed is a better measure of labor market conditions.

Finally, the union wage-bargaining approach of Layard et al. (1991) represents an alternative deviation from the competitive approach where the wage-bargaining is conditioned by the power of unions.

As with other markets in the economy, the concepts of equilibrium price and quantity in the labor market can be grasped by representing the two sides of the market by means of demand and supply curves. Figure 4.1 plots the amount of labor demanded and supplied as a function of the real wage. The demand curve represents what firms can afford to pay, and the supply curve represents the wages workers command and firms have to pay at each level of unemployment. The intersection of the upwards sloping 'supply wage rela-

Figure 4.1: Determination of the natural rate of unemployment

tion' (or wage-setting relation), and the horizontal 'demand wage relation' (or price-setting curve) determines the natural rate of unemployment \tilde{U} , given the structural characteristics of the economy. The interception takes place at point E .

Formally, the supply curve can be represented by the function (4.7), and the demand curve by function (4.8):

$$\left(\frac{W}{P}\right)_s = B g(U, X_s), \quad \frac{\partial g}{\partial U} < 0 \quad (4.7)$$

$$\left(\frac{W}{P}\right)_d = A f(X_d), \quad (4.8)$$

where W is the nominal wage, P is the price level, U is the unemployment rate, B is the reservation wage, and A is the level of total productivity. X_s includes factors affecting wage-setting, such as unemployment benefits, wage-setting institutions, and the level of labor market flows. X_d represents all the factors that affect the real wage that firms can afford to pay.

Equation (4.7) expresses the wages commanded by workers as a function of the reservation wage B , and labor market conditions. The resulting curve is upward sloping since all approaches predict that the tighter the labor market, the higher the real wage conditional on the reservation wage. In turn, for the same level of labor market tightness, reservation wages are higher in economies with more generous unemployment insurance systems – longer entitle-

ment periods and/or higher financial benefits –, and in economies where individuals have important sources of non-labor income, or with larger informal sectors. The value of leisure correlates also positively with the reservation wage.

The demand wage relation, given in equation (4.8), shows the real wage consistent with the employment decisions of firms. In Figure 4.1, the horizontal line, $(W/P)_d$, represents a medium-run situation where the firms have adjusted all factors of production, and therefore the real wage is independent of the level of employment. The demand wage depends also on the level of productivity A , the production function characteristics, and other input prices, including the real interest rate.

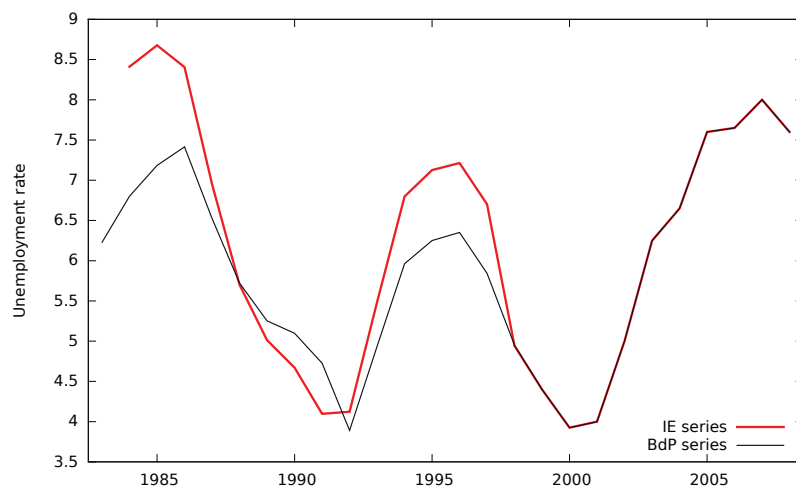
In this framework, the natural rate of unemployment, \tilde{U} , is the rate of unemployment at which the supply wage equals the demand wage. Formally:

$$g(\tilde{U}, X_s) = \frac{A}{B} f(X_d). \quad (4.9)$$

This equation tells us that the natural rate of unemployment is negatively associated with the ratio of productivity to the reservation wage. The X_d and X_s factors influence the natural rate of unemployment in a way predicted by the theory. We will use this framework to explore the empirical long-term relationship between the natural rate and the SDI factors in the Portuguese economy.

4.3 Natural rate estimates

This section presents natural rate of unemployment estimates for the Portuguese economy. Previous estimates include Marques (1990), Luz and Pinheiro (1993), Gaspar and Luz (1997), and Marques and Botas (1997). These studies, which assumed a constant natural rate, placed the estimates between 5.5 and 6.0 percent during the 80s and the 90s. This relatively narrow corridor seems to have defined benchmark figures that the time-varying approach of Dias, Esteves and Félix (2004) did not challenge. The high stability of the Portuguese natural rate, in comparison with other countries, namely European countries, was argued to be consistent with a high macroeconomic flexibility of the Portuguese economy. During this period, it is clear that the Portuguese unemployment rate is not marked by any low frequency movement, as opposed to other European countries, where an upward movement was registered.

Figure 4.2: Unemployment rates

Notes: Annual data. Sources: Inquérito ao Emprego, INE (IE series) and Banco de Portugal (BdP series).

4.3.1 The database

The natural rate of unemployment is derived using quarterly data published by Banco de Portugal. The methodology behind the construction of the database can be found in Castro and Esteves (2004). The database includes the inflation rate, measured in yearly terms by the change of logarithm of the private consumption deflator; the level of real GDP (also in logarithms); and the unemployment rate.

An inspection of the sample period, using an annual periodicity, reveals several important developments. Throughout most of the sample period, the unemployment rate did not depict a clear low frequency movement. Recently, this changed dramatically, with the unemployment rate recording a highly persistent upward movement. In annual terms, the unemployment rate surpassed since 2005 the previous maximum of 7.4 percent, recorded in 1986, and reached 8.0 percent in 2007 (Figure 4.2).

A word of caution is due on the definition of unemployment, which may result in different series of the unemployment rate. Besides the time series of Banco de Portugal, Figure 4.2 depicts the historical data of Instituto Nacional de Estatística published in Inquérito ao Emprego (IE). Although the series are both in line with international standards and coincide from 1998 onwards, they are substantially different early on. The reason lies essentially on the

corrections of non-negligible structural breaks (using statistical procedures) associated with the different series of IE (INE 2006). Furthermore, the methodology of Banco de Portugal is derived from historical data available in Pinheiro (1999), which includes the marginally attached workers in the labor force.

Real GDP in the Portuguese economy displayed over the last 25 years, as expected, a clear positive trend (Figure 4.3). More recently, the economy has been marked by relatively low growth – the annual average growth rate between 2001 and 2008 stood close to 1 percent –, and increasing unemployment rates (Figure 4.4).

Finally, Figure 4.5 plots the overall inflation rate over the last 25 years. In general, the inflation rate showed a pronounced downward trend, from inflation rates around 20 percent in the mid-80s, to levels below 3 percent over the period 1996-2008. Given that the unemployment rate increased continuously since 2001 and remained at historically high levels more recently, without a noticeable decrease in inflation over the same period, this provides an indication that the natural rate may been rising.

4.3.2 Empirical results

For convenience, we reproduce here the full system of equations used to estimate the natural rate of unemployment:

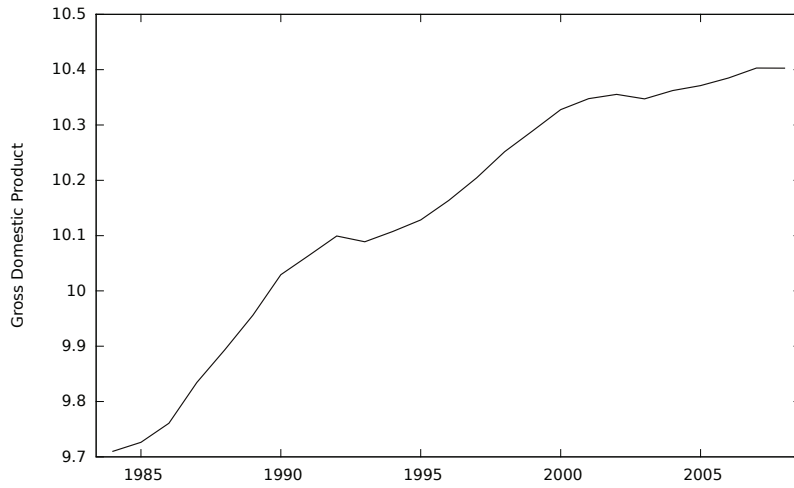
$$\begin{aligned}\pi_t - \pi_t^e &= A(L)(\pi_{t-1} - \pi_{t-1}^e) + \gamma(L)(U_{t-1} - \tilde{U}_{t-1}) + \delta(L)z_t + \epsilon_t, \\ (y_t - \tilde{y}_t) &= \theta(U_{t-1} - \tilde{U}_{t-1}) + \nu_1, \\ \tilde{U}_t &= \tilde{U}_{t-1} + \zeta_{1t}, \\ \tilde{y}_t &= \tilde{y}_{t-1} + \Delta_{t-1}, \\ \Delta_t &= \Delta_{t-1} + \zeta_{2t},\end{aligned}$$

where $\zeta_{1t} \sim N(0, \sigma_{\tilde{U}})$ and $\zeta_{2t} \sim N(0, \sigma_{\Delta})$.

The system was written in state-space form and all unknown parameters and time series of the natural rate and potential output were estimated using the Kalman filter and Maximum Likelihood (Harvey 1990, Hamilton 1994). These unobserved variables were computed using the Matlab toolbox *E4* (Jerez, Sotoca and J.Casals 2007) and correspond to the smooth estimates. Initial conditions for the filter are clarified in Casals and Sotoca (2001). Initial values for the parameters are derived by least squares, assuming a natural rate and a potential output given by an HP filter. All variables not statistically significant were dropped out. The choice of

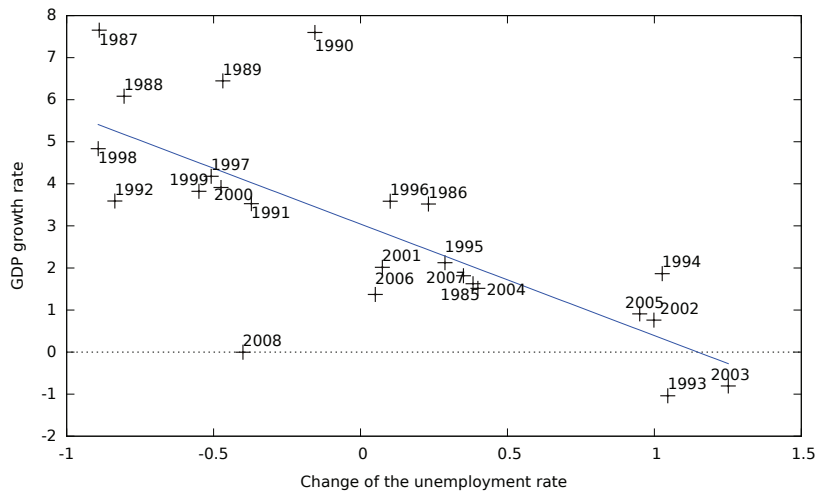
NATURAL RATE ESTIMATES

Figure 4.3: Gross domestic product (real)



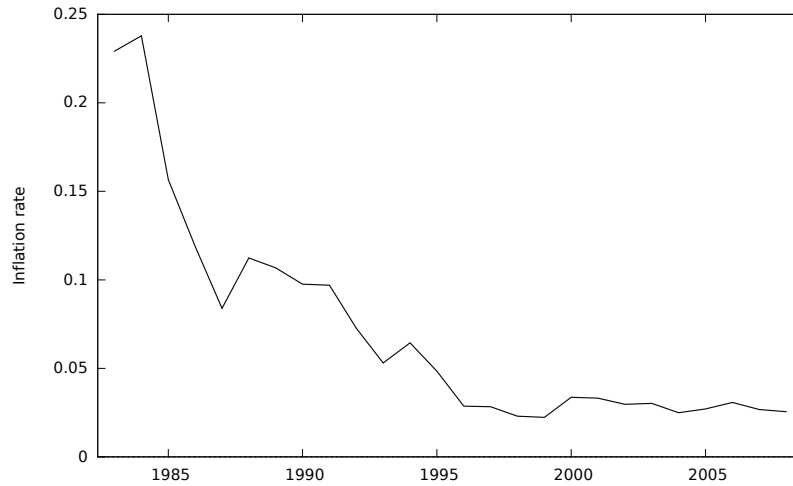
Notes: Annual data. Sources: Banco de Portugal.

Figure 4.4: Real GDP growth and changes in the unemployment rate



Notes: Annual data. Source: Banco de Portugal.

the standard deviation $\sigma_{\tilde{U}}$, which has a discussion somehow akin to the choice of the smoothness parameter of an HP filter, was solved in the light of Gordon (1997, p. 22), who stated that the “*natural rate can move around as much as it likes, subject to the qualification that sharp quarter-to-quarter zig-zags are ruled out*”. Therefore $\sigma_{\tilde{U}}$ was fixed ex-

Figure 4.5: Inflation rate

Notes: Annual changes. Source: Banco de Portugal.

ante at adequate values, different from zero, to allow the natural rate of unemployment to change over time. The profile of the natural rate derived from the full estimation of the system is not altered substantially when the system is fully estimated, i.e, when $\sigma_{\tilde{U}}$ is not pre-determined. Conversely, the standard deviation associated with the potential output, σ_{Δ} , was not fixed *ex-ante*, but estimated by Maximum Likelihood.

The sample period, which includes observed data ranging from 1984:Q1 to 2008:Q4, was extended until 2011:Q4 with autoregressive and moving average models for π , y , U , and z , using procedures built in the TSW software (Caporello and Maravall 2004). There are two main motivations for doing this. First, to mitigate the end-point bias typical of the filters used in the estimation of latent variables. Second, to incorporate into our estimates the recent evolution of the Portuguese economy. This procedure projects low GDP growth and a moderate increase in the unemployment rate until the end of 2011.

Table 4.1 reports the parameter estimates underlying the natural rate estimation. Figure 4.6 reports the natural rate of unemployment over the last 25 years and also the unemployment rate. The reported natural rate fluctuates around 5.5 percent until the late 90s, increasing thereafter to values slightly above 7 percent. The estimates for the earlier period are consistent with the traditional view of a relatively stable outcome over the 80s and the 90s. Boone, Juillard, Lax-

NATURAL RATE ESTIMATES

Table 4.1: Phillips curve and Okun's law

Modelling variable:	Phillips curve $\Delta\pi_t$	Okun's law $(y - \tilde{y})_{t-1}$
$\Delta\pi_{t-4}$	-0.7845 (0.0662) <i>0.0000</i>	
$\Delta\pi_{t-7}$	-0.1497 (0.052) <i>0.0049</i>	
$\Delta\pi_{t-8}$	-0.4931 (0.0751) <i>0.0000</i>	
$\Delta\pi_{t-12}$	-0.1568 (0.0528) <i>0.0037</i>	
$z_{1,t}$	0.4408 (0.1082) <i>0.0001</i>	
$z_{1,t-4}$	0.4270 (0.0987) <i>0.0000</i>	
$z_{2,t}$	0.1788 (0.0712) <i>0.0136</i>	
$(U - \tilde{U})_{t-1}$	-0.3064 (0.0412) <i>0.0000</i>	-1.3460 (0.0314) <i>0.0000</i>
Estimation period	1984:1-2011:4	1984:1-2011:4
Number of observations	112	112

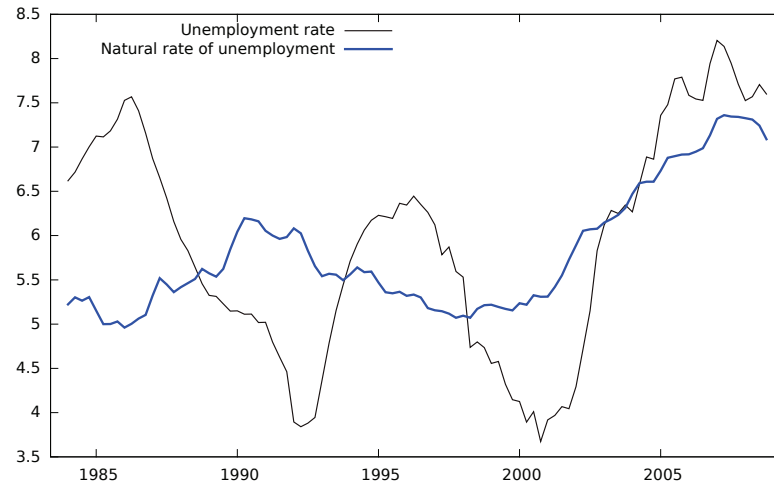
Notes: Standard errors in parentheses and p-values in italics. π is defined in yearly terms by the log change of the personal consumption deflator; $(U - \tilde{U})$ is the unemployment gap, defined as the difference between actual and the natural rate of unemployment; $(y - \tilde{y})$ is the output gap, defined as the difference between actual and potential output; z_1 is defined in yearly terms by the log change in the ratio between the overall imports deflator and the whole economy GDP deflator; z_2 is defined in yearly terms by the log change in the relative consumer prices of energy and unprocessed food items.

ton and N'Diaye (2001), Llaudes (2005), and Gianella et al. (2008) report more significant swings, which are not present in our estimates. These differences may be due to methodological differences and also to data issues.

Figure 4.7 plots the unemployment and the output gaps obtained from the system estimation. It suggests that the output gap remained negative since the 2003 recession, although at lower levels than those seen in previous troughs. The unemployment gap started closing in 2002, remaining positive since the second half of 2004. In comparison with the rest of the sample period, the unemployment gap has remained at relatively low values.

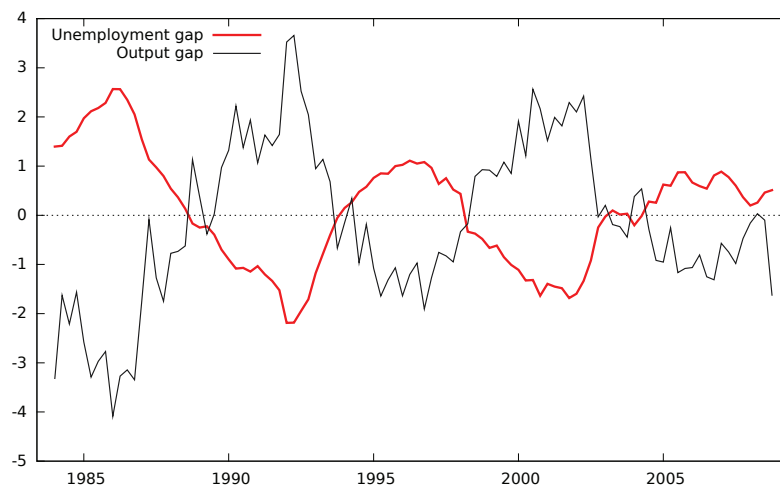
The reported results are naturally conditioned on all assump-

Figure 4.6: Natural rate of unemployment



Notes: Quarterly data, 1983:4-2008:4. Source: Own calculations.

Figure 4.7: The output and unemployment gap



Notes: Quarterly data, 1983:4-2008:4. Source: Own calculations.

tions underlying the system of equations, including the law of motions for the natural rate and potential output. It is undisputable from the empirical literature that the estimates of these unobserved variables may change as more data is used and we must be aware that these estimates vary with the model and the database. Or-

phanides (2002) illustrates this point in relation to the estimates of the output gap and consequences it had on the monetary policy followed by the Federal Reserve. The challenges of estimating the natural rate of unemployment and potential output in real time, particularly in the face of the unprecedented economic crisis of 2009, have also been addressed in the literature (Arnold 2009, OECD 2009, Weidner and Williams 2009). Overall, we can conclude that the increase of the natural rate of unemployment in Portugal is a robust outcome, even though the precise magnitude is subject to uncertainty.

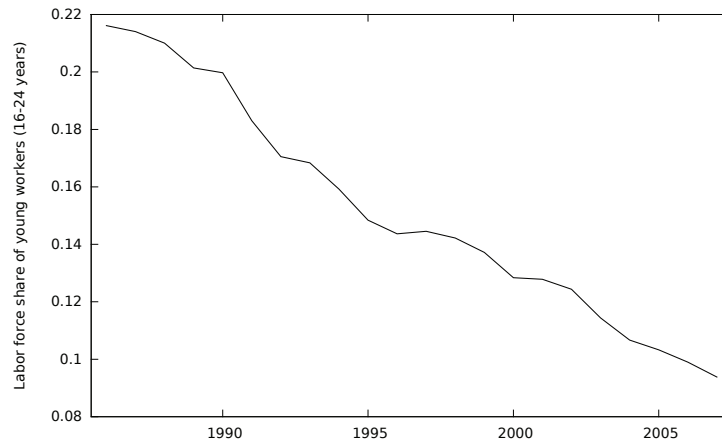
In the following sections, we analyze a set of factors that may have contributed to the evolution of the natural rate. First, we focus on the contribution of demography and, then, study the role of specific SDI elements in Portugal.

4.4 Demographic factors and the unemployment rate

The ability of demographic composition changes to explain trend movements in the unemployment rate has been examined in the macroeconomic literature since the seminal papers of Perry (1970) and Gordon (1982). These authors provide evidence that changes in the age and gender composition of the US labor force contributed to the increase of the natural rate in the 60s and 70s. More recently, Katz and Krueger (1999) show that the recent baby bust experience, associated with a reduction of the share of young workers, contributed to the fall in the natural rate in the 90s.

In Portugal, we observed significant changes in the age composition of the labor force, and only minor changes in its gender composition. These changes are associated with the decline in the crude birth rates, from around 25 births per thousand inhabitants in the 60s, to close to 10 births in the 90s. At the same time, differences in the unemployment rate across age groups remained quite significant, whereas the unemployment rate of males and females converged over time, despite some cyclical differences.

The decline of the share of young workers in the labor force over the last 20 years and the persistence of large differences in the unemployment rates of the different age groups had a non-negligible impact on the overall unemployment rate. The labor force share of young workers (aged 16 to 24) declined from 22 percent in 1986, to around 10 percent in 2007 (Figure 4.8). This evolution is the result

Figure 4.8: Labor force share of young workers

Notes: Annual data. Young workers are defined as those between 16 and 24 years old. Source: Inquérito ao Emprego, INE.

of both a smaller share of young individuals in the population and lower participation rates of this group. The declining participation rate of young workers can be associated with the increasing level of schooling. The share of individuals aged 15-20 years with mandatory schooling (9 years) increased from 36 per cent in 1985/86 to 69 per cent in 2004/5, and college enrollment has also increased significantly.

The evolution of the unemployment rate by age group is presented in Table 4.2. The average unemployment rate for the 15 to 19-years old over the 1986-2007 period is 15.7 and for those aged 20-24 is 12.3 percent. These figures compare with an average of 3.8 percent for the 40-44 age group and 5.9 percent for the overall unemployment rate in the same period. The higher unemployment rates among young workers are not associated with longer durations, but with higher flows into and out of unemployment. Each year a new cohort of young individuals enters the labor market, which have initially higher unemployment rates given that they try to find their first job. In this period, individuals in these age-groups have higher employment instability, in part associated with the higher incidence of fixed-term contracts, finding later on a more stable job match (Centeno, Machado and Novo 2007, Centeno, Machado and Novo 2008).

Table 4.2 illustrates the importance of composition changes to overall unemployment, using the three periods that correspond to

Table 4.2: Unemployment rates by age groups

Age groups	1986-1991	1992-1997	1998-2007	2007
15 to 19 years	14.1	15.3	16.9	24.1
20 to 24 years	13.6	13.3	11.0	14.8
25 to 29 years	7.8	7.8	7.5	11.7
30 to 34 years	5.6	6.3	5.5	8.1
35 to 39 years	3.7	4.7	5.0	7.3
40 to 44 years	3.5	4.3	4.5	6.1
45 to 49 years	2.8	4.0	4.4	6.1
50 to 54 years	2.6	3.9	4.6	7.2
55 to 64 years	2.1	3.9	4.5	6.5
Overall	6.0	6.2	5.7	8.0

Source: Inquérito ao Emprego, INE

the different series of Inquérito ao Emprego. Although the average unemployment rate in the 1998-2007 period decreased relative to the 1986-1991 and 1992-1997 periods, it increased in six out of the nine age groups considered (these six groups represent, on average, 35 per cent of the total labor force). Thus, the aggregate unemployment performance in the 1998-2007 period can be partially attributed to age composition changes.

We use the shift-share decomposition proposed in Shimer (1998) to isolate the impact of demographic developments on the Portuguese unemployment. We ask the question: What would have happened to unemployment if the age-structure of the labor force had remained constant over the 1986-2007 period? We assume that if the age shares had remained constant, the age-specific unemployment rates would have been no different from the observed ones. Thus, we compute an hypothetical age-constant unemployment rate by re-weighting the actual age-specific unemployment rates with a fixed set of age-group weights. Formally, the unemployment rate with fixed-weights (UFW) is given by:

$$UFW_t = \sum_j \bar{\omega}_j u_{jt}, \quad (4.10)$$

where $\bar{\omega}_j$ is the (fixed) weight of age-group j and u_{jt} is the age-specific unemployment rate in period t . This measure contrasts with the actual unemployment rate that is given by $U_t = \sum_j \omega_{jt} u_{jt}$, where ω_{jt} is the weight of age-group j in each year t . The age adjustment to the unemployment rate in period t is the difference between the actual and the age-constant unemployment rates, $(U_t - UFW_t)$. The results for the 1992 to 2007 period are presented in Table 4.3. In

Table 4.3: Age-driven and age-constant unemployment rates

Year	Unemployment rate	Age adjustment 1992-2007 LF (%)	Age adjustment 1998 LF (%)	Age-Driven 1992-2007 Unemployment Rate
	(1)	(2)	(3)	(4)
1992	4.0	0.33	0.29	6.5
1993	5.5	0.45	0.13	6.5
1994	6.7	0.21	0.13	6.2
1995	7.1	0.05	-0.03	6.1
1996	7.3	-0.03	-0.11	6.0
1997	6.6	-0.06	-0.10	6.0
1998	4.7	0.00	0.00	6.1
1999	4.6	-0.02	-0.04	6.0
2000	3.8	-0.09	-0.09	6.0
2001	3.8	-0.09	-0.09	5.9
2002	4.5	-0.15	-0.17	5.9
2003	6.1	-0.27	-0.31	5.8
2004	6.3	-0.34	-0.37	5.8
2005	7.6	-0.45	-0.51	5.7
2006	7.7	-0.58	-0.62	5.7
2007	8.0	-0.62	-0.67	5.6

Source: Inquérito ao Emprego, INE. LF - Labour force.

column (2) the age-adjustment is computed using the average 1992-2007 labor force weights and column (3) uses the 1998's weights (the age-adjustment was normalized to zero in 1998). Notice that the results are not particularly sensitive to the choice of the base period. They show that changes in the age-structure can account for a decline in the unemployment rate of 0.33 percentage points from 1992 to 1998 and a further decline of 0.62 percentage points from 1998 to 2007.

An alternative measure holds constant the age-specific unemployment rates and allows the age-structure to change over the period. This age-driven unemployment rate (UA) is defined as:

$$UA_t = \sum_j \omega_{jt} \bar{u}_j, \quad (4.11)$$

where ω and \bar{u} are defined analogously to the above counterparts, except that now the unemployment rates are kept constant, while the weights change from period to period. Thus, changes in UA are exclusively driven by changes in the age-structure. Column (4) of Table 4.3 presents the age-driven unemployment rate obtained with age-specific unemployment rates equal to the 1992-2007 average. The age-driven unemployment rate declined by 0.4 percentage points from 1992 to 1998 and as since declined by 0.6 percentage

points. Both measures obtain the same conclusion, namely that we would have had observed a significant reduction in the unemployment rate due to an aging population during the last two decades. Available population projections by the Eurostat for next decade imply only minor changes in the age-driven unemployment rate, as the ageing process reaches the maturity (stable) stage.

The significant increase in the unemployment rate in the 1998-2007 period occurred in spite of the reduction implied by the demographic evolution. This result highlights the importance of studying other structural factors behind the unemployment rate. Indeed, the simple shift-share adjustments ignore the fact that changes in the relative size of age groups may affect the groups' unemployment rates and also, in the Portuguese case, simple changes in the age-structure may be hiding more fundamental developments in the labor market.

4.5 SDI factors in Portugal

As documented in section 4.3.2, the natural rate of unemployment has been increasing steadily in the Portuguese labor market since the early 2000s. Additionally, and contrary to other episodes of increasing unemployment, this upward move seems to be long-lasting.

In Portugal, unemployment has been affected by an ageing population. We documented that in the absence of the continuous decline in the share of young workers, the Portuguese unemployment rate might have increased to even levels higher than those registered over the last years.

This section surveys the available empirical evidence on the Portuguese labor market, which may explain, within the SDI framework previously described, the increase of the natural rate of unemployment.

Unemployment insurance

The unemployment insurance (UI) system is a crucial component of the social safety net of a modern economy. It was designed to smooth transitions between jobs that involve an intervening unemployment experience. In this sense, UI can be seen as a way to increase the unemployed's opportunity cost of returning to work. Its impact on extending subsidized unemployment spells is very well

documented (including for the Portuguese case (Pereira 2006, Centeno and Novo 2007) and for other European countries (Lalive 2008, van Ours and Vodopivec 2008)). UI may also have a positive impact on post-unemployment outcomes as predicted in the models of Marimon and Zilibotti (1999) and Acemoglu and Shimer (2000). The empirical evidence favorable to this result is reported in Centeno (2004) and Centeno and Novo (2006) for the American UI system. For the more generous Portuguese UI system, Centeno and Novo (2009a) find also evidence of a small positive impact on reemployment wages.

In job search models, higher UI generosity generates longer subsidized unemployment spells (Mortensen 1986). The impact on total unemployment duration, due to spillover effects on unsubsidized unemployment, is less clear cut. Indeed, the increased duration of insured unemployment reduces effective search in the economy, as in Blanchard and Diamond (1990), and generates an ambiguous impact on non-subsidized unemployment duration. Non-recipients might have their spells of unemployment shortened due to the possibility of spillover effects coming from the reduced job search effort of the insured unemployed (Levine 1993).

The previous arguments are based on moral hazard issues related with the UI, but there is also a liquidity effect that creates a heterogeneous impact on the duration of subsidized unemployment. This feature adds to a more favorable outlook of the overall impact of UI than previously thought. The main job search models show that more liquidity constrained individuals react more to UI generosity. Indeed, it is reported in Centeno and Novo (2007) that the liquidity effect of UI favors the job search process of low income workers. In response to an increase in the entitlement period, these workers extend their job search periods more than individuals with pre-unemployment wages at the top of the income distribution. This result is similar to the one reported for the U.S. by Chetty (2008).

Active labor market policies

The role of active labor market policies for unemployment has been much debated in Europe, as a major component of employment policies, with programs that cover from training to more simple job search assistance (Kluve 2006, OECD 2006). On the one hand, job search assistance and counseling are expected to increase the rate of transition out of unemployment due to improved match efficiency.

On the other hand, public employment assistance may crowd-out private job search effort which, together with the limited capacity of public employment agencies to attract a large number of job vacancies, could reduce the ability of active labor market policies to foster unemployment exit. Participation in programs may also have a locking-in effect, i.e., delay the exit out of unemployment while training is taking place.

In Portugal, large programs of active labor market policies were implemented in the late 90s and early 2000s. Some of these programs were evaluated in Centeno, Centeno and Novo (2009). The overall results show a quite modest impact of these policies on reducing unemployment duration. In the absence of the programs, unemployment duration would have increased by at most two weeks. Thus, these active policies do not seem to be an eminent candidate to explain recent developments in the natural rate of unemployment.

Fixed-term contracts and turnover

European economies have been introducing flexibility in the labor market by means of piecemeal reforms targeting specific groups. The introduction of fixed-term contracts, among these reforms, plays a major role (Dolado, Garcia-Serrano and Jimeno 2002).

The share of fixed-term contracts in total employment has been increasing in most European countries, with Spain being the country with the fastest increase (Dolado et al. 2002). In Portugal, the share of fixed-term contracts has been increasing since the early 90's. However, the increase has been particularly extraordinary since 1998.

The impact of fixed-term contracts on the natural rate is not clear. The matching models provide a useful framework to think about them (Blanchard and Katz 1997). First, the existence of a larger share of fixed-term contracts increases simultaneously the number of workers that lost their job, in percentage of total employment (the separation rate of employment), as well as the percentage of workers who got a new job (the hiring rate). Second, it may increase the effectiveness of the matching of workers to firms and increase average productivity and the demand wage. Finally, they expose workers to the external labor market conditions. To sum up, fixed-term contracts decrease firing costs, induce wage restraints as they reduce incumbents bargaining power and may increase matching efficiency. All these factors would lead to a decreasing unemployment rate. But at the same time, they increase turnover and lower match

specific human capital, which can lead to an higher unemployment rate. The net effect is therefore unknown.

As expected, fixed-term contracts in the Portuguese economy are associated with a much larger job and worker flows. Using data for the period 2002-2005, Centeno et al. (2008) show that workers under fixed-term contracts separate from their jobs at an annual rate close to 32 percent, whereas workers in open-ended contracts separate from their jobs at a rate close to 12 percent. The difference in the hiring rate is even larger. The annual hiring rate of fixed-term contract workers is around 42 percent, and for open-ended contracts is only 8 percent.

Real minimum wage

Search and matching models use the minimum wage as an indicator of the workers' bargaining power (Blanchard and Katz 1997, Katz and Krueger 1999). In an economy where the minimum wage is above the equilibrium wage, these models clarify that, all else equal, the impact on the natural rate of higher minimum wages should be positive.

The minimum wage does not affect directly a large fraction of workers in Portugal (around 7 percent), but it might have some indirect impact throughout the wage distribution, as it compresses the wage scale immediately to the right of the minimum wage (Centeno and Novo 2009b).

The minimum wage is more important for young workers, female workers and those in specific sectors of the economy, namely labor intensive sectors. The evidence for the impact of the minimum wage in Portugal is contradictory. Using a reform of the minimum wage legislation that increased the minimum wage for 15-19 years old, Portugal and Cardoso (2006) show that, in the short-run, a rising minimum wage decreased employment separations for workers affected by the increase that are compensated by a decrease in accessions to firms. In the same setup, Pereira (2003) reports a reduction in employment for workers affected by the increase in the minimum wage.

Marginal attachment and unemployment dynamics

To discuss the determinants of structural unemployment it is important to distinguish between those who are actively looking for

work and those not looking for work. This is particularly important for analyses based on the flows between the different labor market states (normally between employment, unemployment and inactivity). In this context, the idea of actively looking for a job is very often replaced by the more appropriate notion of “productive waiting” for new work (Diamond 1982, Alvarez and Shimer 2008).

The concept of unemployment based on the search-for-work criterion assumes that the proximity of the individuals to the labor market is a function of the effort exerted to find a job. However, those who are not looking for work, even though they might want to work, are usually classified as marginally attached: their ties to the market are not sufficiently strong to justify their classification as unemployed. The explicit consideration of this group is particularly relevant to study the determinants of unemployment dynamics. This is particularly true if the unemployed and the marginally attached workers are behaviorally close in terms of employment entry and exit.

Centeno and Fernandes (2004) study the behavior of the marginally attached in Portugal. They reject the hypothesis of equivalence between the marginally attached and other inactive individuals, showing that the marginally attached are closer to the unemployed than to the other inactive. Mainly for men, but also for women, the hypothesis of equivalence between unemployment and marginal attachment cannot be rejected. These results point to a potential impact of the marginally attached in structural unemployment. In a sense, at a given unemployment rate, the increase in the share of marginally attached workers means that effective search in the economy increases. This increase in effective search is not captured by the unemployment rate. Thus, a larger share of marginally attached workers make transitions out of unemployment more difficult for unemployed workers as, for a given number of vacancies, there is a larger pool of searchers.

Shocks and the institutional setting

The flexibility of the labor market is conditioned by the institutional setting. However, it is not sufficient to explain the increase in structural unemployment in the last decade, nor to explain the huge differences between Portugal and other European countries with similar institutions, but different unemployment outcomes. A possibility would be that the generosity of the welfare system affects the

dynamic response to adverse macroeconomic shocks. Such an explanation would fit the Blanchard and Wolfers (2000) story of the interactions between institutions and shocks. This possibility adheres to the recent evolution of Portuguese unemployment, given the severe negative shocks in competitiveness that hit the economy since early 2000s (see Chapter 2 of this Volume). These shocks implied the decline in relative demand for less skilled workers, who lost their jobs in the process of sectoral restructuring. Their interaction with the institutional setting is also consistent with the segmentation and polarization of the Portuguese labor market (Centeno and Novo 2009*b*, Centeno et al. 2008).

4.6 SDI determinants of the natural rate

The theoretical framework and the discussion of the SDI factors laid down model-based foundations to explore empirically the long-run relationship between the natural rate of unemployment and a set of structural factors. Indeed, this model framework is fundamental to proceed with the empirical analysis because there is no available analytical setting that would allow us to establish a causal relationship going from the SDI factors to the natural rate of unemployment. With this background, the following empirical analysis aims at establishing long-run relationships between some of the SDI factors and our estimates of the natural rate of unemployment.

The choice of the variables to include in the long-run equilibrium cointegrating relationship followed the model laid out above. Thus, the demand wage relation considers as potential factors the following set of variables:

- i) the real interest rate, which is given by the 3-months nominal interest rate adjusted by the consumer price deflator;
- ii) job vacancies, measured by the end-of-quarter flow of job offers reported to the national employment agency (IEFP); and
- iii) the share of fixed-term contracts in the private sector employment.

To represent the supply wage relation, we select the following variables:

- i) real minimum wage, computed with the consumer price deflator;

- ii) UI costs per recipient, measured by the quarterly UI expenses divided by the number of subsidized unemployed;
- iii) short-term unemployment flows, measured by the share of unemployment spells lasting less than one year;
- iv) the level of labor supply; and
- v) the share of the marginally attached to the unemployed population.

Other variables were considered under the SDI framework, but the final econometric specification was limited to those listed above. For statistical reasons, the final specification includes also a linear time trend. The standard deterministic cointegration assumes a stochastic process without deterministic trends; the model estimated corresponds to what is known in the literature as *stochastic cointegration* (Park 1992, Hassler 1999). Stochastic cointegration is motivated by the fact that the model omits trend stationary variables, which may be unavailable in the data or are not suggested by economic theory. Additionally, economic relationships may be mimicked by time trends proxying institutional or behavioral changes. “*A priori there is no reason why one and the same linear combination [cointegrating vector] should annihilate different features like deterministic and stochastic trends*” (Hassler 1999, p. 158).

The analysis covers the period starting in the first quarter of 1992 and extends until the fourth quarter of 2007. Throughout this period, the natural rate of unemployment followed primarily an upward trend (Figure 4.6). The SDI variables exhibit also some form of trend. It is possible that these series are non-stationary, but that some cointegration relationship exists between them. We study this relationship with the Engle and Granger (1987) two-step procedure for modelling cointegrated variables. One advantage of this method is that the ‘long-run equilibrium’ relationship in levels can be estimated consistently with least squares. Indeed, the estimator converges to the true cointegrating vector at rate T , which contrasts with the usual \sqrt{T} -rate of regressions with stationary variables; this result has been labeled super-consistency. The test statistics with appropriate asymptotic distributions can be computed by applying the modifications of Park and Phillips (1988) and Phillips and Hansen (1990); this estimator is known as the Fully-modified ordinary least squares (FMOLS). Table 4.4 reports results with both the latter method and the two-step procedure. Although in processes of cointegration the endogeneity of any of the explanatory variables

has no effect asymptotically, the small size of our sample urges caution. Thus, we follow King and Morley (2007) and complement the results with two-stage least squares estimates to address concerns with the endogeneity of the real interest rate, job vacancies, and UI costs as explanatory variables. The instrumental variables (IV) used are the lagged values up to order 4 of the potential endogenous variables. The Hausmann test rejected the consistency of the least squares estimates and the Sargan test fails to reject the validity of the instruments chosen. For all regressions, we found no evidence of autocorrelation in the residuals, as suggested by the Durbin-Watson statistics reported at the bottom of the table, but also confirmed by LM-test statistics for joint autocorrelation up to order 4. In the two-step procedure, we also tested for the non-stationarity of the residuals, and obtained a statistic of 7.287 (with constant and time trend), rejecting the null hypothesis. Individually, all variables, with the exception of the quarterly dummies and time trend, are non-stationary series. Together these results suggest that there is a stochastic cointegrating relationship.

Qualitatively the results are robust to the choice of the estimator; all estimates preserve the sign of the impact across the three methods presented in Table 4.4. However, the statistical significance must be read carefully. Although the Phillips and Hansen (1990) yields asymptotic valid test statistics, the relatively small sample size affects the performance of the estimator. With this caveat in mind, we proceed to the analysis of the economic significance of each regressor.

The real interest rate affects negatively the demand wage relation, and subsequently is positively associated with the natural rate of unemployment. From an high of 10 per cent in 1992, the real interest has dropped steadily until 2000 (Figure 4.9). This movement was accompanied by a decrease in the natural rate during that period. Since 2000 the real interest rate remained negative most of the time, which might have mitigated the increase in the natural rate of unemployment; a clear benefit of the EMU membership.. According to our point estimates, if the interest rate had stayed at the 1992 level, the current natural rate of unemployment would have been approximately 1.1 percentage points above its current level.

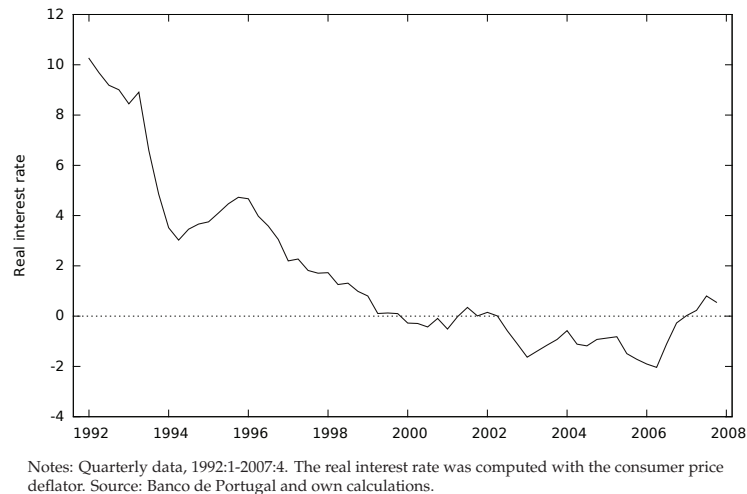
An increase in the flow of job vacancies reduces the natural rate of unemployment. The results indicate that an increase of 10 per cent in the flow of job vacancies reduces the natural rate in slightly

Table 4.4: Determinants of the natural rate: Cointegration relationship

Variables	Engle-Granger 2-step (1)	Hansen-Phillips FMOLS (2)	Two-stage LS (3)
Real interest rate	0.135 (0.017) <i>0.0000</i>	0.119 (0.013) <i>0.0000</i>	0.097 (0.022) <i>0.0000</i>
Job vacancies (log)	-0.394 (0.109) <i>0.0007</i>	-0.359 (0.078) <i>0.0000</i>	-0.434 (0.113) <i>0.0004</i>
Labor productivity (log)	-8.393 (2.185) <i>0.0003</i>	-9.402 (1.561) <i>0.0000</i>	-9.031 (2.171) <i>0.0001</i>
Fixed term contracts	-9.828 (3.933) <i>0.0158</i>	-9.402 (2.814) <i>0.0000</i>	-6.894 (3.605) <i>0.0621</i>
UI costs per recipient (log)	1.555 (0.506) <i>0.0035</i>	1.425 (0.363) <i>0.0001</i>	1.427 (0.547) <i>0.0122</i>
Real minimum wage (log)	-8.222 (2.231) <i>0.0006</i>	-7.516 (1.595) <i>0.0000</i>	-2.987 (2.557) <i>0.2486</i>
Short-term unemployment flows	2.316 (0.694) <i>0.0016</i>	2.736 (0.496) <i>0.0000</i>	1.711 (0.645) <i>0.0109</i>
Labor supply	-0.003 (0.001) <i>0.0000</i>	-0.004 (0.000) <i>0.0000</i>	-0.004 (0.001) <i>0.0000</i>
Marginally attached	0.026 (0.005) <i>0.0000</i>	0.028 (0.003) <i>0.0000</i>	0.015 (0.005) <i>0.0041</i>
Time trend	0.153 (0.013) <i>0.0000</i>	0.171 (0.009) <i>0.0000</i>	0.154 (0.012) <i>0.0000</i>
Intercept	61.433 (10.657) <i>0.0000</i>	69.023 (7.673) <i>0.0000</i>	40.623 (10.842) <i>0.0005</i>
Number of observations	64	63	60
Durbin-Watson statistic	1.730	2.008	1.788

Notes: Estimation period: 1992:1–2007:4. Standard errors in parentheses and *p*-values in italics. The two-state least squares estimation uses as instruments lagged values of order 1 through 4 of the real interest rate, UI costs per recipient, and job vacancies. All regressions include quarterly dummies.

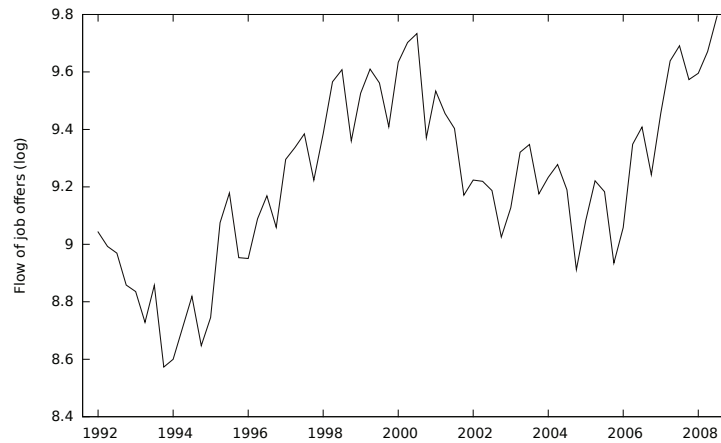
more than one-third of a percentage point. This impact is robust in the instrumental variables estimation. The sharp decline observed around the 2002 recession explains a great deal of the increase in the natural rate of unemployment. However, the flow has recovered to levels similar to those observed before the recession (Figure 4.10), while the natural rate kept on increasing. We must look for other

Figure 4.9: Short-term real interest rate

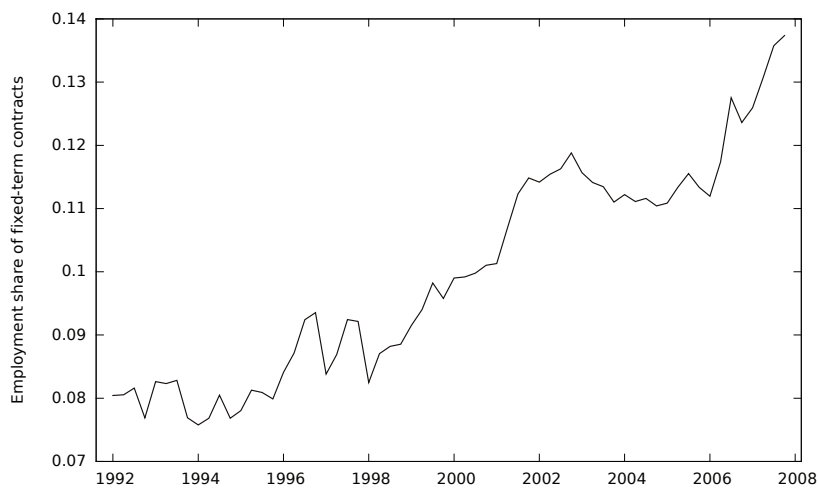
explanations.

After controlling for other factors in the regression, including the minimum wage, labor productivity increases the demand of labor and, therefore, reduces the natural rate of unemployment. The recent slowdown in labor productivity gains is an important explanatory factor for the observed increase in the natural rate. Thus, if we assume that labor productivity would have increased at the rate observed until 2001, the natural rate of unemployment, at the end of 2007, would have been lower in about 0.6 percentage points, according to the FMOLS and the IV estimations.

Fixed-term contracts have become an ubiquitous contractual form in the Portuguese labor market. From the perspective of firms, the flexibility of such contracts can be interpreted as a reduction in hiring costs and, therefore, should contribute to a lower natural rate of unemployment. The estimates confirm this prior. The increase of fixed-term contracts has lead, however, to a sharp increase in the polarization and segmentation of the labor market (Centeno et al. 2007, Centeno et al. 2008). Our most optimistic estimate indicates that the increase in the share of fixed-term contracts in total employment from its minimum value to its maximum level (an additional 7.5 percentage points, see Figure 4.11) may have reduced the natural rate of unemployment in almost one percentage points. However, the more conservative instrumental variables estimate indicates that it may not have exceeded 0.5 percentage points.

Figure 4.10: Flow of job vacancies

Notes: Quarterly data, 1992:1-2007:4. The flows are computed with end-of-period data. Source: national employment agency (Instituto do Emprego e Formação Profissional, IEFP).

Figure 4.11: Share of fixed-term contracts in total employment

Notes: Quarterly data, 1992:1-2007:4. Source: Inquérito ao Emprego, INE.

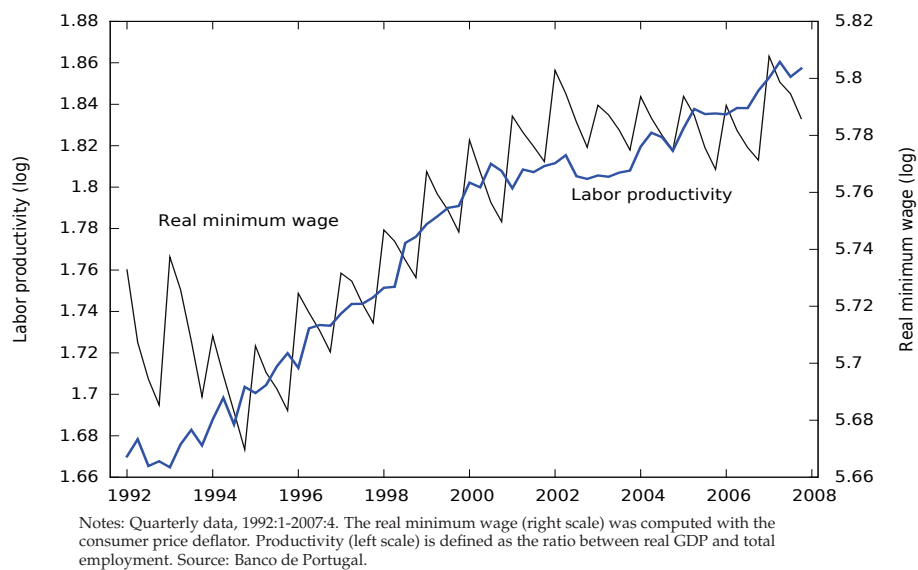
On the supply side, the sign of the coefficients associated with the variables chosen is as expected, except for the real minimum wage. The point estimates do not vary much across estimation methods, but the impact of the minimum wage loses its significance in the instrumental variables estimation.

An increase in unemployment benefits generates two effects that

tend to increase the natural rate. First, it increases the reservation wage relative to productivity. Second, it requires additional taxes to finance the unemployment insurance system. Our results confirm that more generous unemployment benefits increase the natural rate of unemployment. The question of endogeneity is particularly evident in the case of the benefits paid, but our results show a remarkable robustness across estimation methods. The recent efforts to control the costs of the system (Figure 4.12) and simultaneously increase the accountability of recipients to the system's obligations may have prevented a larger increase in the natural rate.

The economic relevance of the minimum wage for the long-term path of the natural rate is questioned by the fact that it is not significant in all three estimation methods. Nonetheless, the puzzle caused by the negative sign of the minimum wage coefficient may be explained by the covariation with labor productivity. Indeed, Figure 4.13 illustrates that the major increases in the minimum wage, 1995-2001, occurred simultaneously with a significant increase in labor productivity. Posteriorly, the slowdown in labor productivity was accompanied by a null real minimum wage growth, with productivity growth exceeding wage gains in the final year sampled. Another possible (complementary) explanation is the polarization of the labor market, which has affected more negatively middle-of-the-distribution wage earners; job creation is concentrated at the two extremes of the distribution and, therefore, it is possible that the data show a negative association between the real minimum wage and the natural rate of unemployment. It is worth noticing that the recent pre-announced minimum wage increases agreed upon by the government and the social partners comes about at a time of lower labor productivity growth. This may have an undesired impact on unemployment.

The secular increase in labor supply has been contributing to lower natural rates of unemployment. It is estimated that each additional 100,000 workers joining the labor force brought down the natural rate by 0.3 to 0.4 percentage points. This relationship between the number of individuals active in the labor market and the structural unemployment rate is dependent, as explored in the demographic section of this chapter, on the characteristics of the individuals that contributed to the increase in labor supply. Indeed, in the period in analysis, the increase has been fueled by prime-age individuals, who have typically a larger labor market attachment and

Figure 4.12: Unemployment benefits per recipient**Figure 4.13: Real minimum wage and productivity**

lower unemployment rates. In other words, a simple mechanical expansion of the labor force may not yield the marginal gains that are observed in our sample period.

The importance of individuals whose labor market attachment is

weaker than that of the unemployed varies across labor markets. In the period in analysis, the structure of the Portuguese labor market and the characteristics of the marginally attached indicate a positive association between the marginal attached and the natural rate of unemployment. This result is in line with the findings in Centeno and Fernandes (2004), which finds that in Portugal individuals classified as marginally attached are closer to the unemployed than to the inactive population. The contrary happens in the Spanish labor market.

4.7 Conclusion

The Portuguese economy is characterized by a high employment rate that coexisted, for a long time, with a low rate natural of unemployment, which more recently increased to levels not seen before. This was mainly due to the significant productivity slowdown that reduced the ability of firms to secure employment. The return of the unemployed to employment is a challenging process for any economy, particularly if they are primarily unskilled and low-educated, as it is the case of Portuguese long-term unemployed.

The tight labor market of the 80s and 90s drew into the labor force a large number of unskilled workers. The demographic factors underlying the Portuguese experience (a late baby boom, increasing female participation, and immigration) may have contributed to keep the natural unemployment rate at low levels during that period. However, the large supply of unskilled workers, coupled with skilled-biased technological change, generated one of the highest degrees of wage inequality in modern economies, which was not counteracted by the wage-setting institutions (labor unions and minimum wage, among others). These market incentives for increased educational attainment were important and have been at play in the Portuguese labor market, as reflected in the extraordinary increase in college graduation since the mid 90s. However, these processes take a long time to build, and are not a solution for many workers already in the labor market.

More recently, the institutional setting, in interaction with supply and global demand shocks have led to the segmentation and polarization of the Portuguese labor market. Indeed, the signs of significant and increasing segmentation are evident in the incidence of fixed-term contracts and self-employment among specific groups,

BIBLIOGRAPHY

the prevalence of long-term unemployment; and the regressive nature and the insufficient coverage of unemployment insurance. Polarization of labor demand that is characterized by net employment growth concentrated in low- and high-skill occupations will predictably affect mostly middle-skill occupations in the coming years. None of these developments will help in alleviating the pressure on the natural unemployment rate.

From an economic policy perspective, the evidence presented highlights to the importance of integrating coherently employment legislation, unemployment insurance, and labor cost factors. The piece-meal approach that has been used to introduce reforms in these three areas has proved unsatisfactory: the introduction of fixed-term contracts, even though increasing labor market flexibility, promoted an inefficient competition between different contractual arrangements, the generalized increase in unemployment insurance generosity, in opposition to targeted reforms, increased inefficiently unemployment duration, and often labor cost factors and productivity were misaligned. The structural features of the Portuguese economy should deal simultaneously with firm's (demand) and worker's (supply) incentives. The introduction of a uniform contract, combining features of both fixed-term and open-ended contracts, such as workers' unemployment protection mechanisms, would allow a more efficient and secure mobility in the labor market. These factors, together with better education and higher qualification levels, are key not only to enlarge the worker's set of employment possibilities, but also to generate more productive jobs.

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Chapter 5

A portrait of Portuguese international trade

João Amador, Sónia Cabral and Luca David Opromolla

5.1 Introduction

International trade is a major dimension of economic integration. This dimension is deeply connected with long-run economic growth and it is particularly important in the case of the Portuguese economy. Economic literature has established a link between international trade and economic growth. In theoretical terms, this link dates back to classic models of comparative advantage where countries reap gains from trade and specialization (Ricardo (1817)). In empirical terms, and in spite of substantial debate, the degree of participation in international trade has come up as a significant variable in most growth equations (Sala-i-Martin (1997), Rodríguez and Rodrik (2001) and Baldwin (2003)).

The economic integration of Portugal increased substantially in the last decades, notably through the participation in trade arrangements like the European Free Trade Agreement (EFTA) in 1960 and the European Economic Community (EEC) in 1986, as well as through the participation in the euro area since its creation in 1999. International trade has played an important role in explaining the path of Portuguese economic growth. In fact, following the EFTA and EEC accessions Portugal recorded an increase of GDP growth

and there was a real convergence to average European Union (EU) per capita GDP levels. Nevertheless, in the last decade Portugal performed poorly in terms of real convergence to the EU levels, in a context of increased trade liberalisation. Contrary to the previous ones, this latest wave of trade liberalisation was mostly externally driven as it followed the drop of economic and political barriers in different parts of the world. In the last two decades, the emergence of new players in Asia and Central and Eastern Europe, in a background of lower trade barriers promoted by the World Trade Organization, implied major changes in the global environment of international trade. The disappointing performance of the Portuguese economy in this scenario mostly reflects competitiveness problems rooted in structural aspects like the quantity and quality of factor endowments, technology and innovation, institutional framework and public policies. These aspects determine the flexibility of the economy in adjusting to new market conditions and in adopting new production paradigms, with a reflex on the pattern of trade and on its relative prices.

Over the last four decades, many changes occurred both in the nature of international trade and in the structure of the Portuguese economy. As changes in the nature of international trade were identified, new explanatory theoretical economic models were put forward. On the empirical front, new models were accompanied by the emergence of novel indicators. The classical type of trade is based on the exchange of different goods (inter-industry trade), i.e., goods embodying different factor intensities. In this context, under a set of assumptions, models associated trade patterns with countries' relative factor endowments - the Heckscher-Ohlin-Samuelson framework. These models presented more elaborate explanations than those just related with technological differences - the classical Ricardian framework. Later on, in the late seventies and in the eighties, economic theory gave increased attention to intra-industry trade, i.e., exchange of similar goods or different varieties of the same good - the Krugman-Helpman framework. Aspects such as increased returns to scale, monopolistic competition and taste for variety gained importance as determinants of trade. Next, it became clear that the international fragmentation of production was establishing a new paradigm in the organization of world production and assessing the import content in countries' exports became an important issue - the Hummels, Ishii and Yi (2001) approach. Trade theory matched these developments with models of fragmen-

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tation, focusing on the organization of production within firms, relating with technological progress and linking with the stronger role played by transnational corporations and their foreign direct investment (FDI) decisions. More recently, trade literature has followed the trend of other economic branches by making use of richer microeconomic data sets. The new strand of research highlights the role of firm's heterogeneity and their export portfolio decisions in explaining trade flows.¹

In parallel to the evolution of international trade, the Portuguese economy has recorded important structural changes. There are obvious interconnections between these two dynamics. On the one hand, changes in the structure of international trade pose challenges to the economy in terms of adaptability to market conditions and production paradigms. On the other hand, structural changes in the Portuguese economy determine its long-term international competitiveness and, thus, trading products, partners and relative prices.

In the last decades Portuguese trade openness increased and both trade products and partners evolved significantly. In addition, some important structural changes occurred since the mid-eighties, though in some dimensions the progress is slow. Firstly, the Portuguese economy witnessed a significant market liberalization. This trend was associated with the progressive reprivatization of several sectors, made possible after the revision of the Constitution in 1989. In addition, the adoption of EU directives into the national legislation after 1986 had an impact in product market competition. This progressive liberalization, which involved both the manufacturing and the financial sector, also eliminated barriers to FDI and non-tariff barriers to international trade. Secondly, despite recent improvements in terms of product and labour market regulation, the Portuguese economy still lacks flexibility in the allocation of resources when compared with the OECD average. Thirdly, although registering some changes in the last decades, the relative factor endowments in the Portuguese economy remain inadequate to take full advantage of the international technological progress and consequent productivity gains. In fact, the Portuguese capital-labour ratio is low when compared with that of other industrialized countries and the quality of the labour force, measured in terms of human capital, is poor in international terms. These features make it difficult

¹See Manteu (2008) for a non-analytical survey of the main theoretical trade models and their implications on the effects of globalization for advanced economies.

for the economy to develop sectors that translate into a high-value added and innovative export specialization pattern. The relative product and geographical specialization of exports has an impact on the evolution of Portuguese market shares. In this chapter, we use a constant market share analysis to quantify the contribution of the trade pattern to the total change of Portuguese export shares. This widely used empirical approach is basically an accounting method for decomposing ex-post the total changes of export share. Therefore, it does not provide information on the factors explaining the changes of market shares but it can still give useful insights, especially if performed over a long period and in reference to other countries.

The aim of this chapter is to analyse complementary dimensions of Portuguese international trade of goods, shedding light on the effect of some of the above mentioned phenomena. The guiding line of the chapter is the evolution of the characteristics of international trade and how they interrelate with the experience of the Portuguese economy. The chapter adopts a fully empirical approach, computing and discussing a wide range of trade measures for Portugal. In order to reinforce the links between sections and suggest further readings, in a context of interrelated types of trade, the chapter includes a brief survey of this literature. Apart from adopting the perspective of the empirical trade literature, two other features are present along the chapter. Firstly, given the structural nature of the issues under analysis, the time span considered in most sections is long. Secondly, the analysis of empirical trade measures is mostly carried out considering other countries as benchmarks.

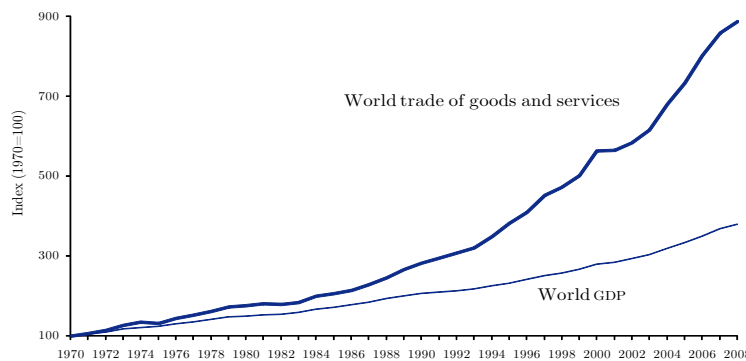
The chapter heavily relies on previous work by the authors and is organized as follows. Section 5.2 highlights the main strands in the empirical trade literature and reviews the main contributions. Section 5.3 analyses the evolution of the process of trade liberalisation in the Portuguese economy. Section 5.4 is mostly based on Amador and Cabral (2008*b*) and reports results from a constant market share analysis to study the evolution of Portuguese market shares in world exports, in comparison with other Southern European countries and Ireland. Section 5.5 examines the evolution of the Portuguese trade pattern in comparison with the other initial EU Cohesion Fund beneficiaries. This section builds on Amador, Cabral and Maria (2007*a*) and reviews both the export and the import structures of Portugal over the last decades, using the Balassa (1965) index of revealed comparative advantages. Section 5.6 draws

on Amador and Cabral (2009) and examines the evolution of Portuguese bilateral intra-industry trade over the 1995-2004 period with a very detailed product breakdown. Section 5.7 relies on Amador and Cabral (2008a), following the methodology proposed by Hummels et al. (2001) to measure vertical specialization in terms of the total imported intermediate content of exports. Section 5.8 reports results from Amador and Opromolla (2008) who use a new transaction level trade database for the 1996-2005 period to describe the joint product and destination decisions of Portuguese exporters. Finally, Section 5.9 concludes.

5.2 Empirical trade literature: brief summary

One of the significant economic trends of the last decades is the strong growth of international trade flows. World trade volume of goods and services exhibited an average annual growth of 6.1 per cent over the 1970-2008 period, well above the real growth rate of world GDP of 3.6 per cent (Figure 5.1). Another important feature of the current globalization phase is the increase in the stock of FDI and the rising importance of multinational corporations in world production.

Figure 5.1: World trade and GDP (in real terms)



Source: International Monetary Fund, World Economic Outlook database.

Several explanations for these trends have been put forward in the literature. Firstly, the recent decades have witnessed substantial progress in the liberalization of international trade and capital flows, with the integration of several emerging market economies in world markets. Secondly, the dissemination of information

and marketing strategies tends to increase consumers' taste for variety, intensifying international intra-industry flows of final goods (see Lloyd and Lee (2002)). Thirdly, a new paradigm in the international organization of the productive process has emerged since, for a large share of goods, production is now vertically decomposed across different countries. This fragmentation of production explains part of the increase in world trade in recent decades because more intermediate goods circulate among countries. The increasing presence of global supply chains in total trade also implies an amplification of trade fluctuations, thus contributing to the strong contraction of world trade observed since mid-2008. The internationalization of production also relates with the increase of FDI because part of these activities are conducted within the structure of multinational corporations as intra-firm trade.²

5.2.1 Constant market share analysis

The constant market share analysis is an accounting method that enables the ex-post breakdown of the changes in total market shares of a certain country over time. This method is particularly useful to separate and quantify the contribution of the country trade pattern (in terms of products and geographical destinations) from the contribution of other factors. The advantages of this method, which is used for descriptive rather than explanatory purposes, result mainly from its simplicity and easiness to use, as well as from its ability to identify key features of the differentiated behaviour of a given variable. This technique was initially used in studies of variables such as employment or labour productivity within the scope of regional economics, where it is best-known as "shift-share analysis". Subsequently, it was applied to studies of international trade flows, where it was used for the first time by Tyszynski (1951).³ The main idea underlying the constant market share analysis is that the export structure of a given country affects its global export performance, despite

²Irarrazabal, Moxnes and Opromolla (2009) propose an heterogeneous firms model of trade and horizontal FDI, where the subsidiary is allowed to source inputs from the headquarters. After matching the model with Norwegian firm-level data, the authors show that intra-firm trade appears to play a crucial role in shaping the geography of multinational production.

³For a detailed description of the constant market share methodology, its different formulations and applications in studies of regional economics, see Loveridge and Selting (1998). For an influential study of the application of this methodology to exports, see Leamer and Stern (1970).

changes in other factors. As stated by Magee (1975), even if a country maintains its share of every product in every geographical destination, it can still have a decrease in its aggregate market share if it exports to individual markets that grow more slowly than the world average.

The constant market share analysis became popular in the literature of applied international economics despite continued criticism both for the lack of theoretical basis and for several shortcomings associated with its empirical application. Richardson (1971*a*, 1971*b*) discusses the main shortcomings of this technique and gives an important contribution to the understanding of its accounting nature. The method has been progressively refined and Milana (1988) proposed satisfactory solutions to some of the major problems of the traditional constant market share decomposition. Some recent studies of constant market share that consider most of the empirical improvements suggested in the literature include the works of Simonis (2000), Foresti (2004) and ECB (2005).⁴ However, several shortcomings regarding the empirical implementation of the constant market share analysis still remain. The most relevant and long standing criticism is that the various effects of the constant market share decomposition vary with the level of breakdown considered (by products and by countries). However, the discretionary decision on the level of disaggregation to be used is generally determined by the availability of information. Section 5.4 analyses the nominal share of Portuguese exports in the world market in the 1968-2006 period, in comparison with other Southern European countries and Ireland, using a constant market share formulation that includes most of the refinements suggested in the literature.

5.2.2 Revealed comparative advantage

According to the traditional Ricardian and Heckscher-Ohlin-Samuelson frameworks, under a set of assumptions, countries' comparative advantages are determined by their technology and relative factor endowments. In addition, in theoretical terms, the pattern of comparative advantage is defined through the comparison of relative autarkic prices. Nevertheless, such autarkic prices are not observable in practice because statistics reflect only post-trade

⁴Cheptea, Gaulier and Zignago (2005) use an alternative formulation in a recent shift-share analysis of trade competitiveness.

situations. Therefore, in order to overcome this fundamental limitation, the empirical trade literature introduced the notion of revealed comparative advantage, i.e., an ex-post analysis of relative trade patterns. The empirical literature proposes several methods to evaluate ex-post the trade specialization of a given country.⁵ The methods solely based on trade flows can be divided into two broad groups. The first group only uses export data, with the Balassa (1965) index being the most widely used indicator. The second group uses both export and import data, with the Lafay (1992) contribution of a product to the overall trade balance being the most popular indicator.

The index of revealed comparative advantage suggested by Balassa (1965) uses the world export share in a given product to normalize the product export share of each country. The Balassa index, which follows an asymmetric distribution with a fixed lower bound of 0, a variable upper bound and a variable mean, has been subject to several critiques, leading some authors to propose modified versions. Dalum, Laursen and Villumsen (1998) suggested a transformation that produces a symmetric outcome, ranging from -1 to 1 and with a threshold of 0 . Proudman and Redding (2000) proposed a transformation that results in a constant mean across the different products for a given country and Amador, Cabral and Maria (2007b) introduced an alternative indicator with a constant mean and a fixed upper bound across countries, which are suitable properties for a cross-country analysis. Nevertheless, the popularity of the original suggestion remains in place and it has been used extensively in the literature.⁶ Finally, it should be noted that the alternative Lafay index, which uses both export and import data, does not allow a comparison between different countries with regard to a common benchmark. This feature severely affects its usefulness in cross-country studies. Therefore, the analysis carried out in Section 5.5 is mainly based on the traditional Balassa index.

5.2.3 Intra-industry trade

The standard definition of intra-industry trade (IIT) refers to the simultaneous import and export of differentiated products within the

⁵The most suited metrics and related theoretical motivations are a rather extensive subject in the trade literature. For a discussion, see Bowen (1983), Yeats (1985), Ballance, Forstner and Murray (1987), Vollrath (1991) and Iapadre (2001).

⁶See Hinloopen and Marrewick (2001) for a list of references and De Benedictis and Tamberi (2004) for a detailed description of the characteristics of the Balassa index.

same industry, but products can be differentiated horizontally (different varieties of a given good) and vertically (different qualities of a given good). The theoretical literature has established the determinants of the two types of IIT: horizontal intra-industry trade (HIIT) and vertical intra-industry trade (VIIT). As regards HIIT, several models were developed in the eighties to provide a theoretical basis for trade of different varieties of the same good. In these models, goods are distinct due to certain attributes, but they are basically the same in terms of quality, cost and technology employed in their production. HIIT between countries with similar endowments is basically driven by consumers' preferences for diversified consumption bundles and by the existence of monopolistic competition with economies of scale in the production of each variety of the good (see, for instance, Dixit and Stiglitz (1977), Krugman (1979, 1980), Lancaster (1980) and Helpman (1981)). VIIT has been modeled differently in the theoretical trade literature, but vertical product differentiation usually takes place under perfect competition. Differences in factor endowments, technology and income distribution explain VIIT using Heckscher-Ohlin-Ricardo type models, as in the works of Falvey (1981), Flam and Helpman (1987), Falvey and Kierzkowski (1987) and Stokey (1991). The results of these models can be interpreted as a "quality ladder" approach, as more advanced countries export higher-quality varieties and lower-income countries export lower-quality varieties.

The most common measure of IIT was proposed by Grubel and Lloyd (1975). This measure, now known as the Grubel-Lloyd (GL) index, is simple to calculate and intuitively appealing. The GL approach is based on the intensity of trade overlap for each product. For each bilateral trade flow in a specific product, Grubel and Lloyd (1975) define the level of IIT as the difference between total trade and the trade imbalance. A large number of empirical studies divide total IIT flows into HIIT and VIIT. This approach has become popular after the works of Greenaway, Hine and Milner (1994, 1995) who adapt the GL index to measure the intensity of VIIT and HIIT in the UK. Starting from the assumption that differences in quality are reflected in differences in prices, information on unit values is used to empirically disentangle HIIT and VIIT.⁷ If the difference in unit

⁷Empirical studies using the GL index with bilateral data and disentangling HIIT and VIIT include the works of Hu and Ma (1999), Durkin and Krygier (2000), Blanes and Martín (2000), Martín-Montaner and Ríos (2002) and Byun and Lee (2005).

values is below a given threshold, goods are considered of the same quality, otherwise they are considered to be vertically differentiated.

An alternative approach to measure IIT was proposed by Fontagné and Freudenberg (1997) and Fontagné, Freudenberg and Péridy (1998), based upon the work of Abd-el Rahman (1991). With this method each elementary trade flow is fully associated with a unique trade type, which contrasts with the relation between IIT and balanced trade present in the GL approach. The methodology proposed by Fontagné and Freudenberg (1997) allows elementary trade flows to be broken down into three different categories according to the similarity in unit values and to the overlap in trade: inter-industry trade (insignificant overlap between exports and imports); HIIT (significant overlap and limited differences in unit values); VIIT (overlap and large differences in unit values).⁸ This is the methodology used to analyse the evolution of Portuguese IIT in Section 5.6.

5.2.4 International fragmentation of production

One of the factors underlying the high growth rate of international trade over the past two decades is the division of the production chain, with different stages of production located in different countries (see Yi (2003) and Jones, Kierzkowski and Lurong (2005)). At present, the increased significance of global supply chains is also contributing to the sharp decline of trade in goods since mid-2008, as it tends to amplify trade fluctuations. The phenomenon has been labelled in the literature as “vertical specialization”, “outsourcing”, “offshoring”, “international production sharing”, “disintegration of production”, “multi-stage production”, “intra-product specialization”, “production relocation”, “international segmentation of production”, etc. International trade theorists tend to call it “fragmentation”, a term proposed by Jones and Kierzkowski (1990). More recently, important contributions to the theory of international fragmentation using Ricardian and Heckscher-Ohlin type models include, among others, the works of Arndt (1997), Venables (1999), Yi (2003), Jones and Kierzkowski (2001, 2005), Deardorff (2001, 2005), Kohler (2004a, 2004b), Grossman and Rossi-Hansberg (2006a, 2006b)

⁸See Fontagné and Freudenberg (2002), Fontagné, Freudenberg and Gaulier (2006), Ecochard, Fontagné, Gaulier and Zignago (2006), Fukao, Ishido and Ito (2003) and Ando (2006) for applications of this method.

and Baldwin and Robert Nicoud (2007).⁹ Another branch of the literature focuses on the firm's choice of organizational form, incorporating firm heterogeneity as in the works of McLaren (2000), Antràs and Helpman (2004), Grossman and Helpman (2005) and Antràs, Garicano and Rossi-Hansberg (2006) (see Helpman (2006) for a recent survey).

The extent of international fragmentation is difficult to measure accurately and assumes a variety of forms. The empirical trade literature suggests a range of different methods and data sources to quantify these activities. Three main data sources have been used to document the international fragmentation of production at the sectoral level: customs statistics on processing trade, international trade statistics on parts and components, and Input-Output (I-O) tables.

Customs statistics provide information from customs arrangements in which tariff exemptions or reductions are granted in accordance to the domestic input content of imported goods. The US Offshore Assembly Programme and the EU Processing Trade data sets are examples of such data, which have been used in a number of empirical studies to obtain a narrow measure of the international fragmentation of production.¹⁰ This narrow measure captures only the cases where components or materials are exported (imported) for processing abroad (internally) and then reimported (reexported).

International trade statistics have been used to measure fragmentation by comparing trade in parts and components with trade in final products. Even if trade in intermediate goods as a whole has not risen much faster than trade in final goods, data shows that trade in parts and components exhibited a dynamism exceeding that of trade in final goods (see Athukorala and Yamashita (2006) and Jones et al. (2005) for a review). The main advantage of this approach is the accessibility of the data and its comparability across countries, allowing the identification of specific trading partner relationships. A drawback is that it relies heavily on the product classification of trade statistics. Typically, the parts and components aggregate is obtained from the Standard International Trade Classification (SITC) at the most detailed level and tends to include products belonging to SITC 7 (Machinery and transport equipment) and SITC 8 (Miscel-

⁹See Arndt and Kierzkowski (2001) and Baldwin and Robert Nicoud (2007) for a review.

¹⁰Studies using data on outward-inward processing trade include the works of Swenson (2005), Clark (2006), Helg and Tajoli (2005), Baldone, Sdogati and Tajoli (2007), Egger and Egger (2001) and Lemoine and Ünal Kesenci (2004).

laneous manufactured articles). This type of analysis was initiated with the works of Yeats (1998) and Ng and Yeats (1999) and has been used extensively afterwards.

Most of the existing systematic evidence on the international fragmentation of production focuses on the imported input shares of gross output, total inputs or exports. Typically, such measures use information from I-O tables sometimes complemented with import penetration statistics computed from trade data. Two different types of measures based on I-O data have been implemented in the empirical trade literature (see Hijzen (2005) for a discussion). The first measure focuses on the foreign content of domestic production as it considers the share of (direct) imported inputs in production or in total inputs (see Feenstra and Hanson (1996)). As a result, this measure has been used to assess the potential impact of fragmentation on employment and wages of low-skilled workers in the domestic economy, as they are substituted by workers abroad (see Feenstra (2007) for a review). The second I-O based measure of fragmentation focuses on the (direct and indirect) import content of exports and it was initially formulated by Hummels, Rapoport and Yi (1998) and Hummels et al. (2001), which labelled it vertical specialization (VS). This measure captures cases where the production is carried out in at least two countries and goods cross at least twice international borders. In this context, countries specialize in particular stages of a good's production. Hummels et al. (2001) found that VS activities accounted for 21 per cent of the exports of ten OECD and four emerging market countries in 1990 and grew almost 30 per cent between 1970 and 1990. Chen, Kondratowicz and Yi (2005), updating the analysis presented in Hummels et al. (2001) using more recent I-O tables, also find that trade in vertically specialized goods has increased over time.¹¹ In Section 5.7, we follow Hummels et al. (2001) to measure vertical specialization in terms of the total imported intermediate content of exports, considering a multiple-stage input-output circulation among Portuguese industries.

¹¹Other studies have applied this methodology, in some cases with minor changes from the original formulation, and found an increase of VS activities. Some examples are Minondo and Rubert (2002) for Spain, Breda, Cappariello and Zizza (2008) for Italy and six other EU countries, Zhang and Sun (2007) for China and Chen and Chang (2006) for Taiwan and South Korea.

5.2.5 Links between intra-industry trade, fragmentation and FDI

It is important to consider the link between the international fragmentation of production and IIT. These activities explain part of the increase in world trade, as more intermediate goods circulate between countries, bearing consequences on the nature and measurement of IIT. In empirical terms, trade resulting from the international fragmentation of production can be classified either as inter-industry trade or as IIT. At a highly disaggregated product breakdown level, different intermediate and final goods are usually classified in distinct product categories and their trade flows are considered inter-industry trade. However, at a more aggregate level, intermediate and final goods tend to be classified in the same category. In this case, simultaneous exports and imports of goods belonging to the same category, but related to different production stages (as a result of international fragmentation) are classified as IIT (see Jones, Kierzkowski and Leonard (2002) and Ando (2006) for a discussion on the link between fragmentation and IIT).

In parallel, international fragmentation of production has been associated with vertical FDI flows, as multinational firms adopt this new paradigm and become prominent players in international trade. In this case, trade in intermediate goods takes the form of intra-firm transactions with production stages located in different countries, i.e., vertical production networks in multinationals. A strand of the literature on fragmentation has focused on the activities of multinational corporations.¹² Two new research avenues on the international fragmentation of production are also worth mentioning. Firstly, the study of fragmentation issues using firm-level data is an interesting approach. Empirical research at the firm level allows for the control of heterogeneity and can give important insights on the impact of outsourcing on productivity.¹³ Secondly, the international outsourcing of services is another area where further investigation seems promising. The empirical evidence is still scarce because only recently technological developments made it possible to offshore some services inputs.¹⁴

¹²See, for instance, Hanson, Mataloni and Slaughter (2005), Borga and Zeile (2004) and Kimura and Ando (2005).

¹³See Görg and Hanley (2005) and Görg, Hanley and Strobl (2008) for Irish manufacturing plants, Tomiura (2005) and Tomiura (2007) for Japanese manufacturing firms, and Kurz (2006) using plant-level US manufacturing data.

¹⁴See Amiti and Wei (2005, 2006), Liu and Trefler (2008) and Geishecker and Görg

5.2.6 Heterogeneous exporters

Differences among firms are crucial to understand several stylized facts of world trade. Since the mid-nineties, empirical evidence based on micro databases showed that most firms do not export at all, while exporting firms tend to export only a small fraction of their total sales and tend to be larger and more productive than other firms in the same industries. Recently, new theoretical trade models have emerged, incorporating firm-level heterogeneity to account for the observed differences between exporting and non-exporting firms.¹⁵ The framework developed by Bernard, Eaton, Jensen and Kortum (2003) incorporates stochastic firm productivity into a multi-country Ricardian model and a second class of models initiated by Melitz (2003) introduces firm heterogeneity into a monopolistic competition model of intra-industry trade (see Bernard, Jensen, Redding and Schott (2007) for a recent survey). The Melitz framework is especially tractable and has stimulated recent studies on the consequences of firm heterogeneity on several dimensions of international trade. Empirical studies based on firm-level data include the works of Eaton, Eslava, Kugler and Tybout (2008) for Colombia, Eaton, Kortum and Kramarz (2008) for France, Muûls and Pisu (2007) for Belgium, Martincus and Carballo (2008) for Peru, Bernard, Jensen and Schott (2005) for the US, and Mayer and Ottaviano (2008) for a sample of European firms, among others. One specific strand of this recent literature focuses on multi-product firms and explores the product choices of exporting firms (see Bernard, Redding and Schott (2006), Arkolakis and Muendler (2007), Iacovone and Javorcik (2008) and Schott (2004)). In Section 5.8, we follow this literature and describe the joint destination/product strategies of Portuguese firms using a new transaction-level database for the period 1996-2005.

(2008) for recent studies on the effects of services offshoring.

¹⁵See Helpman (2006) and Greenaway and Kneller (2007) for a review.

5.3 Openness of the Portuguese economy

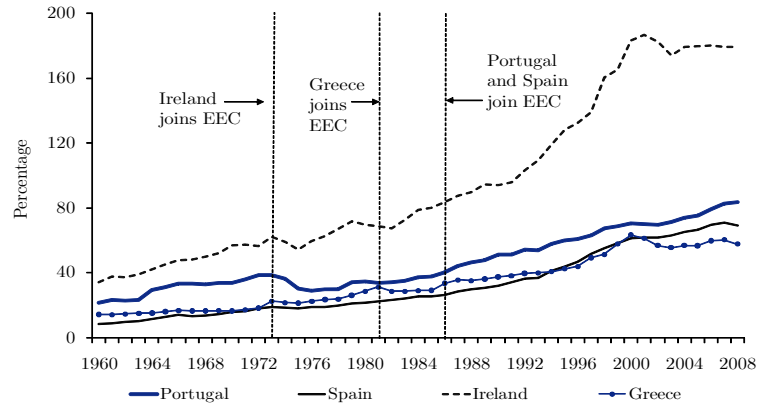
Portugal significantly increased its trade openness.

The degree of openness of the Portuguese economy increased substantially over the last four decades, particularly when measured at constant prices (Figure 5.2). In 2008, total trade flows increased to around 83 per cent of GDP at 2000 prices and to around 75 per cent of GDP at current prices. The disparity between the two measures reflects developments in nominal variables, including sharp movements in commodity prices, different exchange rate regimes and different paths of the domestic inflation, with distinct impacts on the relative behaviour of the exports, imports and GDP deflators. The increase in the openness ratio is visible in most economies and is attributable to several factors, including progressive trade liberalization, lower transport and communication costs, a greater variety of goods and services demanded by consumers and an increasing role of vertical specialization activities. At constant prices, Portugal presents a degree of openness that is slightly higher than that of Spain and Greece, though these countries evolved along similar trends until recent years. Although acknowledging that many factors contributed to this path, the EEC accession in 1986 seems to mark an intensification of trade openness in Portugal and Spain. In fact, the accession to the EEC represented a second wave of liberalization in the Portuguese international trade, further increasing openness. The transition period set for the dismantlement of intra-EEC trade barriers and for the adoption of the common trade policy ended by 1992. In 1993, Portugal joined the European single market and, in 1999, it was among the initial group of countries that adopted the euro.

The real costs of trade are important determinants of a country's ability to participate fully in the world economy. Trade costs, broadly defined, include all costs incurred in getting a good to a final user other than the marginal cost of producing the good itself, namely transportation costs (both freight costs and time costs), policy barriers (tariffs and non-tariff barriers) and other costs of doing business internationally.¹⁶ The accurate measurement of transport costs faces many difficulties and its evolution over time and across countries is hard to assess and conditional on the type of transport.

¹⁶See Anderson and van Wincoop (2004) for a survey on trade costs.

Figure 5.2: Trade openness ratio
(total trade as a percentage of GDP, constant prices of 2000)

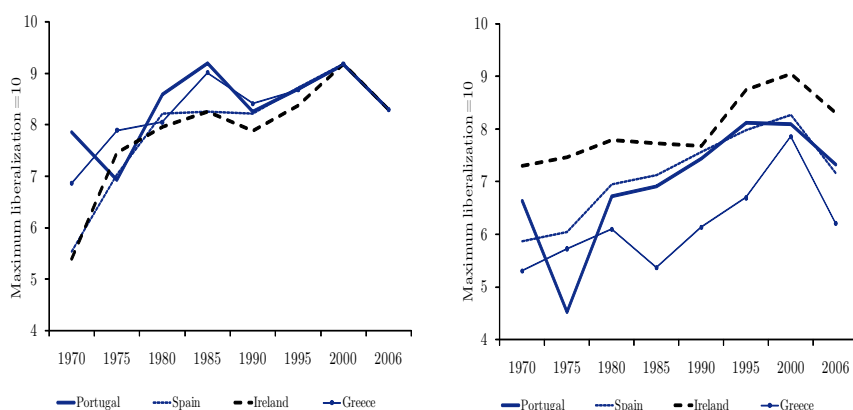


Source: European Commission, AMECO database.

However, time distances between regionally integrated economies, such as those of the EU, have decreased in the last decades due to technological progress, lighter customs procedures and better transport infrastructures. In fact, infrastructures are likely to have a considerable effect on the time costs of trade. Limão and Venables (2001) study the determinants of transport costs and conclude that the levels of infrastructures are a significant determinant of such costs and of bilateral trade flows. In Portugal, transport infrastructures improved substantially after 1986, benefiting from sizeable transfers of EU structural funds. These funds co-financed the upgrading of physical infrastructures, facilitating the expansion of international trade.

Tariffs and quotas are obvious examples of barriers that limit international trade. Over the last decades, the four Cohesion countries reduced the restrictive impact of tariffs on trade and converged to the EU standards. At present, Portugal's trade policy matches that of other EU members, i.e., it applies the common EU tariff rates, leading to an identical index of taxes on international trade for the four Cohesion countries (Figure 5.3(a)). In addition, several non-tariff barriers are reflected in the EU and Portuguese trade policies, including regulatory and licensing restrictions, and other administrative red-tape procedures. For instance, the volume of trade tends to be reduced if the passage of goods through customs is onerous and time consuming. Considering a wider variety of restraints to

Figure 5.3: Trade liberalisation



(a) Index of taxes on international trade (b) Index of freedom to trade internationally

Source: Economic Freedom of the World, 2008, The Fraser Institute.

international trade, it is again evident that there was a decline of the trade restrictions in these four countries over the past decades, but with some differences remaining in the most recent period (Figure 5.3(b)).¹⁷

5.4 Constant market share analysis of Portuguese exports

Effective gains of export market share were recorded until the mid-nineties, though significant effective losses emerged afterwards. The relative product and geographical specialization of Portuguese exports was not favourable.

Changes of a country's market share in world exports result from many different and interrelated factors. Firstly, domestic and external macroeconomic developments influence the relative price/cost

¹⁷The composite index of Freedom to Trade Internationally was published in the Economic Freedom of the World: 2008 Annual Report, The Fraser Institute (data retrieved from www.freetheworld.com). It considers information on taxes on international trade (revenue, mean and standard deviation of tariff rates); regulatory trade barriers (non-tariff barriers and compliance costs); size of the trade sector relative to expected; difference between official and black market exchange rate and international capital market controls (foreign ownership restrictions and capital controls).

competitiveness of exports. Secondly, long term structural factors like the endowment of productive factors, technology and institutional background affect overall competitiveness and the sectoral specialization of exports. Thirdly, geography and cultural linkages condition the performance of exports and its distribution among different trading partners. Fourthly, the dynamics of international trade flows determined, in part, by the entrance of new players, mechanically affects individual countries' market shares. Therefore, as in most sections of this Chapter, the analysis of the export performance of Portugal is put in perspective by analysing long periods in order to identify trends and comparing them with a set of benchmark countries. The discussion on export market shares and on the impact of the product and geographical composition of exports is relevant for the Portuguese economy because, as we will see in Section 5.8, there is substantial reallocation along these margins. Additionally, in a small open economy like Portugal, the deterioration in the export performance tends to hinder economic growth, contributing to the divergence of real per capita income against the euro area that was observed in recent years.

This section mostly focuses on the evolution of Portuguese market shares in world exports over the 1986-2006 period, in comparison with other Southern European countries and Ireland, but it also provides information on a broader period (1968-2006) when relevant. For this purpose, we use a constant market share analysis to disentangle the effective changes of export share in each individual market from the effects related with the product and geographical structure of exports.¹⁸

5.4.1 Methodology and data

According to the formulation suggested by Nyssens and Pouillet (1990), the total change in the share of Portuguese exports in the world market, the Total Effect (TE), is proxied by the difference between the growth of total Portuguese exports of manufactured goods (g) and the growth of total exports of manufactured goods

¹⁸For a detailed description of the methodology used, see Amador and Cabral (2008b). Other applications of the constant market share methodology to Portuguese exports can be found in Abreu and Manteu (1993), Cabral (2004) and Cabral and Esteves (2006).

of the rest of the world (g^*), that is:

$$TE = g - g^* = \sum_i \sum_d \theta_{di} g_{di} - \sum_i \sum_d \theta_{di}^* g_{di}^*, \quad (5.1)$$

where g_{di} is the percentage change of Portuguese exports of product i to country d in period t , θ_{di} is the share of product i to destination country d in total Portuguese exports in period $t - 1$, and g_{di}^* and θ_{di}^* are the equivalent notions for world exports.

If the growth of Portuguese exports is higher (lower) than that of world exports, the TE will be positive (negative), corresponding to a total market share gain (loss) of Portugal. The Total Effect can be broken down into two terms:

$$TE = MSE + CSE, \quad (5.2)$$

one resulting from effective changes in market share in individual markets¹⁹, the Market Share Effect (MSE) and another resulting from the influence of the relative specialization of the country, the Combined Structure Effect (CSE).

Market Share Effect (MSE) - The difference between the growth rate of Portuguese and world exports in each period, excluding the influence of differences in relative specialization. Overall, considering all products and destinations, the MSE for Portugal is given by:

$$MSE = \sum_i \sum_d \theta_{di} (g_{di} - g_{di}^*). \quad (5.3)$$

Taking as given the product/geographical structure of Portuguese exports, a comparison is made between the growth rates of Portuguese and world exports for each product i to each destination country d . The MSE for a specific product i (destination country d) can be taken as the sum over d (i) of this effect.

Combined Structure Effect (CSE) - The relative evolution of each individual destination market (defined as the difference between the growth of world exports to that market and the growth of total world exports) weighted by the relative importance of that market for Portugal (defined as the difference between its share in total Portuguese and in total world exports).

$$CSE = \sum_i \sum_d (\theta_{di} - \theta_{di}^*) (g_{di}^* - g^*). \quad (5.4)$$

¹⁹The notion of individual market used here refers to each di market measured as exports of product i to destination country d .

The relative specialization term $(\theta_{di} - \theta_{di}^*)$ compares export structures and, hence, gives information equivalent to the traditional Balassa (1965) index of revealed comparative advantage that will be analysed in subsection 5.5.2. The CSE determines which part of the total change of market share results from the influence of the relative product/geographical specialization of the country. In each period, the CSE will be positive if Portugal is relatively more (less) specialized in individual markets that grow above (below) the average; the CSE will be negative if Portugal is relatively less (more) specialized in individual markets that grow above (below) the average. The CSE takes into account both the product and geographical specialization of exports as a whole, but it can be further decomposed into three terms to separately account for the effects of the product and geographical compositions.

$$CSE = PSE + GSE + MIX \quad (5.5)$$

Product Structure Effect (PSE) - it determines which part of the total change in the market share resulted from the relative product specialization of Portuguese exports.

$$PSE = \sum_i (\theta_i - \theta_i^*) (g_i^* - g^*), \quad (5.6)$$

where g_i^* is the percentage change of world exports of product i in period t , θ_i is the share of product i in total Portuguese exports in period $t - 1$, and θ_i^* is the equivalent notion for world exports.

Geographical Structure Effect (GSE) - it represents the impact of the relative geographical specialization of Portuguese exports.

$$GSE = \sum_d (\theta_d - \theta_d^*) (g_d^* - g^*), \quad (5.7)$$

where g_d^* is the percentage change of world exports to country d in period t , θ_d is the share of country d in total Portuguese exports in period $t - 1$, and θ_d^* is the equivalent notion for world exports.

Mixed Structure Effect (MIX) - it is a residual term that results from the fact that the product and geographical structures are not independent and thus the sum of the product and geographical effects does not match the combined structure effect.

$$MIX = \sum_i \sum_d \left[(\theta_{di} - \theta_{di}^*) - (\theta_i - \theta_i^*) \frac{\theta_{di}^*}{\theta_i^*} - (\theta_d - \theta_d^*) \frac{\theta_{di}^*}{\theta_d^*} \right] g_{di}^* \quad (5.8)$$

The international trade data comes from the CEPII-CHELEM database, which reports bilateral trade flows for goods in value terms (the unit being the US dollar).²⁰ The sample period starts in 1967 and ends in 2006. The bilateral database comprises 79 countries or country groups and 118 manufacturing products excluding energy-related items, with a product breakdown at the 4-digit level of the International Standard Industrial Classification (ISIC), rev.3.

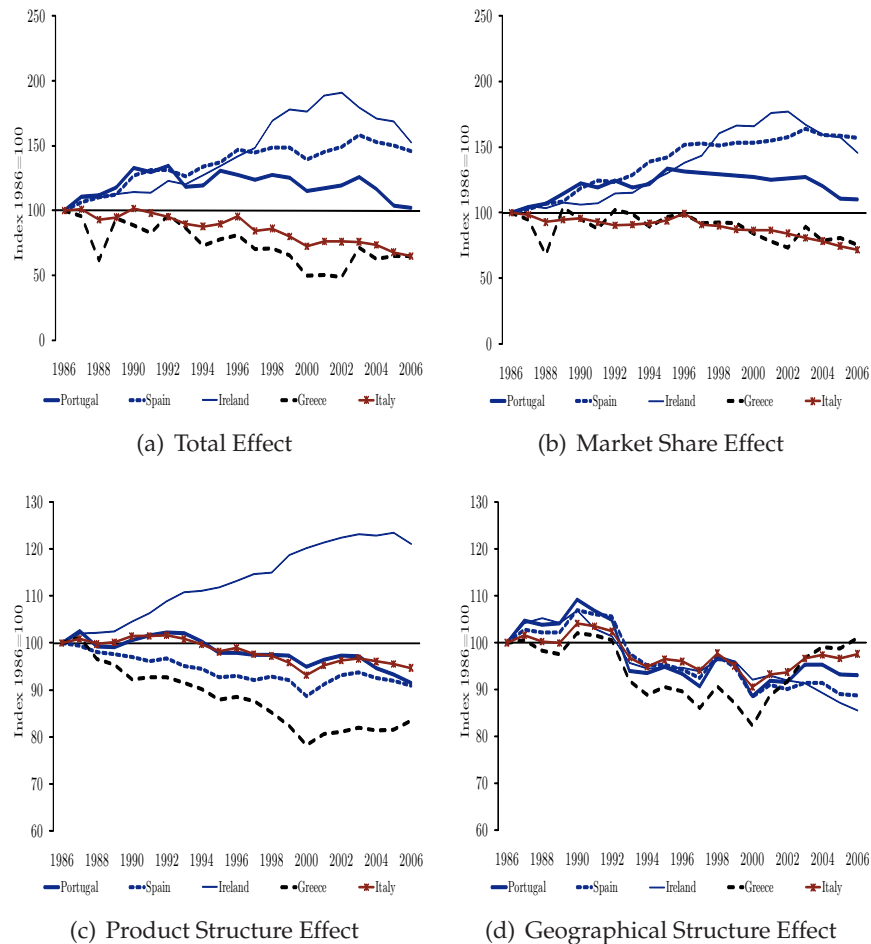
5.4.2 Main results

Figure 5.4 displays the annual results in cumulative terms for Portugal and four benchmark countries - Spain, Greece, Ireland and Italy in the 1987-2006 period. Portuguese exports show a cumulative increase of total market shares over this period of 2.3 per cent. In general terms, an increase of total market share is visible until the beginning of the nineties, but the following years until 2006 are characterized by a gradual reduction of total Portuguese shares in world exports. There are marked differences between the evolution of these countries' export market shares over the last two decades. The cumulative change of total market share of Portuguese exports is better than those observed in Italy and Greece, where total export shares declined by around 35 cent in cumulative terms over the 1987-2006 period. In contrast, the export shares of Ireland and Spain in world markets increased sharply, by around 50 per cent in cumulative terms. In the most recent years, there is a decrease in the market share of these countries (Greece being the exception), partly related with the progressive entrance of new players in world trade. These additional competitive pressures are posed by emerging market economies located in Central and Eastern Europe and, mainly, in East Asia, in particular China. Nevertheless, in the cases of Spain and, especially, Ireland the losses of share observed recently follow substantial cumulative gains recorded earlier.

In the five countries selected, the breakdown of the total effect over the whole period indicates that the market share effect is the major driving force behind the overall evolution of market shares, thus mimicking the results described above. The comparison of Portugal with the benchmark countries in terms of the product and geographical structure effects offers some insights. Starting with the effect of the product structure, the contrast between Ireland and the

²⁰See De Saint-Vaulry (2008) for a detailed description of this database.

Figure 5.4: Main results of the constant market share analysis of manufacturing exports (excluding energy, cumulative results in nominal terms)



Sources: CEPII - CHELEM database and authors' calculations.

other countries is striking. Ireland successfully changed its sectoral export structure towards more dynamic products, contributing to the increase of its total market share. On the contrary, the product structure effect in the other countries was unfavourable over the last twenty years, especially in Greece.

In what concerns the evolution of the geographical structure effect, the interesting result is the similarity observed between these countries over the mid-eighties and nineties. This evolution reflects

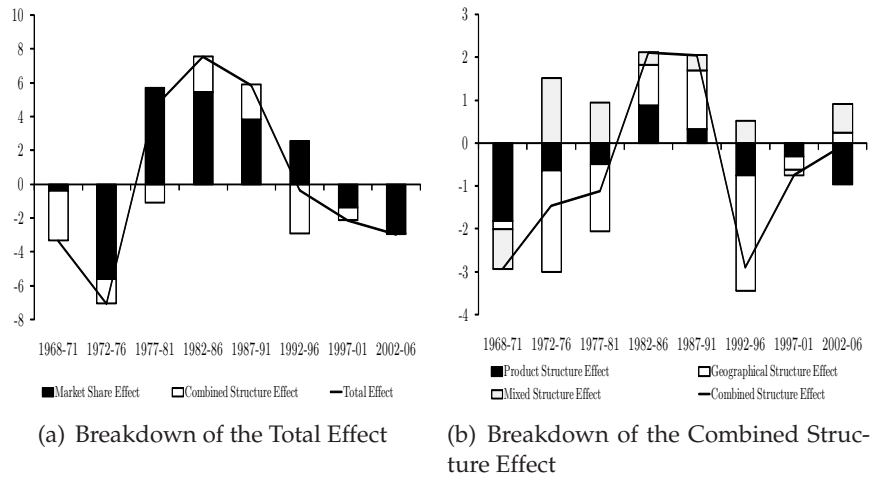
the increased importance of European markets for these countries, translated into a higher share of intra-European trade and a share of trade with the US below that of the world average. In fact, as long as the progress of European integration makes the geographical export structure of Member States more uniform, it drives similar paths for the geographical structure effect. However, some distinct developments are visible in the most recent period. The geographical structure effect is more favourable in the case of Greece and, to a lesser extent, Italy than in the other three selected countries. In the Greek case, this evolution reflects a positive contribution from the non-specialization in the US market that grew below world average in this period ²¹ and from the higher specialization of Greek exports on the recently opened and dynamic Bulgarian and Romanian markets. The non-specialization of these five countries in the dynamic Chinese market contributed negatively to the evolution of their export shares since the nineties.

Figure 5.5 displays the main results of the constant market share analysis of Portuguese exports, organized in five-year periods by averaging the respective annual results. The total share of Portugal in world exports had an average annual increase of only 0.1 per cent over the 1987-2006 period. The first two periods considered in Figure 5.5, from the late sixties to the mid-seventies, are characterized by a substantial overall reduction of market share. In the next three periods, from the late seventies to the beginning of the nineties, the growth of Portuguese exports was higher than the growth of total world exports, leading to a positive total effect. This situation was reversed in the last three periods, which show an increasingly negative evolution of total Portuguese export shares.

The market share effect, with an average effective gain of 0.5 per cent per year in the 1987-2006 period, was the dominant factor behind the total change in Portuguese market shares. It is possible to identify periods with distinct evolutions of Portuguese effective export shares, corresponding to diverse shocks to the economy, different macroeconomic policies and progressive economic integration with the EU. An effective increase of Portuguese market shares is visible in the two five-year periods from 1987 to 1996. The reintroduction and intensification of stabilization policies after the second current account crisis in 1983 and the accession to EEC in 1986 con-

²¹ A positive effect of the US market occurs in all of these countries with the exception of Ireland, where the share of exports to the US surpassed the world average since 2002.

Figure 5.5: Main results of the constant market share analysis of Portuguese exports (excluding energy, average results in nominal terms)



Sources: CEPII - CHELEM database and authors' calculations.

tributed to the recovery of effective market shares. Conversely, the following two periods from 1997 to 2006 are characterized by effective declines of market share, in a context of increased competition in world markets. These recent losses of market share of Portuguese exports are partly the reflex of structural weaknesses in the economy, which contribute to the deterioration of competitiveness. The structural weaknesses range from an inadequate endowment of productive factors, in particular a low human capital and a low capital-labour ratio, to rigidity factors in the functioning of the product and labour markets, which hamper the rapid and efficient sectoral reallocation of resources.

The main contribution to the effective increase of market share in the period from 1987 to 1991 came from the low-technology sector of "Textiles, textile products, leather and footwear". This positive performance benefited from the 1986 accession to the EEC, as larger markets opened to sectors where Portugal held a comparative advantage. This path was reversed in the period 1992-96, with Portuguese exports losing share in this sector. In the 1992-96 period, the most significant contribution to the effective gain of market share resulted from the medium-high-technology sector, more specifically from "Motor vehicles, trailers and semi-trailers". The gains of mar-

ket share in this sector already existed in the previous three periods but were especially strong between 1995 and 1997, coinciding with the location in Portugal of large FDI projects in the automobile sector.

The declines of market share of the low-technology sector of "Textiles, textile products, leather and footwear" made a significant contribution to the negative market share effect observed in the periods between 1997 and 2006. The liberalization of the EU textiles market with the phase-out of the Agreement on Textiles and Clothing certainly contributed to this evolution.²² In fact, the growing participation in international markets of new countries with low production costs and heavily specialized in this sector increases the competition faced by Portuguese exporters.²³ In the 2002-06 period, there were also important reductions of market share of Portuguese exports of "Wood, pulp, paper and printed products" and of "Motor vehicles, trailers and semi-trailers".

The contribution of the combined structure was negative on average over the 1987-2006 period, reflecting both the product and the geographical specialization of Portuguese exports. Starting with the geographical structure effect, there was a significant negative impact of the geographical structure in the 1992-96 period, reflecting mainly the fact that world exports to EU countries grew below average and Portuguese exports are relatively more specialized in these markets. In contrast, the highest positive contribution of the geographical structure effect of Portuguese exports occurred in the 1987-91 period. This effect was mostly related with the evolution of some EU markets that grew above average and that represented a high share of Portuguese exports, in particular Spain, Germany and France. In broad terms, the most significant geographical effect since the eighties, with the exception of the 1992-96 period, was related to the Spanish market. This market recorded a growth rate above average and represents a high and sustained share of Portuguese exports, naturally increasing the sensitivity of the Portuguese economy to the Spanish business cycle. In contrast, the non-specialization of Portuguese exports in the Chinese market gave an important negative

²²In 1993, the Uruguay Round agreement defined a 10-year phase-out of trade barriers existing in the Multifibre Arrangement and in the Agreement on Textiles and Clothing (ATC). As for the ATC, the liberalization would occur in 1995 (16 per cent), 1998 (17 per cent), 2002 (18 per cent) and 2005 (49 per cent). For more details, see Francois, Manchin, Norberg and Spinanger (2007).

²³See Cardoso and Esteves (2008) for an analysis of the impact of low-cost producers on international prices.

contribution in recent years, given the high growth of world exports to China in this period.

In the average of the 1987-2006 period, the relative product specialization of Portuguese exports did not benefit the evolution of total market shares. A significant negative effect came from the high relative specialization of Portuguese exports in low-technology products in periods where world exports of these products grew below average. The negative effect observed in the 2002-06 period is an example of this situation, with the sector of "Textiles, textile products, leather and footwear" giving an important contribution. In addition, Portuguese exports have a bad positioning in most fast-growing products, as is the case of high-technology products that grew above average in almost all periods. However, the non-specialization of Portuguese exports in these products had a small positive influence in the most recent period as world exports of these products grew below average. In the period 1987-91, there was a positive product structure effect, which was mostly related to the fact that some products where Portugal is relatively more specialized had a higher than average growth rate, namely the low-technology sector of "Textiles, textile products, leather and footwear".

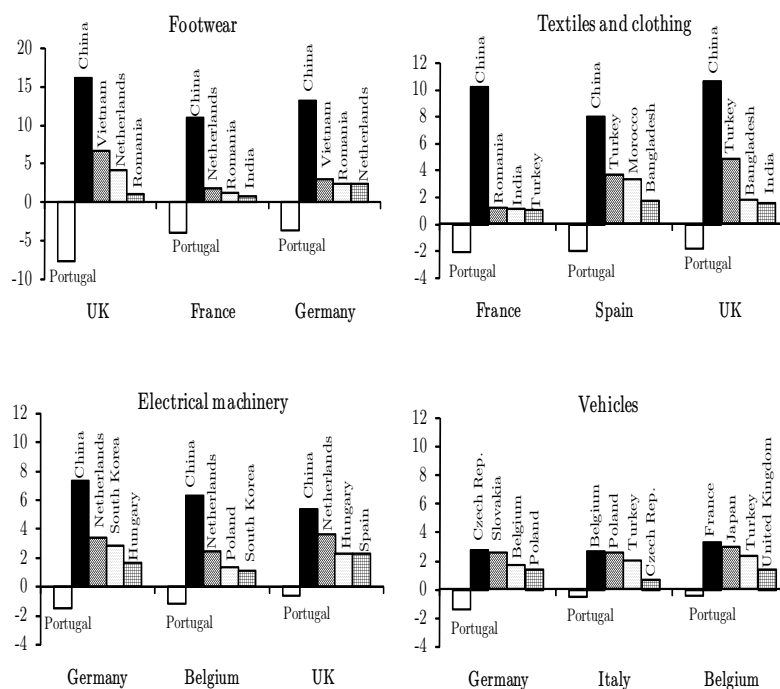
Given the effective losses of export market share in recent years, it is also interesting to identify the main competitors of Portuguese exports. Considering a sample of 96 individual product and geographical markets over the 1999-2005 period, Cabral and Esteves (2006) investigate which countries exhibited more gains of export share in the same individual markets where Portuguese exports had the strongest reductions of share.²⁴ They found that in the markets where Portuguese losses of export share were more substantial, the highest gains were obtained by developing East Asian economies and by Central and Eastern Europe countries. The reduction of Portuguese export shares in these markets was not an isolated phenomenon, as the same happened to other developed countries. Figure 5.6 illustrates this issue by displaying the four main gainers in some of the individual markets where Portuguese losses of share were more severe.

Looking at the twelve individual markets included in Figure 5.6,

²⁴The sample includes the 8 main destination countries and the 12 main manufacturing products of Portuguese exports, i.e., 96 individual markets, representing together more than 70 per cent of total Portuguese manufacturing exports and more than 60 per cent of total exports of goods.

MARKET SHARE ANALYSIS OF PORTUGUESE EXPORTS

Figure 5.6: Portuguese main losses of export share in individual markets (2000-2005, in percentage points)



Sources: World Trade Atlas and calculations in Cabral and Esteves (2006).

competition from Central and Eastern European countries tends to be relatively more intense in the vehicles sector, where the presence of developing Asian economies is still not very significant. In the other three products, China is the main gainer in all geographical markets considered. Over this period, emerging Asia appears to gain more market shares in traditional low-tech, low-skill products, like textiles, clothing and footwear, but there are also gains of China and South Korea in electrical machinery, especially in the German market. Cabral and Esteves (2006) also provide evidence that the product specialization of Portuguese exports is relatively similar to that of the new players in international trade, while other developed economies tend to have a different product specialization. In particular, the still relatively high share of low-tech exports in Portugal, mainly from the textile, clothing and footwear sectors, creates extra challenges for Portuguese exports, given the strong revealed com-

parative advantage that some of the new low-cost competitors from Asia and Eastern Europe have in these products. The product composition of Portuguese exports will be analysed in detail in the next section.

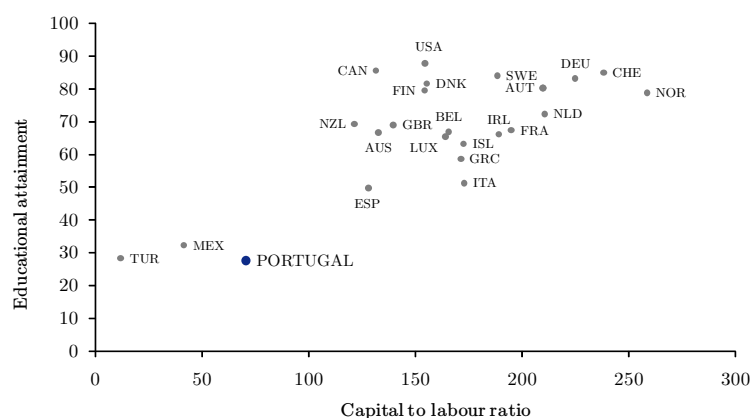
5.5 Revealed comparative advantage

The export share of low-tech products continuously declined, while that of medium-high tech products increased in the mid-nineties but stabilized afterwards.

Over the last four decades, trade openness has increased and patterns of specialization in international trade have evolved significantly. Several papers have studied changes in specialization patterns. From an individual country's perspective it is interesting to identify the modifications in the trade pattern because they may provide insights on the underlying structural changes in the economy, namely in its structure of production. In addition, the magnitude and the pace of such changes is an indirect indicator of the flexibility of the economy in allocating resources among sectors. Therefore, these elements are relevant to understand the growth performance of the economy.

Multiple factors determine the international trade pattern of an economy. In classical trade models based on the Heckscher-Ohlin-Samuelson framework, the relative factor endowments of the economy play a vital role in determining the pattern of comparative advantages and, consequently, the trade pattern. In Portugal, the endowment of physical capital per worker is still relatively low in international terms, in spite of the increase in the capital stock over the last decades (Figure 5.7). There is a strong complementarity between human and physical capital, since the qualification of the population is a central element for the efficient incorporation of technological advances and for the creation and implementation of new ideas. At present, there is still a very low qualification of human resources in Portugal, despite the progress made in the last decades. In most OECD countries, 60 per cent or more of the population aged 25 to 64 has completed at least upper secondary education, while in Portugal that percentage is below 30 per cent. Over the past twenty years, the share of resources that Portugal devotes to education increased sharply. However, when comparing the level of spending

Figure 5.7: Capital to labour ratio and educational attainment in OECD countries, 2006



Sources: European Commission, AMECO database and OECD, Education at a Glance.

Notes: Capital to labour ratio defined as net capital stock at 2000 prices per person employed. Educational attainment defined as percentage of the adult population (25 to 64 years) with at least upper secondary education.

with education outcomes the Portuguese system does not seem efficient (see Chapter 6 in this volume for a discussion). In addition, investment in areas related to knowledge, in particular research and development, is much lower in Portugal than in the majority of European countries. Therefore, the emergence in Portugal of a trade specialization based on exports of labour intensive goods is not in contradiction with the theory. However, after the accession to the EEC in 1986 and until the mid-nineties, there were strong direct investment inflows in the Portuguese economy. A significant share of this FDI was associated to export-oriented projects, some of them in medium-high technology sectors such as motor vehicles. These FDI inflows enhanced the convergence of the Portuguese trade structure towards the one observed in more advanced countries, but substantial differences still remain. In the most recent period, the entrance of new international competitors with low labour costs in Asia and the opening of countries with relatively educated labour forces in Central and Eastern Europe posed serious challenges to the Portuguese economy. The former group of countries puts strong competitive pressures on low technology sectors while the latter tends to compete more in the medium-high technology segment.

5.5.1 Methodology and data

The analysis carried out here makes use of the Balassa (1965) index of revealed comparative advantage. The Balassa index can be defined as follows: assume that the world economy comprises N countries and I products. Denote country s exports of product i with X_{si} and let total exports of country s be given by $X_s = \sum_{i=1}^I X_{si}$. World exports of product i amount to $X_{Wi} = \sum_{s=1}^N X_{si}$, while total world exports can be either seen as the sum of all products or the sum of all countries, i.e., $X_W = \sum_{i=1}^I X_{Wi} = \sum_{s=1}^N X_s$. The Balassa index can be written as:

$$B_{si} = \frac{\frac{X_{si}}{X_s}}{\frac{X_{Wi}}{X_W}} \quad \text{country } s = 1, 2 \dots N; \text{ product } i = 1, 2 \dots I \quad (5.9)$$

According to (5.9), if the share of product i in total exports of country s is higher than the equivalent share of product i in world exports, then $B_{si} > 1$ and country s is classified as having a *revealed* comparative advantage in product i .

The Balassa index can be replicated for the import side. When the Balassa (1965) index for imports assumes a value higher than one, it means that country s is classified as being a relatively stronger importer of product i .

This analysis of the trade specialization of Portugal can be enhanced by taking a set of countries as a benchmark, thereby investigating their relative behaviours. In this section, we are particularly interested in understanding how does Portugal compare with the other initial EU Cohesion Fund beneficiaries, i.e., the relative sectoral specialization of Portuguese exports and imports since 1967, against those of Greece, Spain and Ireland.

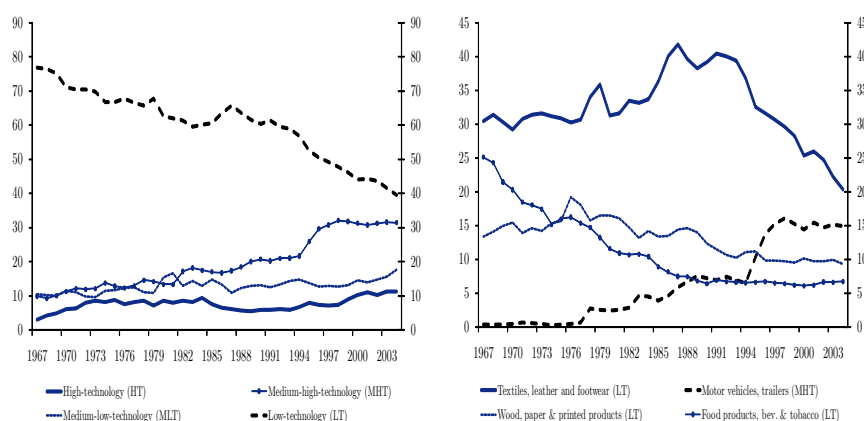
The empirical investigation of the evolution of the Portuguese trade pattern is based on the CEPII - CHELEM database, which was used in the constant market share analysis of Section 5.4. The sample period starts in 1967 and ends in 2004, with a product breakdown at the four digits level of the ISIC rev.3, which includes 120 manufacturing products. These 120 manufactured goods are grouped in accordance with their technological intensity, following the OECD classification of R&D intensities. This widely used technological classification includes four main sectors: high-technology (HT), medium-high-technology (MHT), medium-low-

technology (MLT) and low-technology (LT). A second breakdown level containing twenty sub-sectors is also available.

5.5.2 Portuguese export specialization

The Portuguese export structure underwent important changes over the last four decades. At the first breakdown level, the most striking feature is the continuous decline over time of the share of the LT sector in total manufacturing exports (Figure 5.8(a)). This decline was extensive to all sub-sectors, but was particularly sharp in “Food products, beverages and tobacco” and “Textiles, textile products, leather and footwear” (Figure 5.8(b)). The reduction of the export share of the former sub-sector was broadly continuous until the beginning of the nineties, stabilizing at around 6.5 per cent of total Portuguese exports. In the latter, the loss of importance was only visible after 1993, since its export share increased until that year. Thereafter the decline of the share of textiles and footwear exports was rather marked, which may reflect the increased competition from some developing countries. In spite of the strong decrease of its export share, the LT sector is still the most important technological category in Portuguese manufacturing exports at present, representing around 40 per cent of the total in 2004.

Figure 5.8: Portuguese manufacturing exports by technological intensity (shares as a percentage of total exports)



(a) Main four technological categories

(b) Main four sectors in Portuguese exports

Sources: CEPII - CHELEM database and authors' calculations.

On the contrary, a very strong increase of MHT exports has occurred: its share in total Portuguese manufacturing exports rose from around 13 per cent in 1980 to more than 30 per cent in 2004. In particular, there was a strong increase of the export share of "Motor vehicles, trailers and semi-trailers" in the second half of the nineties. This evolution was largely influenced by increases in the export capacity resulting from the entry into operation of industrial production units associated with FDI projects in that period. However, in the following years there was stabilization of the share of this sub-sector in total exports.

The share of MLT and HT sectors in total Portuguese exports also increased over the last decades, but to a much lesser extent than the MHT sector. In HT products, all sub-sectors increased their export share since 1980, but the highest increase took place in "Radio, TV and communications equipment", reaching 5.5 per cent of total exports in 2004. In MLT exports, the major increase occurred in "Rubber and plastics products", which accounts for around 3.5 per cent of total Portuguese manufacturing exports in 2004.

Although over the last decades, the Portuguese export structure underwent major changes, such developments must be placed in perspective against the world, which has also changed dramatically over the same period. In broad terms, the Portuguese manufacturing export structure converged towards the world average. This can be illustrated by the evolution of the sectoral Balassa indices included in Table 5.1. Portuguese export shares above the world average showed a general downward movement and export shares below the world average tended to increase. The most striking exception is the HT sector: the Balassa index of this sector remained at very low levels, pointing to the maintenance of a strong comparative disadvantage of the Portuguese economy in these products.

All Balassa indices higher than 1 are highlighted in Table 5.1. According to this methodology, Portugal reveals a sustained and clear comparative advantage in the broad LT sector since 1967. The sub-sectors of "Textiles, textile products, leather and footwear" and "Wood, pulp, paper and printed products" have rather high Balassa indices during the entire period. The MLT sub-sector of "Other non-metallic mineral products" shows also high specialization coefficients over the last forty years, with an increase since the eighties.

In the most recent period and despite the changes that occurred over the past decades, the export structure of Portugal still differs substantially from the world average. The proportion of the LT sec-

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Table 5.1: Relative export specialization of the Portuguese economy, Balassa index

	67-69	70-74	75-79	80-84	85-89	90-94	95-99	00-04
High-technology products	0.4	0.7	0.7	0.6	0.4	0.3	0.3	0.4
Aircraft and spacecraft	0.1	0.1	0.1	0.2	0.1	0.1	0.1	0.3
Pharmaceuticals	0.9	0.9	0.7	0.7	0.5	0.3	0.3	0.4
Office, accounting and computing machinery	0.2	0.7	0.6	0.6	0.2	0.1	0.1	0.3
Radio, TV and communications equipment	0.6	1.2	1.1	1.0	0.6	0.6	0.6	0.6
Medical, precision and optical instruments	0.1	0.3	0.4	0.3	0.2	0.2	0.3	0.3
Medium-high-technology products	0.3	0.4	0.4	0.4	0.5	0.6	0.8	0.9
Other electrical machinery and apparatus	0.5	0.8	0.7	0.5	0.8	1.3	1.5	1.2
Motor vehicles, trailers and semi-trailers	0.0	0.0	0.1	0.3	0.5	0.6	1.2	1.3
Chemicals excl. pharmaceuticals	0.6	0.7	0.6	0.7	0.6	0.5	0.4	0.5
Railroad equipment and other transport equip.	0.5	0.7	0.4	0.4	0.3	0.4	0.8	0.7
Other machinery and equipment	0.2	0.2	0.3	0.3	0.3	0.4	0.4	0.6
Medium-low-technology products	0.4	0.4	0.5	0.6	0.6	0.7	0.8	0.9
Coke, refined petroleum prod. and nuclear fuel	0.3	0.5	0.3	0.7	0.6	0.9	0.7	0.6
Rubber and plastics products	0.7	0.6	0.3	0.3	0.5	0.6	0.8	1.1
Other non-metallic mineral products	1.8	1.6	1.5	1.7	2.2	2.7	2.6	2.6
Building and repairing of ships and boats	0.1	0.4	0.7	0.5	0.8	0.5	0.4	0.3
Basic metals	0.2	0.1	0.3	0.2	0.2	0.2	0.2	0.5
Fabricated metal products, excl. machinery	0.9	0.9	0.8	0.9	0.8	0.9	1.0	1.3
Low-technology products	2.5	2.4	2.6	2.5	2.5	2.4	2.1	2.0
Other manufacturing and recycling	2.2	1.8	0.8	0.9	0.6	0.7	0.7	0.9
Wood, pulp, paper and printed products	2.2	2.5	3.3	3.1	2.8	2.2	2.1	2.3
Food products, beverages and tobacco	2.1	1.6	1.6	1.2	1.0	0.9	0.9	1.1
Textiles, textile products, leather and footwear	3.3	3.5	3.9	4.0	4.4	4.3	3.7	3.1

Sources: CEPPII - CHELEM database and authors' calculations.

tor is still twice the world average, especially concentrated in “Textiles, textile products, leather and footwear” and in “Wood, pulp, paper and printed products”, which include cork products, where Portugal has a particularly high export market share.²⁵ The strong specialization of Portuguese exports in LT products is not surprising as it is in line with the relative endowment of productive factors of the economy. In the MHT and MLT sectors, the Balassa index remains below 1 but the difference with the world average is not very significant and has been decreasing over the last two decades. In the most recent period, Portuguese exports are relatively more specialized than the world average in some MLT sub-sectors, like “Other non-metallic mineral products”, and, less importantly, “Fabricated metal products, excluding machinery” and “Rubber and plastics products”. Portuguese exports also reveal a comparative advantage

²⁵Regarding products of wood, articles of cork, straw and plaiting materials (ISIC 2029), almost 11 per cent of total world exports have their origin in Portugal, compared with a share in total world manufacturing exports of around 0.5 per cent in 2004.

in some MHT sub-sectors in the recent periods, namely “Motor vehicles, trailers and semi-trailers” and “Other electrical machinery and apparatus”. As regards HT products, the difference with the world export structure is considerable: the high-tech export share in Portugal is less than one half the world average, with all sub-sectors revealing very low indices.

The analysis of the Portuguese relative export structure can be further enhanced with a direct comparison with those of Spain, Greece and Ireland (Figure 5.9). In the LT broad sector, the main features can be summarized as: (i) Portugal has the highest specialization coefficient during most of the sample, although in a downward path since the mid-eighties; (ii) the path of Greece is very similar to the Portuguese one since the mid-eighties; (iii) Spain has the lowest index until the nineties, being the only country evidencing an upward trend in the last decade; (iv) having started with a Balassa index almost identical to the Portuguese one, Ireland has the sharpest downward trend during the whole period and ends up with the lowest index in this sector.

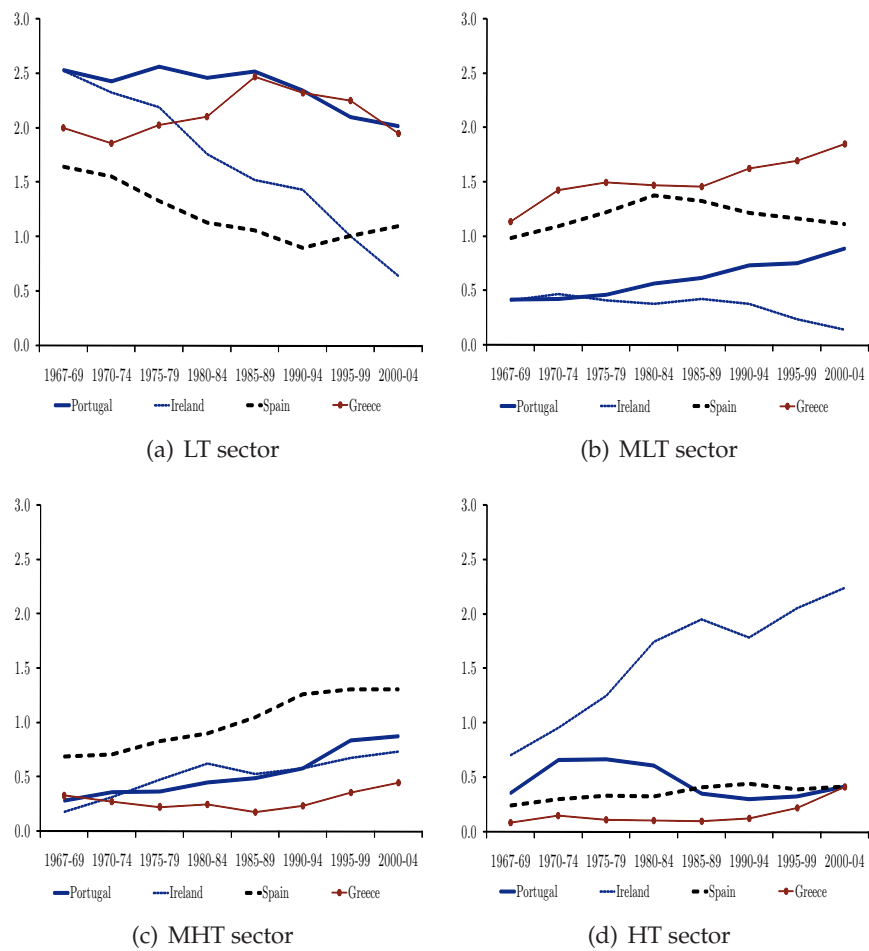
In the MLT sector, Figure 5.9(b) reveals that (i) Greece is the country more specialized in this sector during the whole period, evidencing an upward trend since the mid-eighties; (ii) the specialization coefficient of Spain has been decreasing in the last twenty years; (iii) Portuguese indices increase over the whole sample, leading to a smaller gap with Spain in the most recent period; (iv) on the contrary, Ireland shows again a decreasing trend and has the lowest coefficient over the last three decades.

In general, the four countries tended to increase their specialization in the MHT sector over time, with the exception of Greece until the eighties (Figure 5.9(c)). Moreover, the Balassa indices were rather close among Portugal, Ireland and Greece in the beginning of the sample. Spain has the largest share of MHT exports over the whole period.

In the HT sector, Portugal, Spain and Greece show a high resemblance over the entire sample period, always with coefficients below 1. Portugal had a slightly higher specialization index than Spain and Greece until the mid-eighties, but that difference disappeared in the most recent period. On the contrary, Ireland stands out by its substantial and increasing share of HT exports, which represent almost 60 per cent of total Irish manufacturing exports in 2004 (around 11 per cent in Portugal).

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Figure 5.9: Balassa indices by technological intensity

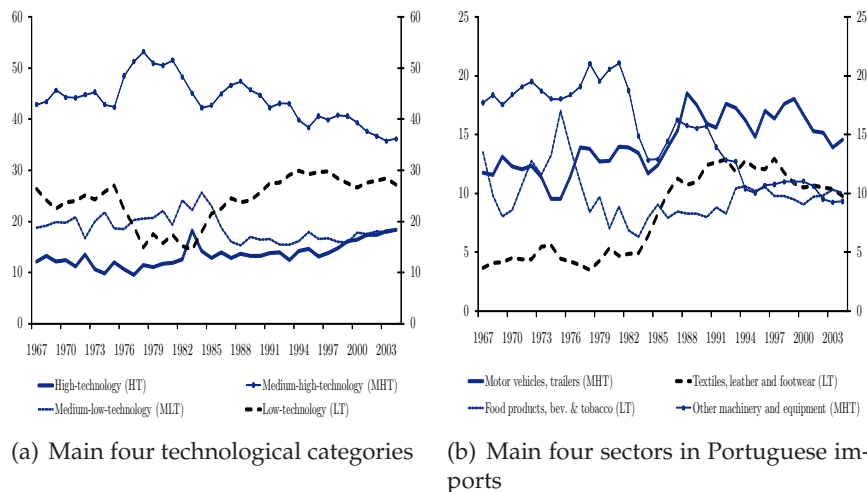


Sources: CEPII - CHELEM database and authors' calculations.

5.5.3 Portuguese import specialization

The structure of Portuguese manufacturing imports experienced important changes over the last decades (Figure 5.10). Since the eighties, there was a decline of import share of MHT and, to a lesser extent, MLT sectors, while the shares in total manufacturing imports of LT and HT sectors increased. Amador et al. (2007a) also found that differences between Portugal and other benchmark countries in the import structure are less pronounced than in the export side, which may reflect relative consumption preferences that are broadly similar between these countries.

Figure 5.10: Portuguese manufacturing imports by technological intensity (shares as a percentage of total imports)



Sources: CEPII - CHELEM database and authors' calculations.

The share of the MHT sector in total Portuguese manufacturing imports declined from more than 50 per cent in 1980 to around 36 per cent in 2004. In spite of this decrease, it is still the most significant sector in Portuguese manufacturing imports during the whole period. The reduction of the MHT import share reflected mainly the substantial decline of the share of "Other machinery and equipment" since the eighties (Figure 5.10(b)). There was also a steady decrease of the share of "Chemicals excluding pharmaceuticals" in total manufacturing imports. On the contrary, there was an increase of imports of "Motor vehicles, trailers and semi-trailers", which is the most important sub-sector at this breakdown level, with an im-

port share of 14.5 per cent in 2004.

The second most relevant sector in Portuguese imports is the LT sector, accounting for around 27 per cent of total imports in 2004. The increase of the import share of this sector was especially marked in the mid-eighties, stabilizing afterwards. In particular, there was a strong increase of the import share of “Textiles, textile products, leather and footwear”, from 5.3 per cent in 1980 to 9.8 per cent in 2004 (Figure 5.10(b)).

The share of the MLT sector in total Portuguese imports declined to 18.4 per cent in 2004. At present, the most important MLT sub-sector is still “Basic metals”, in spite of the reduction of its import share since the eighties, representing almost 7 per cent of total Portuguese imports.

The import proportion of the HT sector increased to 18.3 per cent in 2004, with the increase being mostly concentrated in the last ten years. The higher import share of this sector resulted chiefly from the increase of imports of “Radio, TV and communications equipment”, but there was also an increase in the import shares of “Office, accounting and computing machinery” and “Pharmaceuticals”.

5.6 Intra-industry trade

Intra-industry trade is not dominant in Portugal but it has been increasing, mostly in vertically differentiated goods.

Intra-industry trade (IIT) can be defined as the existence of simultaneous exports and imports within industries. These simultaneous trade flows can be either associated with a specialization along quality ranges (IIT in vertically differentiated products) or with a specialization in varieties (IIT in similar, horizontally differentiated products). This section analyses the evolution of Portuguese IIT over the 1995-2004 period, on a bilateral basis and with a very detailed product breakdown.

5.6.1 Methodology and data

According to the methodology proposed by Fontagné and Freudenberg (1997), trade at the elementary level will be classified either as inter-industry or as IIT, according to:

$$\frac{\min(X_{di}, M_{di})}{\max(X_{di}, M_{di})} < 0.1, \quad (5.10)$$

where X_{di} are exports of product i to country d and M_{di} are imports of product i from country d in period t . If the value of the minority flow (for example, imports) represents less than 10 per cent of the majority flow (exports in this case), then equation (5.10) holds and both bilateral flows are considered as inter-industry trade. Otherwise, total trade of product i with partner d is classified as IIT and will be broken down into VIIT or HIIT using the range of relative unit values.

If the difference in unit values is below a given threshold, goods are considered of the same quality, otherwise they are considered to be vertically differentiated, that is:

$$\frac{1}{1 + \alpha} \leq \frac{UVX_{di}}{UVM_{di}} \leq 1 + \alpha, \quad (5.11)$$

if the unit value of exports of product i to partner d , UVX_{di} , and the unit value of imports of product i from partner d , UVM_{di} , do not differ by more than the dispersion factor α , then equation (5.11) holds and trade of product i with partner d is considered to be differentiated horizontally. If the export and import unit values differ by more than α per cent, trade of product i with partner d is considered to be differentiated vertically. In this case, two situations can happen. Either the unit value of exports is relatively high in comparison with the unit value of imports, that is $\frac{UVX_{di}}{UVM_{di}} > 1 + \alpha$, or the unit value of exports is relatively low compared with the unit value of imports, that is $\frac{UVX_{di}}{UVM_{di}} < \frac{1}{1 + \alpha}$. The first case is usually denominated as superior VIIT or high-quality VIIT and relates to situations where exports are of higher quality than imports. It can also include trade resulting from international fragmentation within the same product category, with exports involving final goods and imports involving intermediate products. In turn, the second case is usually called as inferior VIIT or low-quality VIIT and comprises situations where imports are of higher quality than exports. Again, international fragmentation can generate trade classified as inferior VIIT, if imports involve final goods and exports concern intermediates classified in the same product category. As discussed in Ando (2006), the international fragmentation of production can also result in HIIT, if the local value added to the imported parts and components is small, leading to minor unit-value differentials between imports and exports. In addition, the existence of transfer pricing within multinational firms can, to some extent, influence the relative trade prices of

intermediate and final products involved in international fragmentation activities.

The international trade data used in this section comes from the CEPII-BACI database, which provides reconciled bilateral values (in US dollars), quantities and unit values at the 6-digit of the 1992 Harmonized System (HS) classification, including over 5000 products and 200 trade partners in each year. In this database, the detailed import and export values are fully comparable in a FOB-FOB basis since CIF costs were estimated and removed from CIF import values.²⁶ The sample period starts in 1995 and ends in 2004. We computed the IIT indexes at the 6-digit level in bilateral terms and then aggregated the data using the CEPII classification by transformation level, which includes five different stages of production: primary goods, processed goods, parts and components, investment goods and consumption goods.

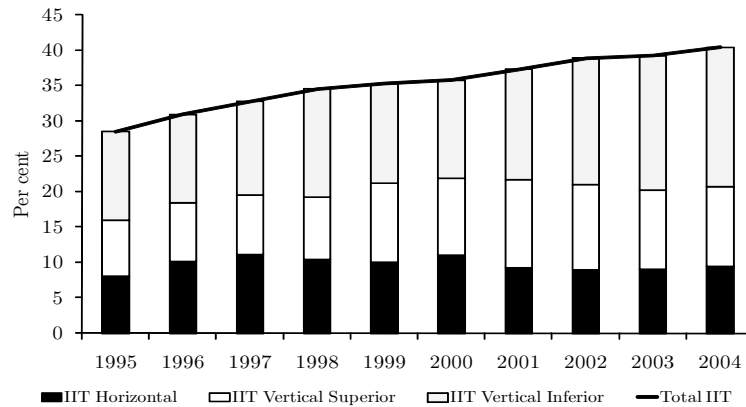
5.6.2 Main results

Figure 5.11 display the evolution of the share of IIT in total Portuguese trade flows from 1995 to 2004 with a dispersion factor of 15 per cent to disentangle VIIT and HIIT. The main type of trade in the Portuguese economy is still inter-industry trade, but IIT rose steadily over this decade. From 1995 to 2004, there was an increase in the share of IIT in Portuguese international trade from 28.5 to 40.4 per cent. The results indicate that a significant and growing share of Portuguese IIT is trade of vertically differentiated products, while the share of HIIT has remained remarkably stable over this period. VIIT in Portugal mainly involves products with export prices lower than import prices, accounting for 60.2 per cent of total VIIT in the 2000-04 period. This fact is in line with the “quality ladder” results of VIIT models that indicate that less advanced economies tend to export lower-price qualities of a given product. The increase in the share of VIIT in total Portuguese trade is more evident since 2000 and results mainly from the growth of inferior VIIT.

Fontagné and Freudenberg (2002) examine the evolution of IIT in the EU and conclude that this type of trade is particularly relevant for intra-EU trade, and this is true for each individual country. However, there are important differences among Member-States concerning the relative importance of IIT in 1999. In intra-EU trade, IIT is most pronounced for France, Germany, Belgium and the UK.

²⁶See Gaulier and Zignago (2008) for a detailed description of this database.

Figure 5.11: Evolution of intra-industry trade in Portugal
(as a percentage of total trade)



Sources: CEPII - BACI database and authors' calculations.

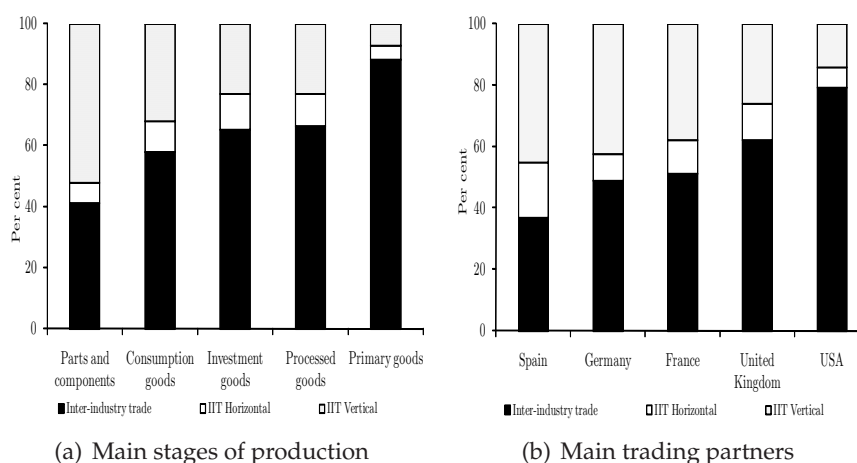
In contrast, trade is mainly inter-industry for small periphery countries, like Greece, Finland and Portugal. They also find that there was an increase of the share of IIT in intra-EU trade between 1980 and 1999 in all member countries with the exception of Greece and Ireland. For most EU countries, the observed increase in IIT is almost entirely due to VIIT, which is in line with the results that we found for Portugal.

We now examine more in detail the Portuguese IIT over the 1995-2004 period, using a sectoral breakdown by transformation level and a geographical breakdown. As expected, trade in primary goods is overwhelmingly dominated by inter-industry trade over the 1995-2004 period, corresponding to around 90 per cent of the total (Figure 5.12(a)). On the contrary, the highest share of IIT in Portugal is found in parts and components, representing 58.8 of total trade in these products in the 2000-04 period. A significant proportion of Portuguese trade in consumption goods is also IIT (42.0 per cent in the most recent period). IIT represents also more than 30 per cent of trade in intermediate processed goods and in investment goods in 2000-04. In all stages of production, Portuguese IIT is higher in vertically than in horizontally differentiated products and there was an increase of VIIT in all categories over this decade. These facts are especially striking in parts and components, where VIIT accounts for 52.2 per cent of total trade in 2000-04 and grew strongly in the last five years. In all stages of production, Portuguese VIIT mainly involves products with export prices lower than import prices, as

would be expected since VIIT in Portugal is mostly carried out with higher-income European countries.

We now turn to the geographical analysis of the different types of trade over the 1995-2004 period. Portuguese IIT is mostly done with other advanced EU countries. In fact, the EU aggregate comprising the other 14 initial Member-States (EU15) represents 76 per cent of total Portuguese trade in the 2000-04 period, but it accounts for 93.8 per cent of Portuguese IIT. The highest bilateral indices of IIT in the 2000-04 period refer to the two major Portuguese trading partners (Spain and Germany) and result mainly from IIT in vertically differentiated products (Figure 5.12(b)). The results for Spain are especially striking, as total IIT and VIIT account for 63.2 per cent and 45.2 per cent respectively of bilateral trade in the 2000-04 period. On the contrary, the share of IIT in total bilateral trade with the US is around 20 per cent. The strongest increase in VIIT as a share of total bilateral trade over this period occurred in Portuguese trade with Germany, which rose from 27.2 per cent in 1995-99 to 42.4 per cent in 2000-04. Portuguese VIIT with all these trading partners involves mainly products with export prices lower than import prices.

Figure 5.12: Portuguese IIT by main stages of production and trading partners, 2000-04
(as a percentage of total trade of each stage/trading partner)



Sources: CEPII - BACI database and authors' calculations.

5.7 Fragmentation and vertical specialization

Vertical specialization has been increasing in Portugal, mostly reflecting developments in the machinery and transport equipment sectors.

International production sharing has always been part of international trade as countries import manufactured goods to be incorporated in their exports (see Yeats (1998) for a discussion). Nevertheless, the reduction of transport and communication costs, the sharp increase in technological progress and the removal of political and economic barriers to trade exponentiated the opportunities for the internationalization of production, as firms began to offshore many tasks that were previously considered non-tradable. Overall, this new paradigm, named by Baldwin (2006) as the “second unbundling”, led to the surge of new countries in world trade depending heavily on outsourced tasks in industries where potential gains of specialization are higher. In geographical terms, this phenomenon has been largely reported in emerging market economies in South East Asia.

In this section, we use the concept of vertical specialization developed in Hummels et al. (2001) to quantify the international vertical linkages for the Portuguese economy from 1980 to 2002. It is relevant to analyse the experience of the Portuguese economy in the context of vertical specialization. This new paradigm in world production implies the reconfiguration of the patterns of comparative advantages and FDI flows, making it important to assess the ability of the Portuguese economy to adjust to that reality. In addition, it is important to identify which sectors are more vertically integrated, as well as the geographical links of this phenomenon. On a policy perspective, it is not possible to directly link the degree of vertical specialization with the economic performance of a country. In fact, a country can perform well in international markets if it is competitive in productions where vertical specialization is not adopted. The participation in vertical specialization activities stands as an opportunity but the underlying determinants of comparative advantages remain crucial for economic growth.

It is difficult to establish a direct link between the trade pattern of a country and isolated economic aspects. Nevertheless, in the context of the international fragmentation of production, it is acknowledged that there is a strong role played by transnational corporations and their FDI decisions. In this respect, the Portuguese

economy benefited from significant net FDI inflows following the EEC accession in 1986 and until the mid-nineties, with important impacts in the productive structure of economy. The increase of vertical specialization observed in the Portuguese economy in the last decades has mostly occurred in sectors where FDI inflows were important. However, since the mid-nineties, there was a decline of the relevance of this type of investment in terms of net inflows in the Portuguese economy. The same pattern is observable in other EU15 economies, suggesting some reorientation of these flows, namely to Central and Eastern European countries.

5.7.1 Methodology and data

Vertical specialization in trade involves the use of imported intermediate goods in the production of goods that are exported. Following Hummels et al. (2001), vertical specialization activities (from now on referred as VS) in sector j can be defined as the contribution of imported inputs to exports of sector j , in nominal terms, and total VS for country s is the sum of VS across all sectors, that is:

$$VS_s = \sum_{j=1}^I VS_j = \sum_{j=1}^I \sum_{i=1}^I \left(\frac{M_{ij} X_j}{Y_j} \right) = \sum_{j=1}^I \sum_{i=1}^I a_{ij}^M X_j, \quad (5.12)$$

where M_{ij} is the value of imported intermediate product i absorbed by sector j , Y_j is the gross output of sector j , X_j is the value of exports of sector j , and a_{ij}^M is the proportion of imported input i used to produce output Y_j , for $i, j = 1, 2, \dots, I$. So VS_j measures the total amount of imported intermediate goods required to produce the exports of sector j , i.e, the import content of exports or the foreign value included in the exports of sector j .

In order to facilitate the analysis, it is useful to calculate VS as a percentage of total exports of the country. The VS share of total exports in country s is given by:

$$\frac{VS_s}{X_s} = \sum_{j=1}^I \left[\left(\sum_{i=1}^I a_{ij}^M \right) \left(\frac{X_j}{X_s} \right) \right], \quad (5.13)$$

where X_s are total exports of country s . Using equation (5.13), total VS share of a country can be decomposed in an export-weighted average of sectoral VS export shares.

One basic element of the methodology proposed by Hummels et al. (2001) is the utilization of Input-Output (I-O) matrices to identify the value of the different intermediates used in the production of each sector, specifically the value of those that are imported. The advantages of the utilization of I-O matrices are twofold. Firstly, the value of imported intermediates is properly accounted, in the sense that the I-O approach bases the classification on the use of the good and not on its characteristics. In fact, there are many examples of goods that can be either final or intermediate, thus strong arbitrariness is introduced when the classification is based on the product characteristics. Secondly, the I-O approach allows for a sectoral breakdown of the VS measure. The drawback is that the I-O matrix does not differentiate the import content of a good that is domestically consumed from that of a good that is exported. Therefore, the assumption that the import content is similar in the two cases is necessary.

The VS measure presented in equation (5.13) can be expressed in a matrix form as:

$$\frac{VS_s}{X_s} = \frac{uA^MX}{X_s}, \quad (5.14)$$

where u is a $1 \times I$ vector of ones, I is the number of sectors, A^M is the $I \times I$ imports direct input coefficient matrix, whose representative element is a_{ij}^M , X is a $I \times 1$ vector of exports of each sector j and X_s is the sum of exports across the I sectors.

Equation (5.14) measures the value of imported inputs that are used *directly* in total exports, i.e., the direct import content of total exports. Nevertheless, the existence of an I-O matrix makes it possible to consider also the imported inputs used *indirectly* in exports. It is clear that one intermediate good can be initially imported as input of one domestic sector and the production of this latter sector is then used as an intermediate in a second domestic sector and so on, until the imported product is finally embodied in a good that is exported. Therefore, the original intermediate import may circulate in the domestic economy across several sectors before there is an exported good. This indirect effect can only be considered if an I-O matrix is used and it is captured by:

$$\frac{\widetilde{VS}_s}{X_s} = \frac{uA^M[I_I - A^D]^{-1}X}{X_s}, \quad (5.15)$$

where I_I is the $I \times I$ identity matrix and A^D is the $I \times I$ matrix of domestic technical coefficients. The term $[I_I - A^D]^{-1}$ is the Leontief

inverse matrix that can be written as the sum of a converging infinite geometric series with common ratio A^D . Thus, the numerator of equation (5.15) measures the total imported inputs, iterated over the economy's production structure, that are needed to produce the total exports. Dividing this by the amount of total exports of a country yields the total (direct and indirect) share of exports attributable to imported inputs, i.e., the total VS share of a country. Therefore, equation (5.15) is the measure elected to compute the importance of VS activities.

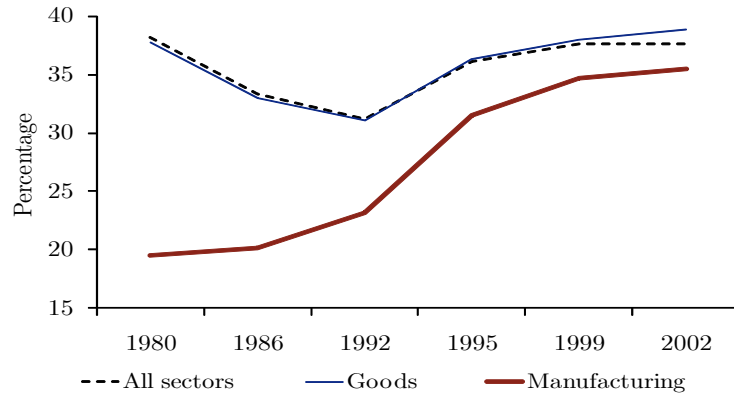
The data used for Portugal comes from the national accounts for the years 1980, 1986, 1990, 1995, 1999 and 2002. The 1995 and 1999 I-O tables were released by the Department of Foresight and Planning and International Affairs (DPP) based on data from Statistics Portugal (INE), while the remaining tables are from INE.²⁷ All I-O tables are available at current basic prices, and hence not affected by taxes. The sectoral breakdown includes 29 sectors/products arranged according to the 2-digits Statistical Classification of Economic Activities (NACE) rev.2 breakdown level. We focus the analysis on the Portuguese manufacturing industry excluding the energy sector, which further reduces the number of sectors considered to 13.

5.7.2 Main results

The computation of the VS index presented in equation (5.15) for the Portuguese economy reveals an increase in the importance of these activities, in particular since the mid-nineties (Figure 5.13). Nevertheless, the results differ depending on the set of sectors considered. When all 29 goods and services sectors are included, the measure of VS is higher than when the analysis is restricted to the 13 manufacturing sectors. In addition, the path of the VS measure in these two situations is also different, especially before 1992. Considering the 29 sectors, the VS measure decreases from 38.1 per cent in 1980 to 31.2 per cent in 1992, increasing afterwards to 37.6 per cent in 2002. When the analysis is restricted to the manufacturing industry, it increases from 19.5 per cent to 23.1 per cent from 1980 to 1992, rising sharply afterwards to 35.5 per cent in 2002. Furthermore, the consideration of the 16 sectors associated with the production of goods gives results very similar to those obtained with all 29 goods and services sectors.

²⁷See Reis and Rua (2006) for further details on the Portuguese I-O tables used.

Figure 5.13: Vertical specialization in Portugal
(as a share of total exports)



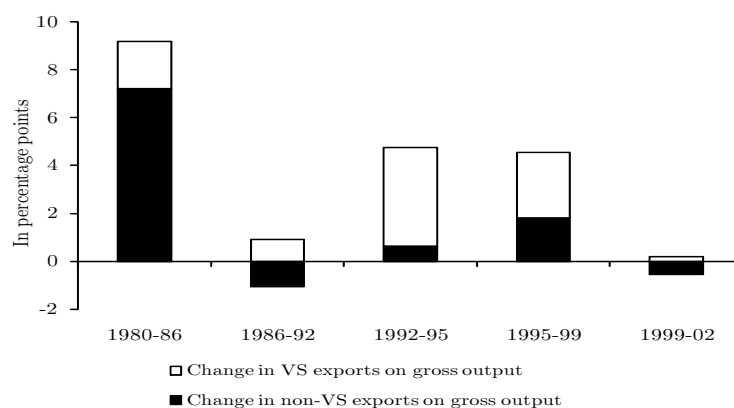
Sources: DPP, INE and authors' calculations.

Two main qualifications are worth underlining in this exercise. Firstly, the difference between restricting to the manufacturing industry or to the total goods sector is associated with the "Fuel and mining" sector. Imports of this sector are important inputs in almost all other sectors and Portugal is a net importer of energetic products. In addition, energy prices have fluctuated significantly in the last decades. High energy prices explain the high VS share in 1980 and subsequent falling prices explain the reduction in the VS share in 1986 and 1992. Secondly, VS activities in Portugal do not appear significant in the 13 services sectors, as illustrated by the small difference between the VS measure of all 29 sectors and the VS measure of the goods sector.

One interesting calculation suggested by Hummels et al. (2001) is to identify how much does VS trade account for the growth of the total exports to gross output ratio. From 1980 to 2002, the export-gross output ratio in the Portuguese manufacturing industry increased by 18.0 percentage points (p.p.) and VS exports as a percentage of gross output increased by 9.9 p.p. in the same period, thus accounting for 55.2 per cent of the change in the total export-gross output ratio. In particular, the increase in the total manufacturing exports to gross output ratio in the nineties was mostly due to the rise of VS exports (Figure 5.14).

Between 1980 and 2002, the majority of Portuguese manufacturing sectors showed a growing propensity to use imported inputs in the production of exported products (Figure 5.15(a)). The only two

Figure 5.14: Contributions to the change of the export-gross output ratio (Portuguese manufacturing industry)

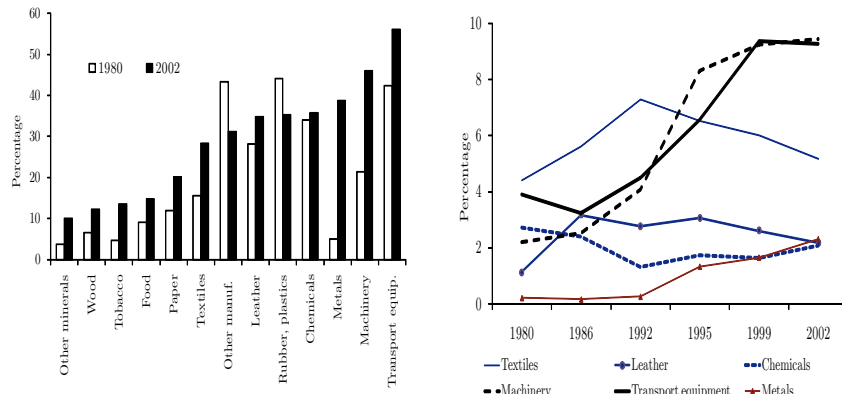


Sources: DPP, INE and authors' calculations.

exceptions are "Rubber and plastics" and "Other manufacturing". The most striking increase in VS intensity occurred in the "Metals" sector, increasing from 5.1 per cent in 1980 to 38.7 per cent of the sector's exports in 2002. The VS export share in the "Transport equipment" and "Machinery" sectors also increased strongly. In the more recent period, substantial differences in terms of import content exist between sectors. In 2002, the extent of VS was particularly high in the "Transport equipment" sector, amounting to 56.1 per cent of the sector's exports, well above the average for the manufacturing industry. Due to its highly standardized production process, this is a sector in which VS opportunities tend to be exploited. The same happens in the Portuguese "Machinery" sector that records an import content of exports of 46.0 per cent in 2002. A second group of industries that displays a high import content of exports includes those that heavily use primary goods, like "Metals", "Chemicals" and also "Rubber and plastics".

The contribution of each sector to total Portuguese VS share of manufacturing exports depends not only on each sector's VS intensity but also on the share of each sector in total exports. As shown in subsection 5.5.2, sectoral shares in total Portuguese exports have been changing over time, in part as a consequence of the evolution of the pattern of comparative advantages. Figure 5.15(b) includes the main sectoral contributions to the Portuguese VS share. The higher contributions in 2002 are given by the "Machinery" and "Transport

Figure 5.15: Portuguese vertical specialization by main manufacturing sectors



(a) As a share of total exports of each sector (b) As a share of total manufacturing exports

Sources: DPP, INE and authors' calculations.

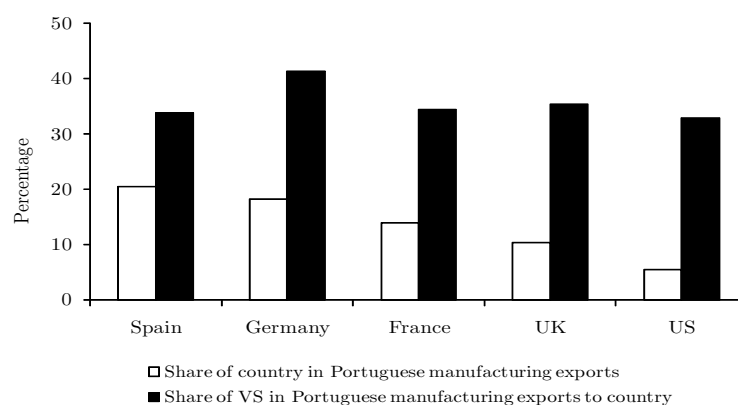
Equipment" sectors, whose intermediate imports reach, in each case, values above 9 per cent of total Portuguese manufacturing exports. The path of the "Machinery" sector is particularly striking, with its contribution rising 7.3 p.p. from 1980 to 2002. This increase is mainly concentrated between 1992 and 1995. The "Transport Equipment" sector also gives an important contribution in terms of VS in the most recent period, with the increases occurring mainly between 1992 and 1999 and coinciding with the settlement in Portugal of large FDI projects in the automobile sector, whose production is directed to exports and where the import content in output is significant. Conversely, the VS contribution of the "Textiles" sector increased until 1992 but lost some ground in recent periods, reflecting the decline in the share of this sector in total Portuguese manufacturing exports.

One interesting dimension to explore is the geographical orientation of Portuguese VS activities. In this section we selected the five main trading partners of Portugal in 2002 (Spain, Germany, France, UK and US) and the Intra-EU15 and Extra-EU15 blocks. The computation of the share of VS in Portuguese exports to each of these destinations uses the same sectoral import content coefficients for all countries, so the results should be interpreted carefully as they mostly reflect the different product composition of Portuguese ex-

ports by destination. The share of Portuguese VS manufacturing exports to each destination was computed for 2002 using nominal international trade data from INE. The results show that Germany, the second major destination of Portuguese manufacturing exports in 2002, is the country where Portuguese VS based trade is more important (Figure 5.16). In fact, 41.3 per cent of the value of Portuguese exports to Germany in 2002 is associated with imported intermediates. In the cases of Spain, France, UK, US, as well as the Intra-EU15 and Extra-EU15 blocks, the values are around 35 per cent in 2002.

As stated in subsection 5.2.4, the Hummels et al. (2001) approach is one of the methods to quantify international fragmentation activities. As explained above, the Hummels' measure shows an increase in Portuguese VS over the last decades, reaching a relatively high figure compared to other OECD countries. However, other economies have witnessed much stronger dynamics. More specifically, the results of a relative measure computed by Amador and Cabral (2008a) indicate that VS activities in the Portuguese economy have been increasing at a pace much lower than that of other countries, notably in East Asia, pointing to a more limited participation in international supply chains. In fact, Amador and Cabral (2008c) identified significant and growing VS activities in East Asia over the last two decades, with countries like Malaysia, Philippines, Singapore, Taiwan, South Korea and Hong Kong showing especially high indices. They also found that China stands out by the striking increase of VS-based trade since 2000.

Figure 5.16: Vertical specialization in Portuguese exports to main trading partners, 2002



Sources: DPP, INE and authors' calculations.

5.8 Portuguese exporting firms: Stylized facts

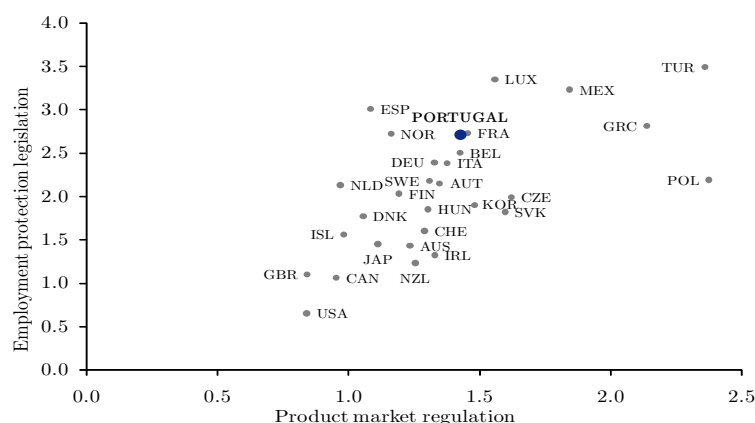
Multi-product and multi-destination firms are few but account for most of Portuguese exports. Changes in aggregate exports over time are mainly driven by the intensive margin but there is considerable amount of resource reallocation among and within firms.

The level of regulation in the product and labour markets conditions the flexibility of an economy in allocating resources across sectors and it tends to have an effect on the demography of firms. In spite of some improvements in recent years, the Portuguese economy is still distant from the best-performing countries in terms of product and labour market regulations (Figure 5.17).²⁸ Nevertheless, there seems to be a relatively high level of reallocation within Portuguese exporters. This is observed in terms of the decision to participate in export markets and in terms of decisions involving the product and destination margins. Product and destination switching reflects firms' adjustments to changes in the underlying conditions and, at the macro level, it can contribute to a more efficient resource allocation.

The study of the Portuguese product/destination export mix is made possible by the use of a new database that includes all export transactions by firms located in Portugal from 1996 to 2005. The data comes from customs forms in the case of extra-EU trade and from the Intrastat form in the case of intra-EU trade and it aggregates to total Portuguese exports as reported by INE. We include only transactions that are worth more than 100 euro in the analysis, but the data still covers, on average, more than 99 per cent of total exports and about 75 per cent of the exporters. Our sample includes 13,632 exporters in 1996, exporting 1,117 products to 200 countries (Table 5.2).²⁹ At the aggregate level, the number of Portuguese exporters

²⁸The overall product market regulation indicator is a weighted average of the administrative regulation and economic regulation indicators. The synthetic indicator of the strictness of employment protection legislation (EPL) is a weighted average of EPL indicators for regular contracts, temporary contracts and collective dismissals. Each of these indicators can range from 0 to 6, with higher values representing stricter regulation. The calculation of these indicators is explained in Wölfl, Wanner, Kozluk and Nicoletti (2009) and in Venn (2009), respectively.

²⁹We define a product as a four-digit Harmonized System (HS) category. An example of a product (out of 1,241 possible products) is the HS 2002 subheading 9201 "Pianos, including automatic pianos; harpsichords and other keyboard stringed instruments". All our main results qualitatively hold at the six-digit HS level as well.

Figure 5.17: Employment protection legislation and product market regulation, 2008

Source: OECD.

Notes: Data on employment protection legislation for France and Portugal refers to 2009. Data on product market regulation for Greece, Ireland and Slovakia refers to 2003.

has increased considerably (around 55 per cent) between 1996 and 2005, while both the number of products exported and the number of destinations served has remained stable over this period.

Table 5.2: Summary statistics, selected years

Aggregate-level	1996	1999	2002	2005
Number of Exporters	13,632	15,054	17,199	21,127
Number of Products	1,117	1,118	1,126	1,143
Number of Destinations	200	201	207	202
Export (Million Euro)	18,876	22,984	27,345	29,620

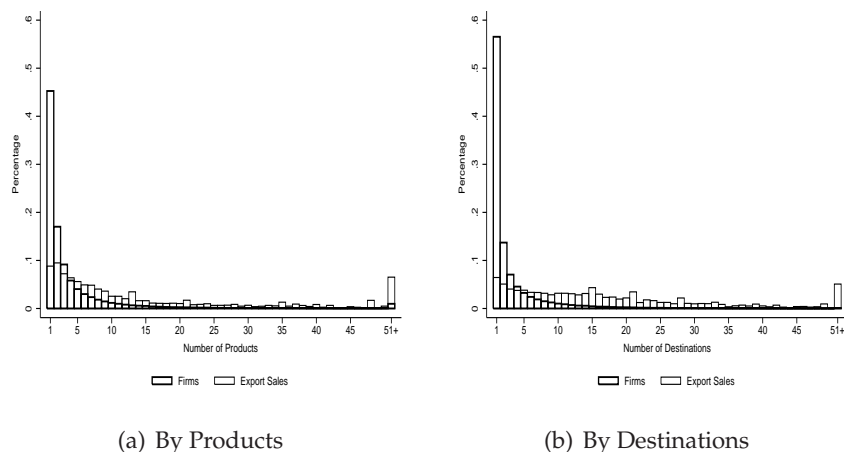
Sources: INE and authors' calculations.

The use of more disaggregated data allows us to outline several characteristics of Portuguese exporters that are not shown in Table 5.2. The first result is that the great majority of exporters has a very limited scope in terms of destinations served and products sold, but then accounts for a very small fraction of total Portuguese exports.

As Figure 5.18 shows, the distribution of exporters in terms of the number of destinations reached and products sold is very concentrated around small values. About 70 per cent of the exporters serve only one or two foreign destinations and about 62 per cent of

the exporters sell abroad one or two products only. These types of exporters account for a very small fraction of total Portuguese exports. Figure 5.18 shows that firms exporting to one or two destinations account for no more than 12 per cent of total exports while firms exporting one or two products account for no more than 19 per cent of total exports. Bernard et al. (2006) show that US exporters are similarly characterized: about 42 per cent of them produce only one product, accounting for 0.4 per cent of total exports and about 64 per cent of them export to one foreign country only, accounting for 3.3 per cent of total exports.³⁰ Iacovone and Javorcik (2008) show that about 80 per cent of Mexican exporters sell abroad only one or two products but, differently from the US and Portuguese firms, they account for about two thirds of total Mexican exports.³¹

Figure 5.18: Distributions of exporters and exports by firms' product and destination scope



Sources: INE and authors' calculations.

The next result we emphasize is that product and destination scopes do not grow hand in hand in the cross-section of Portuguese exporters. The correlation coefficient between the number of products exported and the number of destination reached is about 21 per cent in the pooled 1996-2005 sample.

To analyse this issue in more detail Table 5.3 reports the joint

³⁰Bernard et al. (2006), using data from the 2000 Link-Longitudinal Firm Trade Transaction Database, define a product as a ten-digit HS category.

³¹Iacovone and Javorcik (2008) use data from the Encuesta Industrial Mensual, containing approximately 3,396 products.

Table 5.3: Joint distribution of firms over number of products and countries (average 1996-2005)

Destinations	Products						Total
	1	2	3	4-10	11-50	51+	
1	36.0	8.3	3.5	6.0	2.4	0.4	56.6
2	3.9	3.6	1.7	3.1	1.2	0.2	13.7
3	1.8	1.3	1.0	2.1	0.7	0.1	7.0
4-10	3.1	3.0	2.1	5.6	1.9	0.2	15.9
11-50	0.5	0.8	0.8	2.9	1.6	0.1	6.7
51+	0.0	0.0	0.0	0.0	0.1	0.0	0.1
Total	45.3	17.0	9.1	19.7	7.9	1.0	100.0

Sources: INE and authors' calculations.

Table 5.4: Joint distribution of exports over number of products and countries (average 1996-2005)

Destinations	Products						Total
	1	2	3	4-10	11-50	51+	
1	2.4	1.0	0.5	1.3	1.1	0.2	6.5
2	1.1	0.7	0.5	1.6	1.0	0.1	5.0
3	0.8	0.7	0.5	1.4	0.6	0.1	4.1
4-10	2.5	3.9	2.3	9.3	5.0	0.3	23.3
11-50	2.0	3.2	3.3	16.3	26.5	4.7	56.0
51+	0.0	0.1	0.2	2.1	1.9	1.0	5.3
Total	8.9	9.7	9.2	31.8	35.2	5.4	100.0

Sources: INE and authors' calculations.

distribution of exporters over the number of products and the number of destinations. The joint distribution shows that multi-product exporters are not always multi-destination and vice-versa. For instance, among firms that ship 4 to 10 products, one out of three is reaching one destination only, while 20 per cent of the firms that sell to a number of countries between 4 and 10, export one product only. Table 5.4 reports the joint distribution of exports over the number of products and the number of destinations. Firms that sell multiple products to multiple countries are very relevant in terms of total Portuguese exports: the subset of firms selling from 4 to 50 products to 4 to 50 countries account for 57.1 per cent of total exports over the

1996-2005 period.

Figure 5.18 showed that the distribution of exports along both the destination scope and the product scope are much more spread out than the corresponding distributions relative to the number of exporters. The distribution of exports along the destination scope is actually very flat in the [1, 15] range while, at the same time, the distribution of exporters is steadily decreasing. The size of exporters (in terms of export sales) therefore seems to significantly grow more than proportionally with respect to the number of destinations they export to. Next, we examine how the variation in the number of exported products and destinations reached translates into variation in exports across firms and over time. We analyse this issue in two steps and show that the intensive margin is responsible for most of the variation of exports.³² Nonetheless, the extensive margin is substantial and has increased in importance over time. We decompose total exports of firm ω in a year t , denoted $x_{\omega t}$, into the number of destinations reached $n_{\omega t}^d$ and the average sales per destination $\bar{x}_{\omega t}^d$. In logarithms:

$$\ln x_{\omega t} = \ln n_{\omega t}^d + \ln \bar{x}_{\omega t}^d. \quad (5.16)$$

A regression of $\ln n_{\omega t}^d$ against $\ln x_{\omega t}$ then tells us the extent to which variation in firm exports is accounted for by variation in the number of destinations served.

Table 5.5 presents the results of the associated regression, across firms for the 11 years of the sample. The coefficient of 0.21 indicates that the intensive margin is the dominant one. Firms that export more sell more to each destination with an elasticity of 0.79 so that the number of destinations reached only increases with an elasticity of 0.21. A robustness test regression that includes both firm and year fixed effects gives a similar result with an estimate of 0.15. Moreover, the coefficients of the year dummies (not reported but always significant at 99 per cent) increase over time, showing an expansion in the number of destinations reached even after controlling for the growth in firms' exports. We can make one further step in the analysis to understand to what extent the growth in average sales per destination reflects exports of a higher number of products as opposed to higher

³²The intensive margin refers to the degree (intensity) to which a resource is used, while the extensive margin refers to the range of resources utilized. For example, total exports may grow either through the change of exports of existing products to existing destinations (intensive margin along each dimension) or through the change in the range of products and destinations served (extensive margin along each dimension).

Table 5.5: Dependent variable: $\ln n_{\omega t}^d$

Regressor	Base	Robustness
Intercept	-1.61 (.01)	-.90 (.02)
$\ln x_{\omega t}$.21 (.00)	.15 (.00)
Firm Effects	No	Yes
Year Effects	No	Yes
R^2	.49	.89
N.obs.	169229	169229

Sources: INE and authors' calculations.

Note: Standard errors in parentheses.

average sales per product. We can decompose average sales per destination $\bar{x}_{\omega t}^d$ in a year t into the number of products shipped $n_{\omega t}^i$ and the average sales per product-destination $\bar{x}_{\omega t}^{di}$. In logarithms:

$$\ln \bar{x}_{\omega t}^d = \ln n_{\omega t}^i + \ln \bar{x}_{\omega t}^{di}. \quad (5.17)$$

A regression of $\ln n_{\omega t}^i$ against $\ln \bar{x}_{\omega t}^d$ then tells us the extent to which variation in firm average sales per destination is accounted for by variation in the number of products sold.

Table 5.6: Dependent variable: $\ln n_{\omega t}^i$

Regressor	Base	Robustness
Intercept	-.98 (.01)	-1.07 (.02)
$\ln \bar{x}_{\omega t}^d$.18 (.00)	.20 (.00)
Firm Effects	No	Yes
Year Effects	No	Yes
R^2	.20	.83
N.obs.	169229	169229

Sources: INE and authors' calculations.

Note: Standard errors in parentheses.

Table 5.6 presents the results of the associated regression, across firms for the 11 years of the sample. The coefficient of 0.18 indicates that the intensive margin is again the dominant one. Firms that

export more to each destination sell more of each product in each destination with an elasticity of 0.82 so that the number of products shipped only increases with an elasticity of 0.18. In this case, a regression that includes both firm and year fixed effects gives a slightly higher estimate of 0.20. Again, the coefficients of the year dummies considerably grow over time showing an expansion in the number of products shipped even after controlling for the growth in firms' exports per destination.

Amador and Opromolla (2008) extend this analysis by showing that the exporters' portfolio is very diversified in terms of sectors and product tenure and it is frequently modified over time. They show that the fraction of multi-product (multi-destinations) exporters that modify their product (destination) portfolio is higher than 80 per cent (86 per cent) and is increasing in the portfolio scope. Given the importance of product and destination switching we study how these extensive margins (together with the firm decision to start exporting) affect aggregate Portuguese export over time. The growth of total Portuguese exports can be decomposed in the contribution of three distinct decisions: the decision to entry/stay/exit the export market, the decision of where to export and the decision of what to export. We begin by decomposing the total export growth in the contribution of "entering", "exiting" and "continuing" exporters, that is, in the extensive and intensive margin at the aggregate level along the firm dimension:

$$\Delta X_t = \sum_{\omega \in \Omega_N} \Delta x_{\omega t} + \sum_{\omega \in \Omega_X} \Delta x_{\omega t} + \sum_{\omega \in \Omega_C} \Delta x_{\omega t}, \quad (5.18)$$

where ΔX_t is the change in Portuguese exports from year $t - 1$ to year t , $\Delta x_{\omega t}$ is the change in firm ω exports from year $t - 1$ to year t , Ω_N is the set of entering exporters, Ω_X is the set of exiting exporters and Ω_C is the set of continuing exporters.

The next step is to break down the change in exports of continuing exporters into "added destinations" (AD), "dropped destinations" (DD) and "continuing destinations" (CD), that is, in the extensive and intensive margin at the firm level along the destination dimension:

$$\sum_{\omega \in \Omega_C} \Delta x_{\omega t} = \sum_{d \in AD} \Delta x_{d\omega t} + \sum_{d \in DD} \Delta x_{d\omega t} + \sum_{d \in CD} \Delta x_{d\omega t}, \quad (5.19)$$

where $\Delta x_{d\omega t}$ is the change in firm ω exports to destination d from year $t - 1$ to year t . Finally, we consider the product that firms

choose to export in “continuing” destinations. We distinguish between “added” (*AP*), “dropped” (*DP*) and “continuing” (*CP*) products exported by (continuing) firms in “continuing destinations”, that is, the extensive and intensive margin at the firm level along the product dimension:

$$\sum_{d \in CD} \Delta x_{d\omega t} = \sum_{i \in AP} \Delta x_{di\omega t} + \sum_{i \in DP} \Delta x_{di\omega t} + \sum_{i \in CP} \Delta x_{di\omega t}, \quad (5.20)$$

where $\Delta x_{di\omega t}$ is the change in firm ω exports of product i to destination d from year $t - 1$ to year t . Substituting, we can express the change in Portuguese exports as:

$$\begin{aligned} \Delta X_t = & \sum_{\omega \in N} \Delta x_{\omega t} + \sum_{\omega \in X} \Delta x_{\omega t} + \sum_{d \in AD} \Delta x_{d\omega t} + \\ & \sum_{d \in DD} \Delta x_{d\omega t} + \left[\sum_{i \in AP} \Delta x_{di\omega t} + \sum_{i \in DP} \Delta x_{di\omega t} + \sum_{i \in CP} \Delta x_{di\omega t} \right] \end{aligned} \quad (5.21)$$

Table 5.7 shows the result of this decomposition in terms of the growth rate of total exports.³³ The annual change of total Portuguese exports is mainly driven by the change in exports of continuing firms. This was the main force underlying the reduction in nominal export growth in 2001 and 2005. Over the 1998-2005 period, the average nominal growth of total Portuguese exports was 4.4 per cent and the net extensive margin along the firm dimension represented 1.3 percentage points. Eaton, Eslava, Kugler and Tybout (2008), using Colombian data for the 1997-2005 period, also find that continuing firms drive most of the year to year fluctuations in aggregate exports.

As regards destinations, the intensive margin, i.e., the export growth in continuing destinations, accounts for almost all of the intensive margin along the firm dimension. However, the gross contribution of added destinations and dropped destinations among continuing firms is quite high. Therefore, there is a high level of reallocation of economic resources associated with destination switching.

³³We compute the percentage change of total exports by dividing each term in equation (5.21) by $(X_t + X_{t-1})/2$, i.e., the average between exports in t and $t - 1$. As Eaton, Eslava, Kugler and Tybout (2008) explain, computing growth as the change between two dates divided by the average level in the two dates rather than the change divided by the level in the earlier date has at least two advantages: (i) x percent growth followed by $-x$ percent growth returns us to the same level and (ii) values close to zero in the first year have a less extreme effect on the growth rate.

The decomposition at the product level also offers some interesting patterns. The role of continuing products in continuing destinations is crucial to explain the changes in Portuguese exports. The net contribution of added and dropped products at continuing firms is usually small but the gross level of churning is very high. Bernard et al. (2006), looking at growth of real U.S. output during the 1972-1997 period, also find that U.S. firms, selling on the domestic market, alter their productive capacity far more than reflected by their net contribution to total growth.

Table 5.7: Decomposition of Portuguese export growth, extensive and intensive margins (1998-2005)

	Aggregate Growth	Net	Extensive Margin		Intensive Margin
			Entering Firms	Exiting Firms	Cont Firms
1998	6.2	0.9	2.2	-1.3	5.3
1999	3.4	1.7	3.1	-1.4	1.7
2000	13.6	2.9	4.1	-1.2	10.7
2001	2.0	-0.3	2.9	-3.2	2.4
2002	1.8	1.3	2.9	-1.6	0.5
2003	2.4	0.9	2.5	-1.6	1.6
2004	5.2	2.3	3.6	-1.3	2.9
2005	0.4	0.8	3.0	-2.2	-0.5
Average	4.4	1.3	3.1	-1.8	3.1
	Cont Firms	Net	Extensive Margin		Intensive Margin
			Added Dest	Dropped Dest	Cont Dest
1998	5.3	0.8	3.9	-3.1	4.5
1999	1.7	0.0	2.9	-2.9	1.8
2000	10.7	0.0	2.9	-2.9	10.7
2001	2.4	-1.5	2.7	-4.2	3.9
2002	0.5	0.2	3.0	-2.8	0.3
2003	1.6	0.9	3.3	-2.4	0.7
2004	2.9	0.9	3.1	-2.2	2.0
2005	-0.5	-1.2	2.8	-4.0	0.8
Average	3.1	0.0	3.1	-3.1	3.1
	Cont Dest	Net	Extensive Margin		Intensive Margin
			Added Prod	Dropped Prod	Cont Prod
1998	4.5	-0.1	3.2	-3.3	4.6
1999	1.8	0.2	2.9	-2.7	1.6
2000	10.7	0.8	3.7	-2.9	10.0
2001	3.9	0.6	3.0	-2.4	3.4
2002	0.3	-0.4	2.8	-3.2	0.7
2003	0.7	0.4	3.6	-3.2	0.3
2004	2.0	1.1	3.9	-2.8	1.0
2005	0.8	-0.7	2.4	-3.1	1.4
Average	3.1	0.2	3.2	-3.0	2.9

Sources: INE and authors' calculations.

5.9 Conclusions

This chapter reviews complementary dimensions of Portuguese international trade. It adopts a fully empirical approach, computing and discussing trade measures suggested by the empirical international trade literature. The overall conclusion is that Portuguese international trade has accompanied trends observed in other European countries, notably higher openness, some movement towards exports of medium-high and high technology goods, increase in intra-industry trade (trade in similar goods), growing importance of vertical specialization activities, mainly in machinery and transport equipment, and important activity within exporting firms in terms of product and destination switching. Nevertheless, in some of these dimensions, the changes have been less pronounced in Portugal than in other countries, namely in terms of the importance of high-value products in total exports and of the participation in international supply chains. Finally, the evolution of Portuguese market shares in world exports over the last twenty years has been disappointing.

Over the last decades, Portugal and the other EU15 Cohesion countries significantly increased their trade openness. In Ireland, however, this trend is stronger, leading to a degree of openness substantially higher than that of Portugal, Spain and Greece, which are currently clustered around similar figures.

Taking an export performance based perspective, the average annual increase of total market share of Portuguese exports was only 0.1 per cent, in nominal terms, over the last twenty years. Even more disappointing paths were visible in Greece and Italy over this period, especially when contrasting with the substantial gains of market share observed in Ireland and Spain, whose shares in world exports had an average annual growth of more than 2 per cent from 1987 to 2006. The market share effect was dominant in explaining the total change in Portuguese export shares, though it was not uniform over time. Two distinct sub-periods are identifiable: one period of effective gains of export share from 1987 to 1996 and one period from 1997 to 2006 with significant effective losses of market share. This path is broadly interpretable in the light of the structural transformations and macroeconomic developments of the Portuguese economy and of the major changes in the international environment. The relative product composition and geographical distribution of Portuguese exports had on average a negative impact

on the evolution of total market shares over the last twenty years.

The evolution of the Portuguese international trade pattern over the last decades bears similarities with those observed in Spain and Greece. Conversely, Ireland shows remarkable differences in many aspects of the evolution of its pattern of international specialization. One striking feature of the evolution of Portuguese international trade was the continuous decline in the export share of low-tech products over the last decades. This decline was particularly sharp in "Food products, beverages and tobacco" and "Textiles, textile products, leather and footwear". On the contrary, the share of medium-high-tech exports, in particular "Motor vehicles, trailers and semi-trailers", increased markedly in the second half of the nineties reflecting large FDI projects, but stabilized in the most recent years. Over the past decades, these four countries have become less specialized in low-tech products, as measured by the evolution of the Balassa (1965) index of revealed comparative advantage. However, Portugal still has a clear specialization in this type of products in the most recent period, in line with the relative endowment of productive factors of the economy. In what concerns medium-low-tech products, there was an increase of its export share in Portugal, although still showing a Balassa index below one. As for medium-high-tech products, all countries increased their export share, though Spain shows values substantially higher than those of the other countries. In the case of high-tech products, Portugal, Spain and Greece show a high resemblance over the entire period, always with coefficients below one. The specialization index in Portugal remained broadly similar over time, pointing to the maintenance of a strong comparative disadvantage of the Portuguese economy in these products. On the contrary, Ireland stands out by its substantial and increasing share of high-tech exports.

Inter-industry trade is still the dominant type of trade in the Portuguese economy, but our results point to a substantial increase of intra-industry trade, in particular since 2000. Intra-industry trade in Portugal, measured with the Fontagné-Freudenberg method, accounts for around 40 per cent of total trade in 2004 (28.5 per cent in 1995). As observed in other EU countries, this increase mostly resulted from the growth of trade in vertically differentiated goods. Vertical intra-industry trade in Portugal is mainly of products with export prices lower than import prices, representing around 60 per cent of the total. This fact is in line with the "quality ladder" results of vertical intra-industry trade models that indicate that less

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advanced economies tend to export lower-price qualities of a given product. Portuguese vertical intra-industry trade is mostly done with higher-income European countries, with Spain and Germany showing the highest proportions of this type of trade. When products are grouped according to their transformation level, Portuguese trade in primary goods is dominated by inter-industry trade, corresponding to around 90 per cent of the total. On the contrary, the highest share of intra-industry trade in Portugal is found in parts and components, representing more than 50 per cent of total trade in these products since 1998. This fact points to the existence of some intra-industry trade associated with the international fragmentation of production.

Over the last decades, the nature of trade has changed, as countries increasingly specialize in producing particular stages of a good, rather than making a complete good from start to finish. Following the methodology suggested by Hummels et al. (2001) to measure vertical specialization in terms of the total imported intermediate content of exports, we conclude that in Portugal such activities are important in the manufacturing industry, but not in the services sector. In the Portuguese manufacturing industry, vertical specialization based trade has been steadily increasing and it accounts for 35.5 per cent of total exports in 2002, up from 19.5 per cent in 1980. Our results also indicate that vertical specialization in trade plays an important role in explaining the increase in Portuguese manufacturing export share of gross output.

Two groups of industries in Portugal show a especially high import content of exports in 2002. The first group includes some technology intensive industries with standardized production processes, like the "Transport equipment" and "Machinery" sectors. In particular, vertical specialization in the "Transport equipment" sector exceeds 55 per cent of the sector's exports in 2002. The second group of sectors with significant shares of vertical specialization trade are more basic industries, like "Metals" and "Chemicals". We complemented the input-output analysis with data from international trade to get some indications on the geographic orientation of Portuguese vertical specialization in 2002. We found that vertical specialization activities are especially relevant in Portuguese trade with Germany.

Expansion into foreign markets is a major decision for a firm, involving choices about which markets to select in terms of products and countries. We find that multi-product and multi-destination firms are crucial in explaining the dynamics of exports over time.

In particular, firms that export four or more products and operate in four or more destinations are responsible for over two thirds of total Portuguese exports. We break down the aggregate export growth along three margins: firms, destinations and products. We show that while continuing firms exporting continuing products to continuing destinations are fundamental in explaining the growth rate of exports, the contribution of gross entry and exit of both destinations and products is, in absolute value, as important as the gross entry and exit of firms.

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Chapter 6

Public finances in Portugal: trends and challenges

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6.1 Introduction

Public finance imbalances have been one of the main topics of public debate in Portugal, in the last decades. After the accession to the European Community their correction was always identified as a central issue in the context of successive medium-term macroeconomic and fiscal adjustment programmes. The Maastricht Treaty in 1992 stepped up the urgency of achieving sound public finances, as fiscal criteria played a key role in the decision on the participation of Member-states in the euro area. In 1997, the Stability and Growth Pact established the multilateral fiscal supervision framework, focused on avoiding excessive deficits and achieving fiscal positions close to balance or in surplus, in the medium-term. Portugal fulfilled the convergence criteria in 1997, but showed some difficulty in complying with the discipline and objectives of the Pact afterwards.

The rationale for fiscal soundness underlying the Stability and Growth Pact relies on its crucial contribution to the medium and long-term stability of the economy. Its role in the context of short term macroeconomic developments, by reducing uncertainty of private agents and providing room for the full operation of automatic

stabilisers, also assumes a particular relevance. These arguments are even stronger in a monetary union like the euro area, characterised by a single monetary policy and national fiscal policies. Indeed, in this context, the incentives for sound fiscal behaviour may be reduced, whereas budgetary imbalances in one country may negatively affect other countries.

The Pact was subject to an important revision in 2005. Beyond enforcing the prescription of avoiding excessive deficits, it put an explicit emphasis on sustainability issues, in particular throughout the definition of the medium-term objectives (MTO's). Additionally, it was accepted that the pursuance of sound public finances, in conjunction with other structural policies, calls for a comprehensive assessment of the quality of public finances.

This chapter uses the analytical framework currently underlying the multilateral supervision of national fiscal policies in the EU to explain the key features of budgetary developments in Portugal from 1986 to 2008 and assess fiscal sustainability having in mind, *inter alia*, the prospects for the growth of ageing-related expenditure in the next decades.

Efficiency gains in the public provision of services may have significant spillovers to the overall economic performance, as well as give an important contribution to enhance fiscal sustainability. This issue is generally addressed by comparing the resources employed with the quantity/quality of the services publicly provided. This chapter presents an overview of efficiency issues in the sectors of health care and education, which, in the Portuguese case, assume special relevance, mostly arising from the fact that spending in these areas has been rising significantly and represents an important share of general government overall expenditure. Therefore, if efficiency gains in the public provision of health and education services materialise, they create room for manoeuvre in the fiscal consolidation effort.

Given the labour-intensive nature of the public production process of services, in particular in these two areas, improving the efficiency in human resources management is an important way to achieve those gains. This chapter also focuses on this issue, namely by addressing factors determining wages and incentives faced by public employees, using the benchmark provided by the private sector.

6.2 The main trends in public finance developments in Portugal in the 1986-2008 period¹

6.2.1 Overview

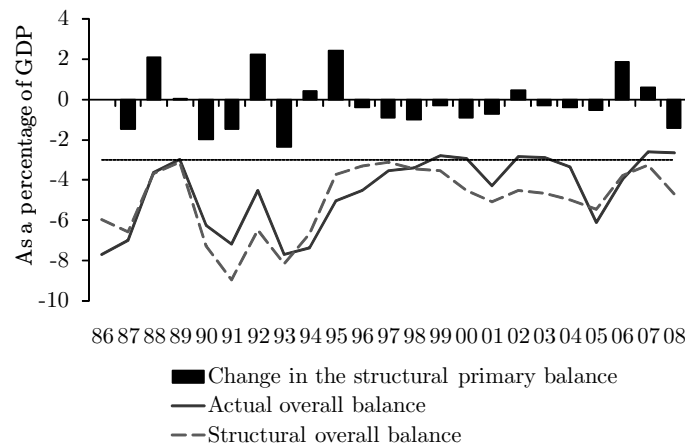
In 1986, the year of Portugal's accession to the European Community, the general government deficit according to the accounting rules currently in force (ESA95, base year 2000)² amounted to almost 8 per cent of GDP. In 2008, it reached a figure close to 2.5 per cent of GDP (Figure 6.1). A remarkable feature is that it never fell significantly below the reference value of 3 per cent of GDP³, even after the coming into force of the Stability and Growth Pact in 1999.

The breakdown of the annual change in the overall balance into the contributions of the cyclical component, interest payments, temporary measures and the structural primary balance provides a useful insight into the dynamics of the Portuguese public finances in the last two decades. In the first years of the period, until 1989, there was a sharp decline in the deficit, explained to a large extent by a positive contribution of the cycle and the decline of interest payments (Figure 6.2). From 1990 to 1993 the trend reversed owing to an adverse conjunction of expansionary discretionary measures (with the exception of 1992, when a major change of VAT rates led to a substantial increase of tax receipts), a hike in interest expenditure in the first years and a sudden deterioration in cyclical conditions in 1993. From 1994 onwards the deficit again showed a declining trend as a consequence of a sustained fall in interest payments related with nominal convergence, enhanced in a first phase by discretionary measures and after-

¹This section is based on Cunha and Braz (2009). This paper includes more details on data compilation, cyclical adjustment methodology, definition of temporary measures and the reforms of the taxation and public pension systems. Other useful references are Cunha and Neves (1995), Cunha and Braz (2003), Cunha and Braz (2006a) and Cunha and Braz (2006b).

²The elaboration of this section is based on the general government accounts compiled by the National Statistical Institute according to the 1995 European System of National and Regional Accounts (ESA95). There is, however, a structural break in the data from 1994 to 1995 since the accounts for the 1986-1994 period are only available according to the procedures of base year 1995 and in the following period (1995-2008) base year 2000 was used. This methodological change had a minor impact on the deficit, but it implied an increase of both revenue and expenditure ratios by around 0.8 p.p. of GDP.

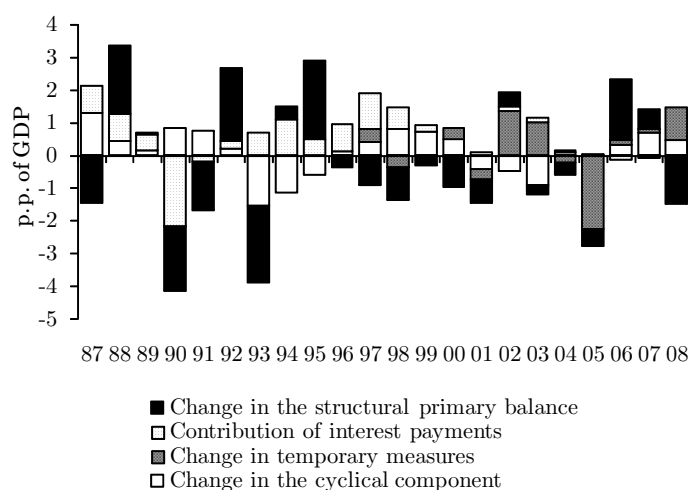
³Reference value for the deficit in the context of the excessive deficit procedure. It is an important part of the criteria for euro accession and plays a key role in the framework of the Stability and Growth Pact.

Figure 6.1: Actual and structural overall balance and fiscal policy stance

Sources: INE and authors' calculations.

wards by particularly favourable cyclical effects, partially resulting from the composition of expenditure and income. This context, decisively marked by the impact of disinflation, allowed the fulfilment of the fiscal criteria for the accession to the euro, according to the national accounting rules then in force (ESA79), in spite of a continuous deterioration of the structural primary balance.

In 2001, already in the framework of the Stability and Growth Pact, as interest expenditure stabilised as a ratio to GDP and economic activity decelerated, the deficit exceeded 4 per cent of GDP. The policy package adopted in 2002 in order to correct the excessive deficit included a hike in the standard rate of VAT and several short-term measures, in particular a sizeable amount of temporary measures. The structural measures on the expenditure side implemented from 2002 to 2004 were relevant in some major areas such as the public employees' pension system, the National Health Service and the financing of municipalities, but failed to tackle the reforms of public administration and the private sector social security system, instrumental to curb the growth of current primary expenditure. As a consequence, the accumulated change in the structural primary balance over this period was close to zero and in 2003 and 2004 even deteriorated. Portugal only avoided incurring on excessive deficit once again through the recourse to temporary measures, which exceeded 2 per cent of GDP in both of these two years.

Figure 6.2: Breakdown of the change in the overall balance

Sources: INE and authors' calculations.

The political decision of not using temporary measures in 2005 unveiled the magnitude of the deterioration of the structural fiscal position. For the second time in a short period, Portugal was subject to an excessive deficit procedure. The fiscal adjustment programme delineated to correct it put a strong emphasis on structural reforms to dampen expenditure growth, in particular compensation of employees and pension outlays. In 2006 and 2007, however, the considerable improvement in the structural balance mostly relied on short-term measures on the expenditure side (which permanently affect the expenditure level, but only transitorily have an impact on its rate of change as, for example, the freezing of automatic progressions in careers, the limitation of early retirements, changes in unemployment benefits procedures and reduction in expenditure on co-financed medicines), several tax increases, in particular in indirect taxation, and the ongoing process of stepping up the effectiveness of tax administration. Following the 2007 fiscal outcome the excessive deficit procedure was closed, one year ahead of the deadline initially set down. The structural deficit was, however, still significantly above the medium-term objective (MTO), set at that time at 0.5 per cent of GDP.⁴

⁴The MTO's are currently under revision in the context of the establishment of

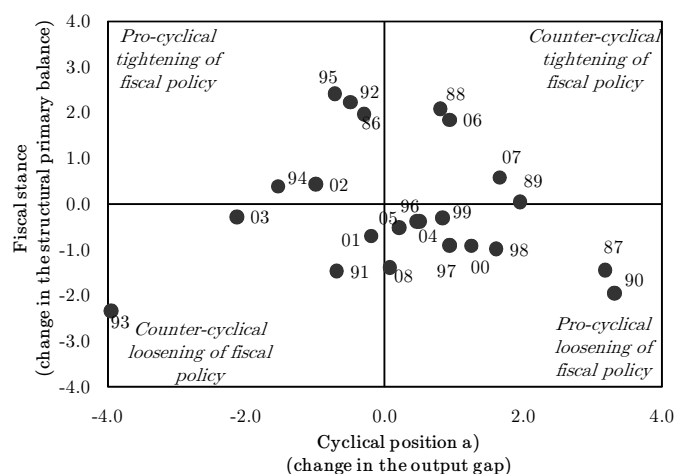
The most prominent features of 2008 fiscal developments were the return to the pattern of increasing structural primary current expenditure ratio to trend GDP, after a halt in 2006 and 2007, and the magnitude of temporary measures, which were decisive to avoid a deficit of more than 3 per cent of GDP. This evolution raises the issue of how important were the measures implemented in 2005-2007 in curbing expenditure growth, which is crucial to achieve a sound fiscal position.

Looking at the fiscal outcomes over the period 1986-2008, it should be highlighted that the fiscal stance, measured by the change in the cyclically adjusted primary balance excluding the impact of temporary measures, loosened in most years, in general procyclically (Figure 6.3). In these conditions, it would have been possible to achieve a much sounder fiscal position without major strains. Additionally, it appears that the implementation of fiscal policy was far from optimal in terms of macroeconomic stabilization. Figure 6.4 shows the contributions of structural revenue and primary expenditure ratios to the annual change in the structural primary balance. In the years represented above the 45 degree line a loosening of the fiscal stance occurred, while the years below the line correspond to periods of tightening. The most common outcome was a simultaneous increase in both structural revenue and structural primary expenditure. For the period as a whole structural revenue and structural primary expenditure increased by 10.7 and 14.6 percentage points (p.p.) of nominal trend GDP.

The sizeable rise of the structural revenue and structural primary expenditure ratios appears as a peculiar feature of public finance developments in Portugal, contrasting with the general trends in the euro area (12).⁵ Table 6.1 clearly highlights that point for the years from 1995 to 2008, using the AMECO database. Indeed, while in this period cyclically adjusted revenue and primary expenditure increased by 3.7 and 5.4 p.p. of GDP in Portugal, they declined by 2.1 and 1.2 p.p. in the euro area (12). Figure 6.5 shows the gradual convergence of the cyclically adjusted primary current expenditure ratio in Portugal to the euro area (12) average from 1997 to 2005. It also illustrates the upward trend of the cyclically adjusted tax burden after

the appropriate criteria and modalities to take into account implicit liabilities (see Section 6.3).

⁵Comprising the first 12 participating countries, i.e., Austria, Belgium, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, Netherlands, Portugal and Spain.

Figure 6.3: Fiscal policy and cyclical position

Sources: INE and authors' calculations.

Note: a) The cyclical position of the economy is assessed by the change in the output gap which approximately represents the difference between the growth rates of GDP and trend GDP.

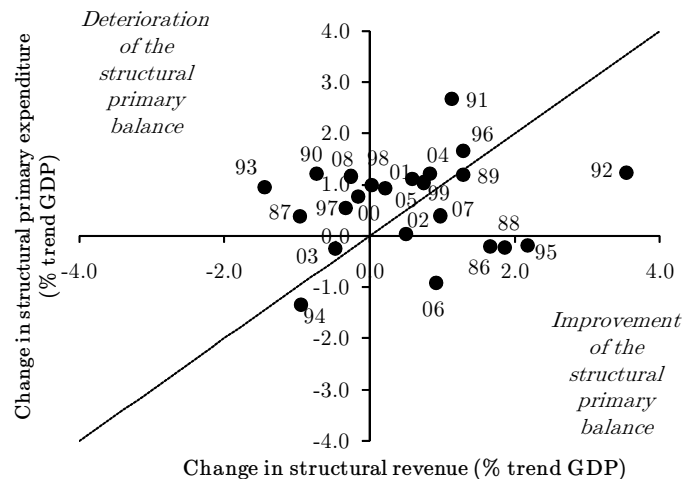
2001, approaching but staying below the euro area (12) average.

6.2.2 Revenue

As already highlighted, the increase of the structural revenue ratio to trend GDP was one of the driving forces of Portuguese public finances from 1986 to 2008, reaching a peak of 43.5 per cent in 2007. It predominantly reflected the rise in the tax burden.⁶ In the last years, tax and social contributions receipts exceeded 85 per cent of overall revenue. The sustained growth of the tax burden was possible after the reforms of direct taxation in 1989 and indirect taxation in 1986.⁷ Indeed, they laid down the foundation of a modern tax system, broadening the tax base and decreasing tax rates. As a consequence, tax-induced distortions in several key areas were reduced

⁶Includes receipts from taxes on income and wealth, taxes on production and imports and social contributions.

⁷The taxonomy of taxes in public accounts (direct or indirect) does not exactly match the national accounts categories (taxes on income and wealth and taxes on production and imports). For example, the taxes on real-estate and real-estate transactions are direct taxes in the public accounts, but in the national accounts are included in taxes on production and imports.

Figure 6.4: Change in structural revenue and structural primary expenditure

Sources: INE and authors' calculations.

Note: See footnote 2.

and the ability to raise revenue increased. Further, the system became potentially less vulnerable to tax evasion and fraud. After the reforms of direct and indirect taxation several other discretionary measures were adopted in order to fine tune the existing structure or execute active tax policy.

The increase of structural tax revenue from 1986 to 2008 was explained not only by discretionary measures, but also by several structural trends. The most relevant are: the long-term trend of consumption patterns towards a larger share of goods and services taxed at the standard rate of VAT; the structural evolution of the economy, in particular in the distribution sector, which led to a growing weight of medium and large companies more prone to fulfil tax obligations; the fast expansion of the general government wage bill; the sharp growth of pension expenditure of the public employees' subsystem, implying a parallel increase of the contributions required to finance it⁸; and the improvement in the effectiveness of

⁸ Actual contributions of general government entities as employers include not only the amounts resulting from the application to gross wages of the rates defined by law, whose scope and value has been gradually increased, but also the State transfer necessary to balance the system. As such, the growth of expenditure of

Table 6.1: Change in the main fiscal indicators in the 1995-2008 period: comparison with euro area developments

Percentage points of GDP	1995-2008	
	Portugal	Euro area (12)
Overall balance	2.4	3.1
Cyclical component	1.3	1.5
Cyclically adjusted overall balance	1.2	1.6
Interest expenditure	-2.9	-2.4
Cyclically adjusted primary balance	-1.7	-0.9
Cyclically adjusted total revenue	3.7	-2.1
Cyclically adjusted primary expenditure	5.4	-1.2
Public debt	5.3	-2.6

Source: European Commission (AMECO database).

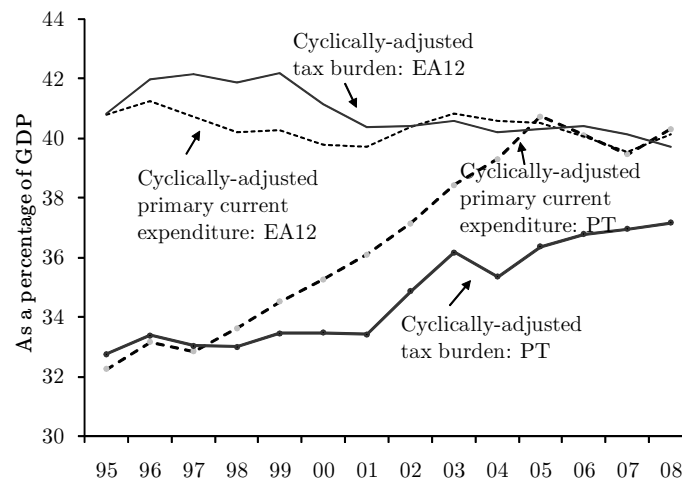
tax administration, in particular in the more recent period. On the contrary, the decline in nominal interest rates had a sizeable negative impact on the receipts of taxes on income. Overall, all main categories of the tax burden contributed to the rise of structural tax revenue (Figure 6.6).

The national accounts data show that as short a time ago as 1995, the tax burden in Portugal was much lower than the average for the euro area (12) (Table 6.2).⁹ In 2008, it still appears as a relatively low tax country when compared with the same group of countries although the gap has narrowed substantially, partly as a result of the rise in all major categories of taxes and social contributions in Portugal, as already mentioned. In terms of the composition of the tax burden, Portugal has a relatively high ratio of taxes on production and imports to GDP. The revenue from taxes on income and wealth

former public employees pensions in the past few years has contributed somewhat artificially to the increase in the tax burden in Portugal.

⁹Comparisons of the tax burden between countries may be distorted by several legal or institutional features. In this regard three issues should be highlighted. Firstly, the government may choose to pursue a certain goal through explicit expenditure, tax benefits or a combination of both. The first option will show a higher tax burden, everything else constant. Secondly, several items of expenditure, such as social transfers or interest on public debt may or may not be subject to taxation. For instance, in Portugal, unemployment benefits are exempt from income taxation, decreasing the tax burden recorded in national accounts relative to alternative arrangements. Finally, the treatment of social contributions in national accounts is not fully comparable between different countries, in particular in matters related to the public employees' pension system (see footnote 8).

Figure 6.5: Cyclically adjusted tax burden and primary current expenditure: comparison with euro area developments

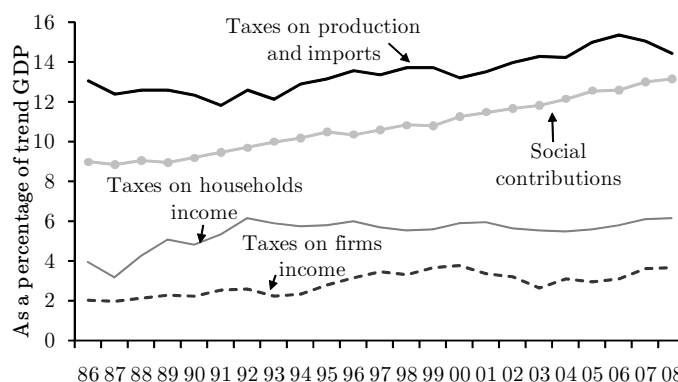


Source: European Commission (AMECO database).

Note: The concept of tax burden used by the European Commission includes taxes on production and imports paid to the EU budget and excludes imputed social contributions.

and social contributions is, on its turn, lower than the average in the context of the euro area (12).

Since 1989, most receipts from taxes on income and wealth paid by households are raised through personal income tax withholding schemes on labour income, pensions and interest. The net refunds related with the final settlement of the tax on the previous year's income are also an important factor behind yearly developments. The hike in its ratio to GDP in the first years after the 1989 reforms and its relative stability afterwards are noticeable. Four other points are worth mentioning. Firstly, final withholding tax on interest income declined substantially, in particular from 1992 to 1999. Secondly, the receipts from the taxation of public employees' wages recorded a buoyant growth until 2002 paralleling the swift expansion of the general government wage bill. Thirdly, discretionary tax measures had a significantly positive impact on revenue in 1995-1996, but afterwards do not appear to have had a major effect on the ratio of the amounts collected to trend GDP. Finally, the increased effectiveness of tax administration is the main factor underlying the slightly

Figure 6.6: Breakdown of the structural tax burden

Sources: INE and authors' calculations.

Note: All the values are cyclically adjusted and exclude the impact of temporary measures.

upward trend recorded in the last years.

After the 1989 reform, most revenue from the taxation of firms' income took the form of prepayments and the final settlement of the tax on the previous year income, in the context of the corporate income tax. The structural evolution of taxes on income and wealth paid by firms is presented in Figure 6.7. Three points should be highlighted. Firstly, the sharp rise of the receipts until 1997, partly explained by the evolution in profits of some of the main taxpayers and the growth of final withholding taxation. Secondly, successive rate reductions occurred whose impact on revenue has essentially materialised with a one year time lag. Finally, the upward trend in receipts over the last few years also results predominantly from the stepping up of tax administration.

As in the other Member-states of the EU, VAT is a major source of tax revenue. In the case of Portugal, as Figure 6.8 shows, other taxes on specific items of expenditure are also an important part of taxes on production and imports receipts. Looking at the developments in the 1986-2008 period, the most noticeable feature is that the rising trend of this item of revenue is basically explained by VAT, as a consequence of changes of rates, several structural developments in the economy and the stepping up of the effectiveness of tax administration. Whenever it was necessary to increase tax revenue, VAT

Table 6.2: Tax burden: comparison with euro area developments

As a percentage of GDP

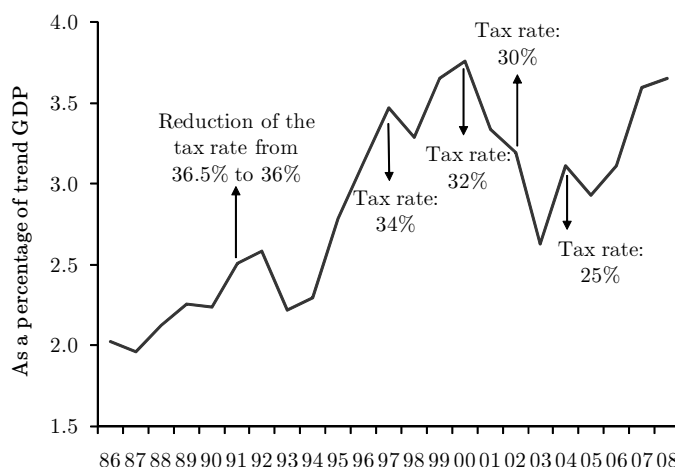
	Portugal		Euro area (12)	
	1995	2008	1995	2008
Tax burden	31.9	37.5	40.4	40.5
Taxes on income and wealth	8.4	9.9	11.1	12.3
Taxes on production and imports	13.0	14.6	12.2	12.9
Social contributions	10.5	13.0	17.0	15.3
<i>of which: actual social contributions</i>				
to the CGA subsystem	1.7	3.0	-	-
<i>of which: imputed social contributions</i>	0.8	1.0	1.4	1.1

Sources: European Commission (AMECO database) and authors' calculations.

was a key instrument. On the contrary, both the Tax on Oil Products and, to a lesser extent, the Tax on Vehicles Sales have since the last years of the nineties evidenced declining trends. In the first case, it is predominantly due to the increasing number of diesel cars, as the tax on diesel is lower than the tax on petrol, and the move to more fuel-efficient vehicles. These long-term trends are enhanced in periods of high fuel prices, through behavioural changes. Regarding the Tax on Vehicles Sales, the explanation relies, to a major extent, on the gradual deceleration of car sales, only partially offset by an upside quality effect.¹⁰ The relative reduction of other taxes on production and imports until 1994 is basically explained by the decrease in customs duties.

After the creation of a unified scheme in 1986, up to 2008, the contributions of the Social Security subsystem only recorded minor adjustments: regarding employment income, the employers' rate was reduced from 24.5 to 23.75 per cent in 1995, and self-employment contributions were increased in several steps. In the *Caixa Geral de Aposentações* (CGA) subsystem, the rate of employers' contributions was increased from 8 to 10 per cent of gross wages in 1994 and contributions of general government entities as employers were gradually introduced and increased. The upward trend in the Social Security subsystem receipts recorded since the second half of the nineties may be explained by an increase in self-employment contributions

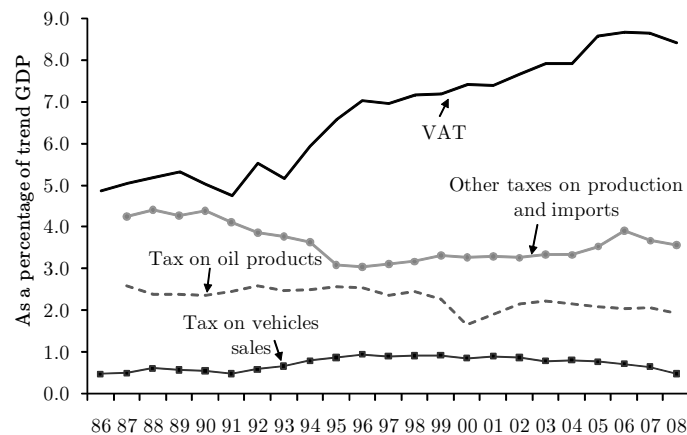
¹⁰The quality effect stems from the sale of vehicles belonging to different ranges concerning engine capacity and, more recently, pollution emissions subject, as such, to different rates in the context of this tax.

Figure 6.7: Structural receipts of taxes on income and wealth paid by firms

Sources: INE and authors' calculations.

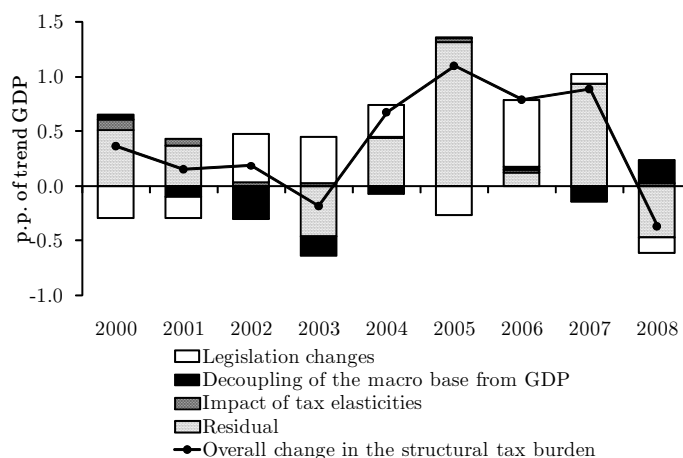
and more effective collection procedures. The sustained growth of overall CGA contributions basically mirrors the evolution of pension expenditure in this subsystem (see footnote 8).

A useful approach to the analysis of tax developments consists of the breakdown of the change in the structural tax burden into: the effect of legislative changes, the decoupling of the macroeconomic bases from GDP, the impact of tax elasticities and a residual. Figure 6.9 summarizes the results of this exercise for the period 2000-2008 using the ESCB methodology described in Kremer, Braz, Brosens, Langenus, Momigliano and Spolander (2006). One of the more striking features is the magnitude of the residuals in almost all years from 2000 to 2008. Its explanation may to some extent be associated with the drawbacks of the cyclical adjustment methodology, an inaccurate quantification of the effects of policy measures and the change in items that affect simultaneously general government revenue and expenditure. Indeed, the positive residual in 2000 is mostly related with social contributions, due to the increase of the State subsidy to the CGA subsystem also recorded on the expenditure side, while the negative residual in 2003 is mainly concentrated on corporate income tax and might be explained by a poorer evolution of profits than the one of its macroeconomic base. The major factor behind the positive residuals in the period 2004-2007 is the enhancement of

Figure 6.8: Structural receipts of taxes on production and imports

Sources: INE and authors' calculations.

the effectiveness of tax administration, based on a wider use of information technology and stepped up human resources. It is worth noting that the improvement in administrative procedures has a permanent nature, but that a part of the revenue windfalls recorded in this period also stemmed from the collection of overdue amounts, which will tend to vanish in time. In 2008, the sign of the residual reversed but apparently not yet as a result of the decrease in the transitory part of effectiveness gains, once it is essentially associated with the specific behaviour of several taxes on production and imports. Regarding procedures, five main areas are worth mentioning. Firstly, at the preventive level, an effort has been made to identify taxpayers who belong to risk groups in terms of fraud and evasion in order to alert them to their tax obligations. Secondly, at the corrective level, taxpayers who do not fill in their tax returns are notified. Thirdly, the cross-checking of databases became a common practice. Fourthly, recourse to the administrative derogation of bank secrecy increased substantially. Lastly, an automatic system for the seizure of moveable and immovable goods and financial assets was implemented.

Figure 6.9: Breakdown of the change in the structural tax burden ^{a)}

Sources: INE and authors' calculations.

Note: ^{a)} For further details on the methodology used to calculate these contributions, see Kremer et al. (2006) and Braz (2006).

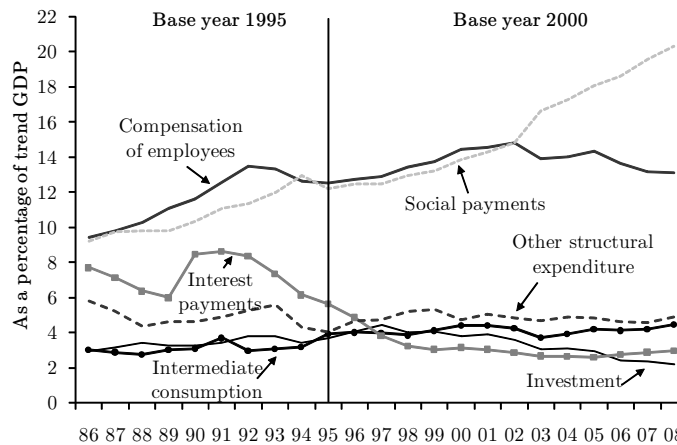
6.2.3 Expenditure

As already mentioned, the evolution of public expenditure is crucial for understanding Portuguese fiscal developments in the period under analysis. Indeed, structural expenditure as a ratio to trend GDP grew in more than half of the years from 1986 to 2008. As a whole, the increase totalled 9.8 p.p. of trend GDP (around 10.6 p.p. of trend GDP corrected for the impact of the 1995 structural break in the data¹¹). This outcome was driven by structural primary current expenditure, whose ratio to trend GDP went up by 15.1 p.p. On the contrary, interest payments declined significantly (-4.8 p.p. of trend GDP), while investment decreased only slightly between 1986 and 2008. Social payments and, to a minor extent, compensation of employees were the items of primary current expenditure that contributed the most to this evolution (Figure 6.10).

Table 6.3 presents the comparison of public expenditure ratios to GDP between Portugal and the euro area (12) in 1995 and 2008.¹² As

¹¹See footnote 2.

¹²International comparisons between levels and developments in public expenditure may prove useful but should be made with caution. Three points should be highlighted in this respect. Firstly, the comparisons with other countries are

Figure 6.10: Breakdown of structural expenditure

Sources: INE and authors' calculations.

Note: All the values are cyclically adjusted and exclude the impact of temporary measures.

shown, the strong growth of total expenditure in Portugal contrasts with a decline in this variable as a percentage of GDP at the euro area level. In spite of this evolution, public expenditure in the economy was still slightly below the euro area (12) average in 2008, but this is not the case for current expenditure. Concerning social payments in cash, the relatively low value of this item in Portugal in 1995, and the strong rise thereafter, suggests that the degree of maturation of the social security system was then lower than in other euro area coun-

often influenced by the delimitation of the general government sector. Indeed, it is important to know for each country the degree of outsourcing in the supply of several goods and services usually provided publicly, in particular in the areas of health and education. The differences in the general government perimeter may only have an effect on the composition of public expenditure, for example in the case of health services financed publicly but provided by entities classified outside the general government sector, or, alternatively, may also have an impact on the time pattern of government expenditure (and, as such, on its level in each period), as it is the case of public-private partnerships. Secondly, differences in the tax system concerning the taxation of social benefits and the existence of tax allowances and tax credits instead of explicit expenditure might have a non-negligible impact on the level of overall public expenditure as measured in national accounts. Finally, other country-specific factors, such as the recording of expenditure related with the public employees' pension system in Portugal, might also distort international comparisons relating to public expenditure.

tries (or that the Portuguese system became relatively more generous, which was not the case). On the contrary, the relatively high ratio of compensation of employees vis-à-vis the euro area average was explained, in addition to the high average relative wage of public employees, by the fact that most health and education services were provided by entities classified inside the general government sector in Portugal. Indeed, according to the functional classification of expenditure, in 1995, education and health represented 55.6 per cent of compensation of public employees in Portugal, to be compared with 45.4 per cent in the euro area. The gradual transformation of public hospitals into corporations affects the analysis of public finance developments, in particular as regards expenditure composition, as it results in an increase in social payments in kind and a decline in compensation of employees and intermediate consumption in the general government accounts. Correcting for this effect, compensation of employees as a ratio to GDP would have increased by around 1.3 p.p. of GDP in the period from 1995 to 2008 (the offsetting effect is on other current expenditure). In addition, it should be noted that this expenditure item is influenced by the fact that, in Portugal, only part of actual social contributions of general government entities as employers is calculated as a fixed rate on wages, as it also includes the amount required to ensure the financial balance of the public employees' pension system. As in the last few years expenditure on pensions of former public employees has been increasing substantially, the figures for compensation of employees are affected by this recording scheme. Lastly, it should be mentioned that developments between 1995 and 2008 in interest expenditure in Portugal and the euro area (12) were broadly similar.

The evolution of social payments stemmed, mostly, from the behaviour of pension expenditure. Indeed, from the 11.1 p.p. of trend GDP increase in structural social payments in the period from 1986 to 2008, 6.7 p.p. are related to pensions. The remaining increase in social payments results predominantly from social payments in kind (3.5 p.p. of trend GDP) and is explained by both a strong growth in spending on medicines co-payments and contracts with private health-care providers, as well as the already mentioned transformation of public hospitals into corporations (which occurred at the end of 2002, mid-2004, end-2005 and during the course of 2007 and 2008, and implied an increase in this item by approximately 2.0 p.p. of trend GDP).

Table 6.3: Expenditure: comparison with euro area developments

As a percentage of GDP

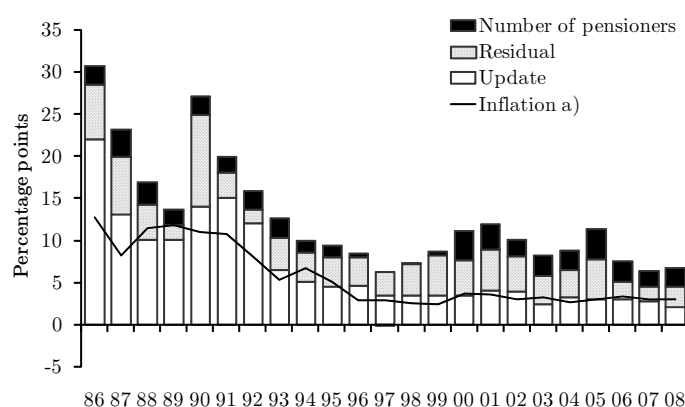
	Portugal		Euro area (12)	
	1995	2008	1995	2008
Total expenditure	43.4	45.9	50.6	46.7
Current expenditure	38.1	43.2	46.3	43.0
Social payments (except in kind)	11.2	15.6	16.9	16.1
Compensation of employees	12.9	12.9	10.9	10.1
Interest	5.8	3.0	5.4	3.0
Other current expenditure	8.3	11.8	13.1	13.8
Capital expenditure	5.3	2.7	4.3	3.8
Investment	3.8	2.1	2.6	2.5
Other capital expenditure	1.5	0.6	1.7	1.3

Source: European Commission (AMECO database).

As in Portugal there are two main public social security subsystems, comprising private sector workers (Social Security subsystem) and public employees (CGA subsystem), they are analysed separately. The strong increase in expenditure on old-age, disability and survivors' pensions of the Social Security subsystem between 1986 and 2008 (reaching 3.6 p.p. of trend GDP) can be explained by three factors: (i) the annual updates of pensions; (ii) the increase in the number of pensioners; (iii) the additional change in the average pension, reflecting, essentially the impact of a composition effect and discretionary measures. Concerning the former, the pensions of this subsystem were updated above expected inflation in most years under consideration. Among the three factors underlying pension growth in the Social Security subsystem, this has definitely been the least important over the last few years. The strong rise in the number of pensioners, particularly relevant in the case of old-age pensions, stemmed mainly from the ageing of population and contributed by 2.0 p.p. to the annual average growth rate of old-age pension expenditure, which stood at 13.2 per cent (Figure 6.11). It is worth mentioning that between 1994 and 1999 the slowdown in the growth rate of the number of pensioners was explained by the gradual increase in the retirement age for women from 62 to 65 years old, six months per year. Finally, the hike in the average pension, excluding the annual update, was also very significant from 1986 to 2008: 4.0 p.p. of the annual growth rate of old-age pensions, on average. This effect was a consequence of the higher wages the new retirees

received during their contributory careers, but it is also due to the fact that, on average, they contributed more years to the system. In addition, in 1990, it incorporates the effect of the introduction of the 14th month in the payment of pensions.

Figure 6.11: Breakdown of the growth rate of old-age pension expenditure of the SS subsystem



Sources: Social Security statistics and authors' calculations.

Note: a) Measured by the private consumption deflator.

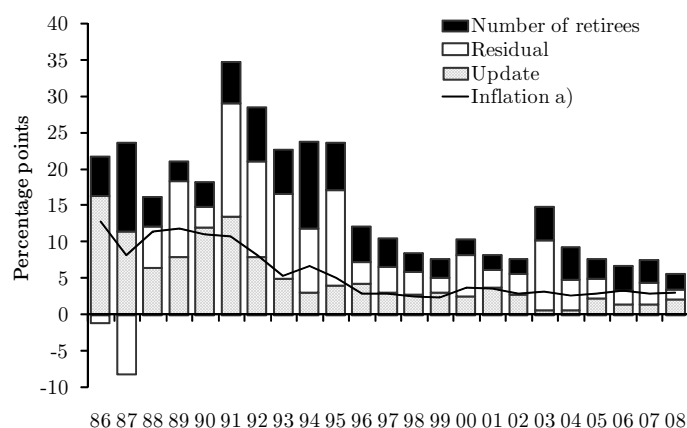
Pension expenditure in the public employees' subsystem increased by 3.1 p.p. of trend GDP in the period from 1986 to 2008. Figure 6.12 illustrates the breakdown of the rate of change of this item according to the same explanatory factors as in the case of the Social Security subsystem. Concerning the update of former public employees' pensions, it is worth referring that in general they were annually adjusted in line with the update of the wage scale, which has followed inflation quite closely. Pensions were, however, nearly frozen in 2003 and 2004. As far as the number of pensioners is concerned, a strong growth can be observed in all years of the period from 1986 to 2008 (around 4.6 per cent on average in this period). It is worth mentioning that the substantial increase in the number of pensioners in 2003 is mainly the result of an extraordinary rise in requests for retirement before the entry into force of new rules from January 1 2004 onwards, which involved a new definition of the initial pension - formerly the average gross wage of the last three months, afterwards the average wage of public employees net of social contributions of the last three months - and the introduction of

penalties for those who retire before reaching the age of 60: - 4.5 per cent for each year below the age of 60. Further, there was an additional effect in 2003 and 2004, related with the inclusion of pensions of former employees of several public corporations in general government expenditure, following the transfer of pension funds to the public employees' subsystem. Again, in 2006-2007 and to a lesser extent in 2008, a significant rise in the retirement requests delayed the deceleration of pension expenditure in the context of the reform of the Retirement Statute introduced at the beginning of 2006. The magnitude of the increase in the average pension (not explained by the annual update), which usually follows quite closely the change in the number of pensioners, has also been very significant in almost all years of the 1986-2008 period due, essentially, to higher wages just before retirement. The latter was particularly significant in the years after the approval of the New Public Employees Pay System. Occasionally, several discretionary measures contributed considerably to the growth of pension expenditure in the public employees' subsystem, as the compensation for taxation in the context of the personal income tax, the adjustment of pensions initiated before the New Public Employees Pay System and the introduction of the 14th month in the payment of pensions.

In the absence of the recent reforms of Social Security and CGA pension subsystems, public expenditure on pensions would have continued to grow much above nominal GDP, offsetting any consolidation effort carried out by fiscal authorities. In the first case, population ageing and maturation of the system were the main explanatory factors. In the CGA case, the unsustainable evolution of expenditure would have stemmed from the generosity in the calculation of the initial pension and eligibility conditions, in conjunction with the age structure of general government employees. It is also worth referring that the fact that CGA paid higher pensions for similar contributory careers raised equity concerns.

Concerning compensation of employees, an increase in its ratio to trend GDP can be observed in most years until 2005. As already mentioned, part of this evolution stems from the current procedure of recording as actual social contributions of general government the amounts transferred by the State in order to ensure the financial balance of the public employees' pension system. Figure 6.13 presents the breakdown of compensation of employees into three components: the wage bill, actual employer social contributions and

Figure 6.12: Breakdown of the growth rate of pension expenditure of the CGA subsystem

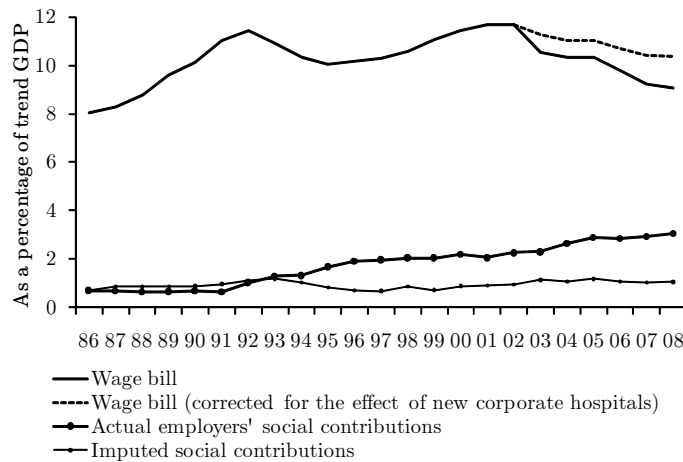


Sources: *Caixa Geral de Aposentações* and authors' calculations.

Note: a) Measured by the private consumption deflator.

imputed social contributions. The part of the evolution of compensation of employees in the last decade to be explained by actual social contributions is more than half of the overall change observed in this item (2.3 out of 3.7 p.p. of trend GDP) and results, to a large extent, from the rise in expenditure on the pensions of former public employees, which has already been analysed in more detail. Imputed social contributions, which mainly encompass general government expenditure with health care subsystems benefiting public employees, were reasonably stable as a ratio to trend GDP in the period under analysis.

Regarding the wage bill, corrected for the effect of new corporate hospitals classified outside the general government sector, there was a 2.3 p.p. of trend GDP increase in the period under analysis. This rise was quite significant in the 1986-1992 and 1996-2002 periods. Figure 6.14 shows the breakdown of the growth rate of the wage bill into three explanatory factors: the update of the wage scale, the number of public employees and a residual. This residual essentially incorporates the wage 'drift', which corresponds to the increase in wages due to normal promotions and progressions in careers and the rise of the average wage resulting from the renewal of the population of public employees, and the effect of extraordinary revisions of careers. The relative rise in the wage bill does not stem from an-

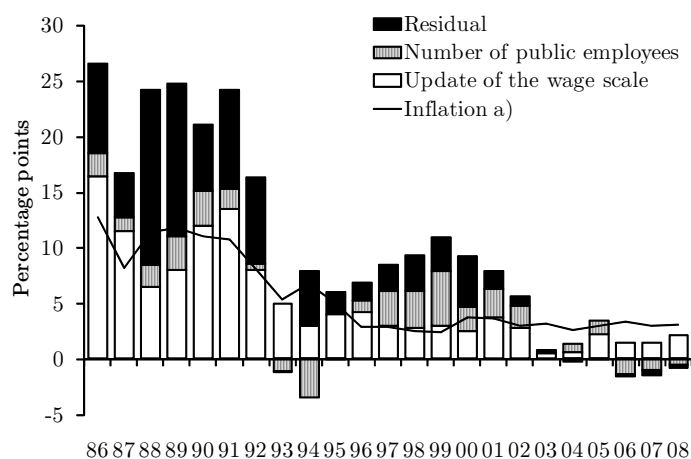
Figure 6.13: Breakdown of compensation of employees

Sources: INE and authors' calculations.

nual updates of the public employees' wage scale above inflation, as those were broadly in line with expected inflation as assumed in the budgets, in reasonable anticipation of the disinflation process. In addition, it is worth mentioning that in both 2003 and 2004 there was a quasi-freezing of the update of the public sector wage scale in the context of the measures undertaken to control the growth of public expenditure. Regarding the number of general government employees, the period from 1986 to 2002 witnessed a strong rise, in particular until 1991 and after 1997. In 2003, correcting for the impact of the transformation of several hospitals into public corporations, the number of public employees remained more or less constant and showed a slower growth in 2004-2005. In the 2006-2008 period it declined, mostly as a result of the control of hiring, in particular the implementation of the rule of only one employee hired for each two that leave service from mid-2005 until 2008. The residual effect was also very significant in almost every year from 1986 until 2002. Part of this evolution stemmed from an automatic scheme of promotions and progressions in careers, essentially based on tenure, which was basically frozen from mid-2002 onwards. In 2008, new rules for promotions were already in force but the amounts involved were still not representative of the new steady state. In addition, the residual also incorporates the impact of discretionary measures such as mak-

ing public employees' incomes liable to taxation in 1988-1989 (simultaneously increasing gross wages), the introduction of the New Public Employees Pay System in 1989-1993, and extraordinary revisions to several specific careers in particular between 1997 and 2002. The New Public Employees Pay System was designed with two main objectives: the public employees pay system needed to regain internal fairness and public sector salaries needed to become more competitive in relation to those paid by other sectors for the same job or the same qualifications. Its implementation, however, resulted in a substantial across the board increase in wages of public administration careers, distorting to a certain extent the initial purposes of the reform. These developments contributed to a significant wage premium associated with working in the public sector vis-à-vis the private sector (see Section 6.5).

Figure 6.14: Breakdown of the rate of change of public employees wage bill (corrected for the effect of new corporate hospitals)



Sources: *Caixa Geral de Aposentações* and authors' calculations.

Note: a) Measured by the private consumption deflator.

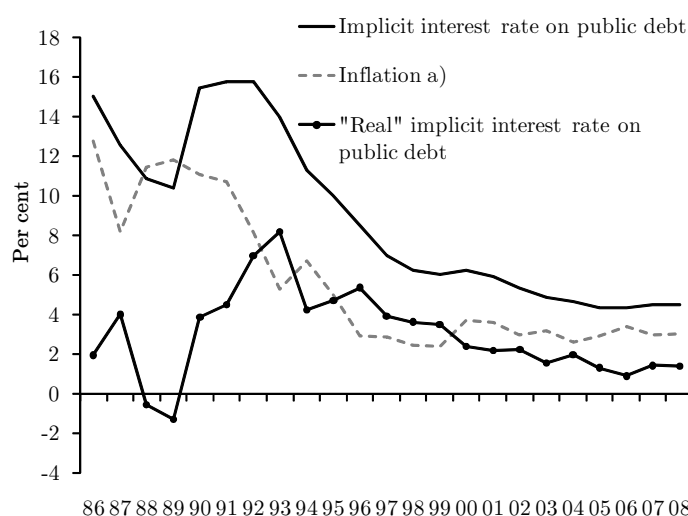
The other items of primary expenditure as a ratio to trend GDP show diverse patterns in the 1986-2008 period (Figure 6.10). Indeed, while intermediate consumption increased by 1.4 p.p. of trend GDP (slightly more when corrected for the impact of new corporate hospitals net of the effect of the 1995 structural break in data), investment and other primary expenditure (encompassing subsidies,

other current expenditure and other capital expenditure) declined by 0.7 and 0.9 p.p. of trend GDP, respectively. Regarding intermediate consumption, it is worth highlighting that the rise observed in this item over the entire period is, nevertheless, considerable given that on average intermediate consumption represented only 10 per cent of primary expenditure. In the case of investment a rising trend is noticeable up to 1997, though not very pronounced. This one can be partly explained by accession to the European Community and the use of structural funds. The decline observed thereafter can, to some extent, be justified by the use of public-private partnerships, in particular as far as the construction and exploitation of toll-free motorways is concerned. Lastly, it should be noted that the reduction in other primary expenditure stemmed almost entirely from the developments concerning subsidies.

As already mentioned, interest expenditure as a ratio to trend GDP showed a clear declining trend in almost every year of the period under analysis, with the exception of 1990-1991, 2000 and 2006-2008. These developments followed quite closely those of the implicit interest rate on public debt, as illustrated in Figure 6.15. The disinflation process contributed significantly to the reduction of the public debt interest rates, in particular at the beginning of the nineties, since public debt was then predominantly composed of short-term instruments, such as Treasury bills, and by floating-rate instruments such as saving certificates and most bond issues and loans provided by the domestic banks. From 1992-1993 onwards, the nominal convergence required to ensure the participation of Portugal, from the outset, in the euro area became the key objective of economic policy. Until 1993 there were still increases in the "real" implicit interest rate of public debt mainly explained by three factors. Firstly, the gradual substitution of tax exempt public debt by public debt subject to income tax from 1989 onwards. Secondly, the substitution of public debt at below market interest rates held by the central bank and financial institutions, on a compulsory basis, by public debt with market interest rates. In this respect, reference should be made to an important operation, amounting to more than 12 per cent of GDP, geared to absorbing the excess banking liquidity deposited with Banco de Portugal, which took place at the end of 1990 (for more details, see Chapter 7). Finally, the tightening of monetary and exchange rate policy. As nominal convergence progressed, the level of interest rates, as well as their differentials with

other countries, recorded a sharp reduction, mainly as a result of the decline in the currency risk premium. Overall, the implicit interest rate on public debt reached a minimum of 4.3 per cent in 2005, in comparison to 15.0 per cent at the beginning of the period.

Figure 6.15: Implicit interest rate on public debt



Sources: INE and authors' calculations.

Note: a) Measured by the private consumption deflator.

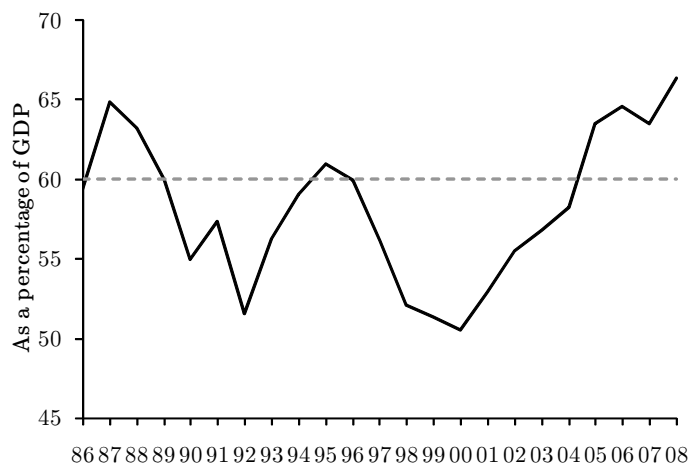
6.2.4 Public debt

In the framework of the Maastricht Treaty and the Stability and Growth Pact, the relevant concept of public debt is total gross debt at nominal value outstanding at the end of the year and consolidated between and within the sub-sectors of general government. Figure 6.16 presents the evolution of this variable in Portugal for the period between 1986 and 2008.¹³ In 1986, the debt ratio was very close to 60 per cent and at the end of the period under analysis was above that threshold, reaching 66.4 per cent. According to the data now available, in the year relevant for the participation in the euro area, public debt as a ratio to GDP was clearly below the 60 per cent reference value (56.1 per cent in 1997). The debt ratio ended up by not

¹³Since data is only available from 1990 onwards, a retropolation was made based on the work by Sousa (1998).

playing an important role in the initial stage of the fiscal surveillance mechanism at the European level. The revised Stability and Growth Pact, however, increased the importance of this variable, in particular by making it relevant to the definition of each Member-state's medium-term fiscal objective.

Figure 6.16: Evolution of the public debt ratio



Sources: INE and authors' calculations.

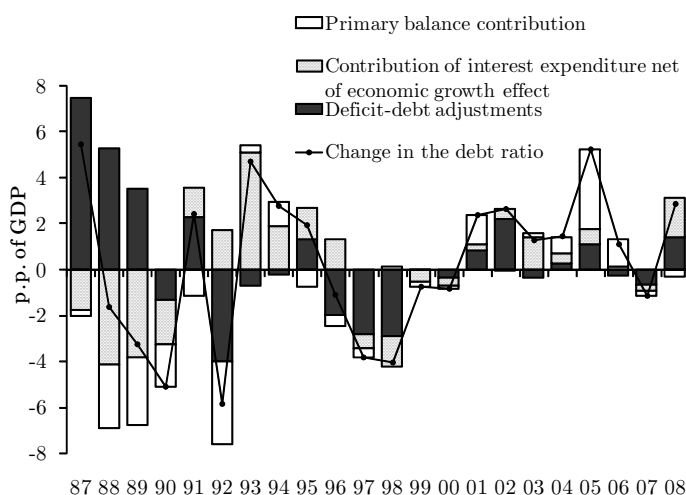
The impact of the increased integration of financial markets was crucial in this period, not only reducing, in particular, the currency risk premium, which, as already mentioned, benefited the implicit interest rate on public debt, but also creating the conditions for a growing role of non-residents in general government financing. Indeed, the share of Portuguese government debt held by non-residents rose from around 7 per cent at the beginning of the nineties, to around 78 per cent in 2008. In fact, with the elimination of the exchange rate risk as a consequence of the participation in the euro area, government debt securities of euro area countries became virtually perfect substitutes and until the end of 2007 there was no significant market discrimination on the basis of sovereign risk. This situation changed in 2008 in a context of high uncertainty stemming from the international economic and financial crisis.

The evolution of the debt ratio can be broken down into three factors: the contribution of the primary balance, interest expenditure net of the effect of economic growth ("snowball effect") and deficit

debt-adjustments. Over the period as a whole, the 7.0 p.p. rise in the debt ratio results from a debt increasing contribution of deficit-debt adjustments of 10.4 p.p. and the effect of interest expenditure net of economic growth, which reached 3.3 p.p. in cumulative terms. These effects were partially offset by the debt decreasing impact of the primary balance that amounted to 6.7 p.p. (Figure 6.17). In the period after the outset of the euro area, up to 2008, the debt ratio rose by 14.3 p.p. as a result of primary deficits (5.9 p.p.), “snowball effect” (4.1 p.p.) and deficit-debt adjustments (4.3 p.p.).

The favourable impact of the primary surpluses was clearly concentrated in the years from 1988 to 1992, while 2005 was the most unfavourable year due to a significant primary deficit. In this respect it is worth highlighting that, in the absence of temporary measures, the primary deficits in the years from 2002 to 2004 and 2008 would have had a more important contribution to the debt ratio increase.

Figure 6.17: Breakdown of the change in the debt ratio



Sources: INE and authors' calculations.

Concerning the “snowball effect”, the impact of strong nominal economic growth surpassed the high level of interest expenditure up to the economic downturn in 1991. This situation was reversed afterwards, until 1996, in spite of the declining trend in interest payments. After 1998, with interest outlays broadly stabilised, the contribution of this item to the evolution of the debt ratio was not very important and was broadly in line with the economic cycle.

Lastly, regarding deficit-debt adjustments, two points are worth highlighting. Firstly, the important amount of deficit-debt adjustments at the beginning of the period, in particular between 1987 and 1989, may partly arise from data inconsistencies (see footnote 13). Secondly, in 1992 and between 1996 and 1998, privatisation receipts contributed significantly to the reduction of the debt ratio. In the remaining years, several factors were behind the quite erratic evolution of deficit-debt adjustments. These included changes in general government deposits, equity injections not reclassified as capital transfers, debt settlements by the Treasury, the difference between accrual and cash recording of taxes and social contributions, EU transfers and several expenditure items, *inter alia*.

6.3 Fiscal sustainability and pension expenditure in Portugal

6.3.1 The concept and measurement of fiscal sustainability

The concept of fiscal sustainability is not straightforward. General intuition says that fiscal policy is sustainable if general government solvency is guaranteed in the long run, but the rule is difficult to formalise and there is no agreed theoretical benchmark to assess its fulfilment.

Earlier discussions placed the question in terms of the effects of public debt accumulation on the economy and the existence of limits to that accumulation, as well as the generational distribution of the debt burden (see Balassone and Franco (2000) for a survey on earlier literature).

Modern analytical discussions frame the problem in terms of the fulfilment of an intertemporal budget constraint, in which the sum of the present values of all future primary balances must equal the initial stock of public debt. Some shortcomings of this definition have been highlighted in the literature. Among them, three are worth mentioning. Firstly, the intertemporal budget constraint may be respected even in the presence of a diverging debt ratio. Secondly, a discussion of sustainability on the basis of a government constraint is a partial equilibrium analysis that does not take into account the effects of fiscal policy on macroeconomic variables. Lastly, the composition of public debt (e.g. by currency of denomination and maturity) is as well relevant for sustainability analysis.

In terms of assessing sustainability, the methodologies used may be classified into three categories: backward-looking tests, sustainability indicators and generational accounting. The backward-looking tests are econometric tests (mainly cointegration tests) that try to check if, under the processes underlying the past behaviour of fiscal variables, the intertemporal budget constraint holds or is violated. The main criticism to this approach, beyond the issues on the definition of variables and specification of tests, is the fact that test results are based on past data, being only partially informative in terms of future solvency. Several sustainability indicators have been developed since the mid-eighties. In particular, Blanchard, Chouraqui, Hagemann and Sartor (1990) proposed a set of sustainability indicators based on the intuitive idea that a sustainable fiscal policy should maintain debt at its current level. Although there is no sound theoretical argument for choosing a certain debt level, these indicators have the advantage of being simple, intuitive and flexible. Nevertheless, in general, they are based on long term projections that involve considerable uncertainty and often signal budgetary strains in the future without identifying the appropriate timing for the required adjustment. Generational accounting was essentially developed by Auerbach, Gokhale and Kotlikoff (1991) with the aim of assessing the fiscal burden current generations are placing on future generations. Being based on long term projections of budgetary items, generational accounts are subject to the criticism made to sustainability indicators. In addition, the results are not very intuitive, hampering their use for policy communication purposes.

The revised Stability and Growth Pact put an explicit emphasis on sustainability issues on several accounts. Firstly, the medium-term objectives (MTOs) for individual Member-states should be differentiated on the basis of their current debt ratio and potential growth. In addition, they should take into account implicit government liabilities associated with ageing, although the appropriate criteria and modalities to do so are still being established. Secondly, the European Commission will periodically assess fiscal sustainability in Member-states in the context of the analysis of stability/convergence programmes. Lastly, deviations from the MTO or the adjustment path to reach it are allowed if a Member-state introduces a major reform that directly leads to long term budgetary savings but has a short term cost. Currently, the European Commission uses the following synthetic sustainability indicators:

- Projections of gross debt, with sensitivity analysis.
- S1 indicator, which is the permanent change in the revenue and/or primary expenditure as a ratio to GDP required to reach a debt ratio of 60 per cent at a specific date, generally some decades ahead.
- S2 indicator, which is the permanent change in the revenue and/or primary expenditure as a ratio to GDP that ensures that the present discounted value of future primary balances equals the current stock of gross debt.
- Primary balance required in the first five years of the projections to ensure the fulfilment of the intertemporal budget constraint.

Both S1 and S2 indicators are calculated for two points in time: the end of the previous year and the end of the stability/convergence programme assuming its budgetary targets are fulfilled.

6.3.2 Long term projections for age-related expenditure

As mentioned above, most sustainability indicators rely on long term projections, which have important limitations. On the one hand, they are based on assumptions that involve considerable uncertainty, like those concerning demographic developments (in particular, migration flows), employment, productivity growth and real interest rates. On the other hand, they are not elaborated in a general equilibrium framework and, as such, ignore interactions between demographics, macroeconomic developments, labour market, pension systems and other expenditure items.

Currently, in the European Union context, long term projections for age-related expenditure (pensions, health and long term care, unemployment benefits and education) are elaborated regularly by the Ageing Working Group (AWG) of the Economic Policy Committee (EPC). These results are used by the European Commission services to assess the sustainability of public finances in the framework of the Stability and Growth Pact. The two last exercises were concluded in 2006 and 2009 (Economic Policy Committee and European Commission (2006) and Economic Policy Committee and European Commission (2009)). The pension projections are essentially elaborated

by national experts using their own models, under the guidance of the AWG. Although an effort was made aiming at the harmonisation of the assumptions underlying the projections, the results are still not strictly comparable (for an assessment of the 2006 AWG projections see Balassone, Cunha, Langenus, Manzke, Pavot, Prammer and Tommasino (2009)).

The 2009 AWG projections for Portugal are based on a demographic scenario which implies a 5.7 per cent increase in the overall population between 2008 and 2060 (0.6 millions) as a result of important net immigration and a rise in both the fertility rate and life expectancy. The demographic structure of the population is foreseen, however, to change dramatically. In particular, an increase in the old age dependency ratio¹⁴ from 26 per cent in 2008 to 55 per cent in 2060 is expected to occur, figures quite similar to those obtained for the euro area and European Union as a whole. Working age population would decline by 0.8 millions over the 2007-2060 period, which corresponds to a change of around -11 per cent. This outcome would be partially offset by the assumed rise in the participation rate of females, in particular in the older cohort (55 to 64 years old), and a decline in the unemployment rate, which mitigate the fall in employment to approximately 0.3 millions. Potential GDP annual growth is projected to peak at 2.5 per cent in 2030, benefiting until then from still positive growth rates in employment, and decelerate thereafter to reach 1.4 per cent in 2060. It is worth noting that the projected potential GDP growth rates would remain below the euro area and European Union averages until 2020, but surpass them afterwards and until 2045, essentially as a result of an assumed strong increase in labour productivity.

Against this background, Portugal belongs to the group of countries with prospects for a moderate increase in pension expenditure in the next decades (Table 6.4). In what concerns health care expenditure, however, the increase is slightly above the euro area and EU overall averages. The opposite happens regarding public expenditure in long-term care, which in Portugal shows one of the lowest values, in terms both of level and change of this type of expenditure. This may signal some upward risks.

Figure 6.18 compares the results of the AWG 2006 and 2009 projections, for age-related expenditure as a whole, over 2010-2050. In

¹⁴Defined as the ratio between the population of 65 years old or more and the working age population (from 15 to 64 years old).

Table 6.4: Main results of the 2009 AWG Report

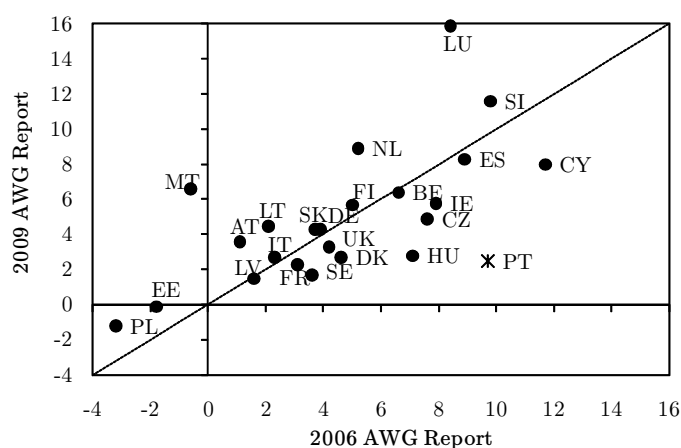
As a percentage of GDP

	Pensions		Health care		Long-term care		Unempl. benefits		Education		Total	
	2007	07-60	2007	07-60	2007	07-60	2007	07-60	2007	07-60	2007	07-60
	level	change	level	change	level	change	level	change	level	change	level	change
Belgium	10.0	4.8	7.6	1.2	1.5	1.4	1.9	-0.4	5.5	0.0	26.5	6.9
Bulgaria	8.3	3.0	4.7	0.7	0.2	0.2	0.1	0.0	3.3	-0.2	16.6	3.7
Czech Republic	7.8	3.3	6.2	2.2	0.2	0.4	0.1	0.0	3.5	-0.3	17.9	5.5
Denmark	9.1	0.1	5.9	1.0	1.7	1.5	1.0	-0.2	7.1	0.2	24.8	2.6
Germany	10.4	2.3	7.4	1.8	0.9	1.4	0.9	-0.3	3.9	-0.4	23.6	4.8
Estonia	5.6	-0.7	4.9	1.2	0.1	0.1	0.1	0.0	3.7	-0.2	14.3	0.4
Ireland	5.2	6.1	5.8	1.8	0.8	1.3	0.8	0.1	4.5	-0.3	17.2	8.9
Greece	11.7	12.4	5.0	1.4	1.4	2.2	0.3	-0.1	3.7	0.0	22.1	15.9
Spain	8.4	6.7	5.5	1.6	0.5	0.9	1.3	-0.4	3.5	0.1	19.3	9.0
France	13.0	1.0	8.1	1.2	1.4	0.8	1.2	-0.3	4.7	0.0	28.4	2.7
Italy	14.0	-0.4	5.9	1.1	1.7	1.3	0.4	0.0	4.1	-0.3	26.0	1.6
Cyprus	6.3	11.4	2.7	0.6	0.0	0.0	0.3	-0.1	6.1	-1.2	15.4	10.8
Latvia	5.4	-0.4	3.5	0.6	0.4	0.5	0.2	0.0	3.7	-0.3	13.2	0.4
Lithuania	6.8	4.6	4.5	1.1	0.5	0.6	0.1	0.0	4.0	-0.9	15.8	5.4
Luxembourg	8.7	15.2	5.8	1.2	1.4	2.0	0.4	0.0	3.8	-0.5	20.0	18.0
Hungary	10.9	3.0	5.8	1.3	0.3	0.4	0.3	-0.1	4.4	-0.4	21.6	4.1
Malta	7.2	6.2	4.7	3.3	1.0	1.6	0.4	0.0	5.0	-1.0	18.2	10.2
The Netherlands	6.6	4.0	4.8	1.0	3.4	4.7	1.1	-0.1	4.6	-0.2	20.5	9.4
Austria	12.8	0.9	6.5	1.5	1.3	1.2	0.7	0.0	4.8	-0.5	26.0	3.1
Poland	11.6	-2.8	4.0	1.0	0.4	0.7	0.1	-0.1	4.4	-1.2	20.5	-2.4
Portugal	11.4	2.1	7.2	1.9	0.1	0.1	1.2	-0.4	4.6	-0.3	24.5	3.4
Romania	6.6	9.2	3.5	1.4	0.0	0.0	0.2	0.0	2.8	-0.5	13.1	10.1
Slovenia	9.9	8.8	6.6	1.9	1.1	1.8	0.2	0.0	5.1	0.4	22.9	12.8
Slovak Republic	6.8	3.4	5.0	2.3	0.2	0.4	0.1	-0.1	3.1	-0.8	15.2	5.2
Finland	10.0	3.3	5.5	1.0	1.8	2.6	1.2	-0.2	5.7	-0.3	24.2	6.3
Sweden	9.5	-0.1	7.2	0.8	3.5	2.3	0.9	-0.1	6.0	-0.3	27.2	2.6
United Kingdom	6.6	2.7	7.5	1.9	0.8	0.5	0.2	0.0	3.8	-0.1	18.9	5.1
EU - 27	10.2	2.4	6.7	1.5	1.2	1.1	0.8	-0.2	4.3	-0.2	23.1	4.7
Euro area	11.1	2.8	6.7	1.4	1.3	1.4	1.0	-0.2	4.2	-0.2	24.3	5.2

Sources: Economic Policy Committee and European Commission.

a significant number of Member-states, the most recent projections show a stronger increase for age-related expenditure than calculated in the 2006 exercise. In twelve countries, including Portugal, however, the revisions are downward. The explanations for this change are substantially different from case to case, relying both in differences in the demographic and macroeconomic assumptions and in the implementation of structural reforms with impact on age-related expenditure, particularly pension spending, as was the case of Portugal.

Figure 6.18: Change in age-related expenditure between 2010 and 2050 (p.p. of GDP)



Sources: Economic Policy Committee and European Commission.

Note: The result for Greece is not presented as the 2006 AWG Report did not include pension projections for this country. In the cases of Estonia, France, Hungary and Portugal the projections for long-term care expenditure were not available in the 2006 AWG Report. As such, to ensure comparability, it was considered an estimate elaborated thereafter by the European Commission.

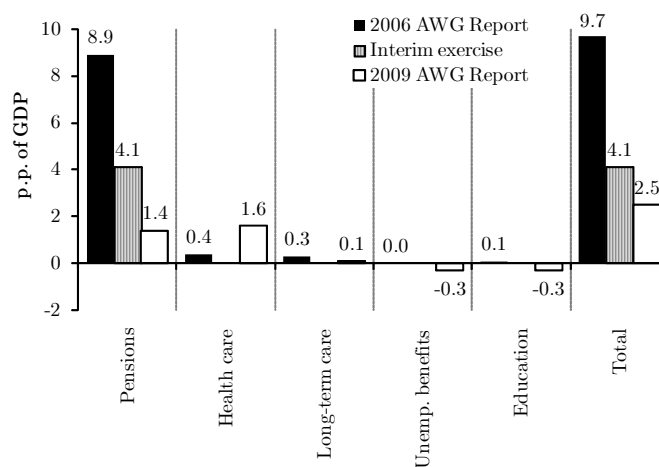
A reform of public pension systems was approved in Portugal in 2006-2007, which justified an update of the 2006 AWG Report projections for pension expenditure.¹⁵ Accordingly, the projected increase of pension expenditure between 2010 and 2050¹⁶ was revised from 8.9 p.p. of GDP in the 2006 AWG Report to 4.1 p.p. in the interim exercise, to be compared with 1.4 p.p. currently (Figure 6.19). Indeed,

¹⁵Peer-reviewed at the AWG and approved at the EPC in October 2007.

¹⁶In order to ensure comparability.

this reform allowed a very substantial reassessment of prospects regarding pension expenditure growth in the long term through: (i) the introduction of the sustainability factor, (ii) the reinforcement of incentives regarding the extension of working life, (iii) a closer relationship between contributions made during the working life and the amount of the initial pension, (iv) the convergence of the rules applicable to public employees to the Social Security general scheme and (v) new rules regarding annual pension updating. The difference between the interim projections and the ones included in the 2009 AWG Report for pension expenditure is due, essentially, to changes in the underlying assumptions, particularly those related with a much higher net flow of immigrants. It is worth highlighting that, considering a nil net migration flow every year, pension expenditure would increase over 2007-2060 2.9 p.p. of GDP more than in the reference scenario.

Figure 6.19: Breakdown of the change in age-related expenditure in Portugal between 2010 and 2050



Sources: Economic Policy Committee and European Commission.

Note: The projections for long-term care were not available in the 2006 AWG Report. As such, to ensure comparability, it was considered an estimate elaborated thereafter by the Commission.

In Portugal, health care expenditure has been a steadily rising component of total general government expenditure in the last decades. While assessing the past is a straightforward task, the elaboration of projections is more difficult since demand and supply of

health care services are affected by different factors, some of them very difficult to predict. According to the 2009 AWG Report, in the reference scenario health expenditure in Portugal is projected to increase by 1.9 p.p. of GDP between 2007 and 2060. The reference scenario assumes, beyond pure demographic effects, that half of the additional years of life resulting from higher life expectancy are spent in good health (it is worth highlighting that an assumption of constant number of years spent in good health would imply a reduction in the change of health care expenditure in the same period by 1.2 p.p. of GDP). Also on the health care demand side, the reference scenario considers an income elasticity equal to 1.1 in the base year, in accordance with international empirical evidence over the recent decades, converging linearly to 1 at the end of the projection horizon in 2060. The sensitivity analysis on this parameter showed that a change to a constant unit elasticity for the whole projection period would only affect results to a small extent. Lastly, on the supply side, it was assumed that unit health costs would evolve in line with GDP *per capita* (+0.9 p.p. of GDP in the 2007-2060 change if otherwise they followed GDP per worker growth). It is worth referring that the main options described above for the reference scenario were already considered in the last AWG Report.

In the case of unemployment benefits and education spending projections, the forecast change over the 2007-2060 period and the revisions relative to the last AWG Report are not very significant. It should be highlighted, however, that the substantial room for improvement in the efficiency of public education, in a context marked by declining young cohorts, may imply a reduction in education expenditure exceeding that assumed in the AWG projections (see Section 6.4 for more details).

6.3.3 Estimates for sustainability indicators

As previously mentioned, the European Commission uses, among others, indicators S1 and S2 to assess the sustainability of public finances in each Member-state. The S2 indicator, defined as the change in the current level of the primary balance required to ensure that the discounted value of future primary balances is equal to the current level of debt, can be decomposed into two parts. Firstly, the initial budgetary position (IBP) which represents by how much the primary balance would have to rise from its current level so as to keep the debt ratio at its current level. Secondly, the long term

cost of ageing (LTC) that reflects by how much the primary balance would have to rise further in order to finance the projected increase in age-related expenditure in an infinite horizon. The S1 indicator is defined similarly, with the difference that it does not require the debt ratio to remain unchanged but to reach 60 per cent of GDP at a specific date, usually some decades ahead. As such, in comparison with S2, a third element enters the breakdown, the debt requirement (DR). The latter increases the gap if the initial level of debt is above 60 per cent and reduces it otherwise.

Table 6.5 shows the latest results publicly available for these indicators in the EU, calculated by the European Commission in the context of the 2009 Sustainability Report (European Commission (2009)). The starting point of the exercise is the fiscal position foreseen for 2009.¹⁷ This means that vis-à-vis the former estimates based on 2008 outcomes (obtained by the European Commission in the framework of the assessment of the last updates of the Stability and Convergence Programmes) there is a deterioration of public finances sustainability prospects for most Member-states owing to the decline in the structural primary balances and the increase in the debt ratios. Additionally, regarding the long term cost of ageing component, the estimates for the sustainability indicators are now based on the 2009 AWG Report. Concerning Portugal, ageing-related expenditure increases in the Commission exercise by 2.5 p.p. of GDP between 2010 and 2050, falling short of the interim exercise outcome and, by a larger margin, of the 2006 AWG Report. According to the more recent results, Portugal is included in the medium risk group of countries concerning the sustainability of public finances as it would have to permanently improve the primary balance by 4.7 p.p. of GDP in 2010 to achieve a debt ratio of 60 per cent in 2060, or by 5.5 p.p. of GDP to respect the intertemporal budget constraint. Although this prospect is similar to that projected for the euro area as whole and slightly more favourable than the EU average, the results show that fiscal sustainability in Portugal is still not assured, in particular given the high positive values of the components related with the initial budgetary position and the long term cost of ageing. Indeed, as the sensitivity analysis developed by the European Commission makes clear, if the medium term objective was reached in Portugal the improvement in the structural fiscal position would more than offset the long term cost related with population ageing.

¹⁷According to the spring 2009 economic forecasts of the European Commission.

Table 6.5: Sustainability indicators

	S1				S2		
	Total	IBP	DR	LTC ^{a)}	Total	IBP	LTC ^{a)}
Belgium	4.5	0.5	0.6	3.5	5.3	0.6	4.8
Bulgaria	-0.6	-0.7	-0.5	0.6	0.9	-0.6	1.5
Czech Republic	5.3	3.6	-0.3	1.9	7.4	3.7	3.7
Denmark	-0.6	-1.9	-0.5	1.8	-0.2	-1.6	1.4
Germany	3.1	0.8	0.2	2.1	4.2	0.9	3.3
Estonia	0.3	1.0	-0.6	-0.2	1.0	1.1	-0.1
Ireland	12.1	8.2	0.2	3.7	15.0	8.3	6.7
Greece	10.8	2.4	0.7	7.7	14.1	2.6	11.5
Spain	9.5	5.9	-0.1	3.6	11.8	6.1	5.7
France	5.5	3.8	0.4	1.4	5.6	3.8	1.8
Italy	1.9	-0.2	0.7	1.4	1.4	-0.1	1.5
Cyprus	4.6	0.2	-0.3	4.7	8.8	0.5	8.3
Latvia	9.4	8.8	-0.2	0.9	9.9	8.9	1.0
Lithuania	5.4	3.7	-0.3	2.0	7.1	3.9	3.2
Luxembourg	6.2	-0.6	-0.8	7.5	12.5	-0.4	12.9
Hungary	-1.1	-1.9	0.4	0.4	-0.1	-1.6	1.5
Malta	4.7	1.1	0.2	3.4	7.0	1.4	5.7
The Netherlands	5.2	1.6	0.0	3.7	6.9	1.9	5.0
Austria	3.8	1.5	0.2	2.2	4.7	1.6	3.1
Poland	2.9	4.2	0.0	-1.2	3.2	4.4	-1.2
Portugal	4.7	3.4	0.3	1.0	5.5	3.7	1.9
Romania	6.9	4.1	-0.4	3.2	9.1	4.3	4.9
Slovenia	9.2	3.8	-0.3	5.7	12.2	3.9	8.3
Slovak Republic	5.7	4.3	-0.3	1.6	7.4	4.5	2.9
Finland	2.6	-0.8	-0.3	3.7	4.0	-0.5	4.5
Sweden	0.5	-0.1	-0.3	0.8	1.8	0.2	1.6
United Kingdom	10.8	8.6	0.2	2.0	12.4	8.8	3.6
EU-27 average	5.4	3.1	0.2	2.0	6.5	3.3	3.2
Euro area average	4.8	2.1	0.3	2.4	5.8	2.3	3.5

Source: European Commission (2009).

Note: ^{a)}If the budgetary impact of ageing is increasing over time, discounted budgetary cost of ageing will be less in S1 than for S2, as S2 is defined over an infinite horizon and therefore gives relatively more weight than S1 to ageing costs arising in the latter part of the period.

6.4 Efficiency of public expenditure in Portugal: the cases of health and education

6.4.1 Overview

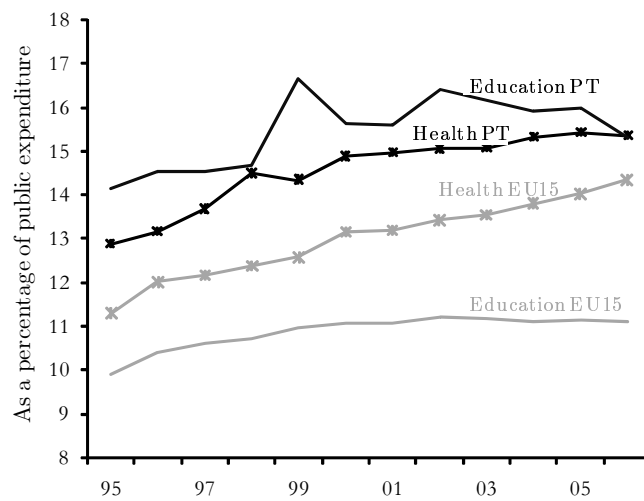
The quality of public finance has been, in the last years, a concern of European policy makers, given the importance of shifting public expenditure towards growth-enhancing items as well as improving efficiency in the use of public resources. A fundamental aspect of the quality of public finances is the efficiency of government entities in the provision of goods and services. In general terms, its evaluation is done by comparing the resources used with the quantity/quality of goods and services provided. This section deals with the efficiency of the Portuguese general government in its role of health care and education supplier. This is a complex issue that involves commitments with other objectives such as equity and economic growth. However, the analysis here presented will not take into account any equity concerns or macroeconomic considerations. It is worth noting, however, that education is deemed to be one of the key factors for a sustained increase in labour productivity. As regards health, economically sustainable health care systems should relieve the pressure on public accounts while keeping the population healthy, preventing negative impacts on labour supply and productivity.

In Portugal, public spending on health and education reaches nearly 30 per cent of overall government expenditure (Figure 6.20). A comparison with other European Union countries shows that the Portuguese general government spends relatively more on these two sectors, especially on education.¹⁸ In the last decades, health and education outlays had a sizeable contribution to the upward trend of public expenditure (from a functional classification perspective, only surpassed by “social protection”). In the medium to long run, in the absence of new measures, health expenditure will record

¹⁸This generally holds when the comparison between countries' expenditure is made by using other standard indicators (some more accurate but not available over time). For example, the Portuguese annual expenditure on educational institutions per student (based on full-time equivalents) relative to GDP *per capita* increased and in 2005 was one of the highest among the OECD countries (OECD (2008)).

a strong growth, especially driven by cost pressures (partially, associated with technology progress) and population ageing (see Section 6.3.2). Also related to demographic changes, educational institutions started to experience a decline in the number of students, which, if the flexibility of the system allows, may free resources without sizeable impacts on outcomes.

Figure 6.20: Public expenditure on health and education: comparison with EU15 developments



Source: European Commission (AMECO database).

In broad terms, the provision of a specific good or service is classified as efficient when a given performance is achieved using as few inputs as possible. In the public sector its empirical assessment faces many challenges. There are issues related to the level of aggregation and to data requirements. For example, cross-country comparisons are often hampered by the lack of strictly comparable data between countries. The difficulties extend to the definition of the production process, in particular the relevant inputs, outputs and ultimate policy objectives or outcomes.¹⁹ The problems are also related to the measurement of the variables of interest in a precise way. For instance, an approach based on a “value added” specification that

¹⁹In the literature, the concept of efficiency is more often associated to performance measured by outputs, while the concept of effectiveness is usually broader, associating performance with both outputs and outcomes.

takes into account the cumulative influence over the years, could be preferable but is very demanding in terms of data, which might explain the small number of studies that follow it. Additionally, price data are generally unavailable because public sector outputs are often not subject to market transactions. As a consequence, the studies often focus on technical efficiency, by working mainly with outputs and inputs measured in physical units. Finally, it is often difficult to choose among the available methodologies for evaluating efficiency. To date, literature has not come up with an optimal method (all of them have advantages and disadvantages). The peculiarities of the sector, together with the availability of information (in particular the underlying data set), should determine, in each case, the most appropriate technique and how results should be used.

In the health sector, the measurement of efficiency is especially hampered by the nature of its production process. Outputs should reflect the degree of improvement in the population health status. In practice several shortcomings exist. For example, when measuring the role of the health care public policy, one should study those changes in health status strictly attributable to public resources devoted to health care. Since disentangling the effect of private and public spending is virtually impossible, empirical work has focused on health care *per se*. Depending on the type of analysis, different outputs proxies have been used. Aggregate level studies commonly consider average outcomes, such as life expectancy or mortality indicators, while microeconomic analysis use information on health care services, such as the number of consultations or surgical interventions. The difficulties in finding proper indicators are extended to the definition of health resources, since health status is a function of several variables, many of which are exogenous to the provider (e.g. education, income). Expenditure as a share of GDP provides a broad indicator, whereas labour and capital measures (e.g. number of doctors, nurses, beds) allow a more complete characterization of the production process. An additional difficulty is related to health services heterogeneity, which hampers the determination of the underlying technology and, as a consequence, the functional form. Cross-country analyses of health care efficiency were in the past somewhat limited by the lack of available data and suitable analytical techniques. The recent compilation of more comprehensive and standardized cross-country databases and the improvement of evaluation methods enabled, even with several caveats, such inter-

national assessments in the last years.

Also the modelling of the production of education services raises some specific problems. The main purpose of education is to develop the skills and knowledge of students which are hardly measurable. Depending on the coverage of the efficiency analysis, several proxies for educational output and outcomes may be used, as levels of schooling, attainment level, standardized test scores or approval rates. Moreover, the resources determining students' performance can be difficult to incorporate in an efficiency assessment. Expenditure as a ratio to GDP provides a broad indicator. Nonetheless, ideally, the analysis should go much further by including education institutions inputs, control for family and classmates background influences, as well as innate endowments and learning abilities. Some of those factors influencing the educational production process are not observable and/or quantifiable, and, as such, are ultimately impossible to take into account in the analysis.

The objective of this section is to review recent empirical evidence on the relative position of Portugal in a cross-country analysis of public spending efficiency, with a view to assess the extent to which there is scope for achieving improvements in the use of public resources. It is structured as follows. Section 6.4.2 examines efficiency in the Portuguese health sector, devoting some attention to the characterization of the system and presenting the available evidence on efficiency developments. Section 6.4.3 conducts the same exercise for the education sector.

6.4.2 Efficiency in the health sector

The Portuguese health care system

The Portuguese health system is composed of a network of public and private health care providers and funding schemes, organized around the National Health Service (NHS) in the continent and around the regional health services in the Azores and Madeira.²⁰ Since 1979, with the inception of the NHS, Portugal has a public health insurance scheme that covers all residents. At the same time, a considerable share of the population (about one fourth) benefits from overlapping mandatory "corporatist" health protection sub-

²⁰Regional services are implemented by regional governments and follow the same principles of the NHS.

systems (Barros and Simões (2007)).²¹ In general, subsystems beneficiaries also have access to the NHS services, benefiting from double or multiple coverage which allows an enlarged choice of providers and a decrease in the time needed to get health care. Part of this overlapping is a legacy from the past related to the reluctance shown by successive governments to integrate subsystems into the NHS (Oliveira and Pinto (2005)). Voluntary health insurance still remains relatively uncommon, covering a small part of the population (estimates range between 8 and 20 per cent), mostly built up through employment schemes. Portugal's NHS and others following the *Beveridge* model (United Kingdom, Spain and Ireland) are based on the principle of universal coverage, the production of health care is often a responsibility of public units and the funding is by general taxes, contrasting with social insurance systems (Belgium, France and Germany, among others) that are financed through social contributions of employees and employers. The funding by general taxation points to a progressive scheme. According to Pereira (1998) and De Graeve and Ourti (2003)²², however, there is evidence of regressivity in health care financing in Portugal especially due to a high share of out-of-pocket payments (e.g. medicines co-payments and direct expenses for private services) and uncapped tax credits related to health care expenditure borne by households.²³

Around 90 per cent of the NHS budget is financed by central government and the remaining come from NHS own receipts, mainly generated by hospitals when collecting payments from services provided to beneficiaries of health subsystems and private insurers. The entities of the NHS typically adopted a historical approach (based on past developments) in the elaboration of their budgets. Currently, hospitals are moving towards contract-based budgeting and a performance-related pay is starting to be implemented in new primary care centres. Both procedures are a proxy to the needs-based approach (the optimal allocation method) if the services are expected to provide fit the health care needs of the population (Bar-

²¹Most of the subsystems beneficiaries work in the public sector. The public employees' subsystem (ADSE) covers 13 per cent of the population (Oliveira and Pinto (2005)).

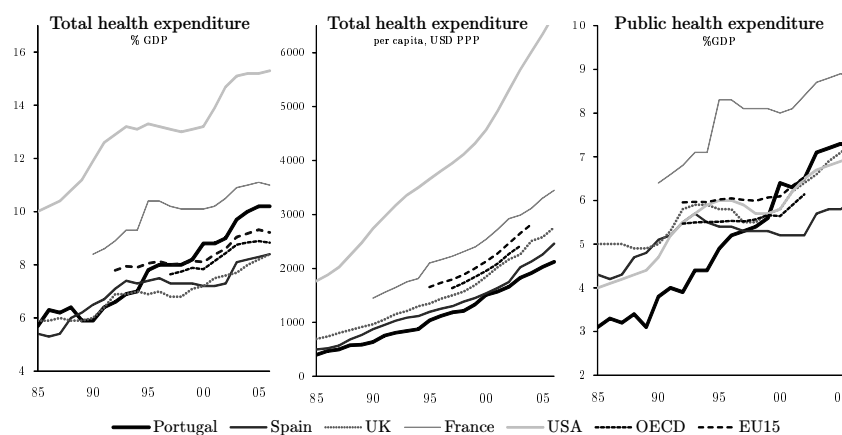
²²An OECD cross-country study on equity in access to health care services found out that Portugal is one of the countries with a more "pro-rich" health care system.

²³Note that low income households exempt from the personal income tax do not benefit from this tax credit. For details, see *Comissão para a Sustentabilidade do Financiamento do Serviço Nacional de Saúde* (2006).

ros and Simões (2007)). It should also be highlighted that, until 2005, the State transfers to the NHS considered in the initial Budget were most of the times insufficient, leading to a significant accumulation of debt, which was settled afterwards by the Treasury. Since 2005, there has been an effort to move away from this unrealistic under-budgeting.

In Portugal the ratio of health care spending to GDP followed an upward trend in the last few decades (Figure 6.21). The growth was so sharp that, even taking into consideration that in 1970 Portugal had one of the lowest figures among OECD countries, it now reaches around 10 per cent of GDP, placing Portugal among the countries with the highest relative level of health care outlays across the EU and the OECD (albeit the country also presents one of the lowest levels of *per capita* health care expenditure). Public expenditure accounts for most of this rise, representing in recent years more than 70 per cent of total health care outlays. In fact, since the mid-1990s, public health expenditure grew at a fast pace, while private spending remained relatively constant as a percentage of GDP. Out-of-pocket payments account for more than 80 per cent of private funding.

Figure 6.21: Evolution of health care expenditure



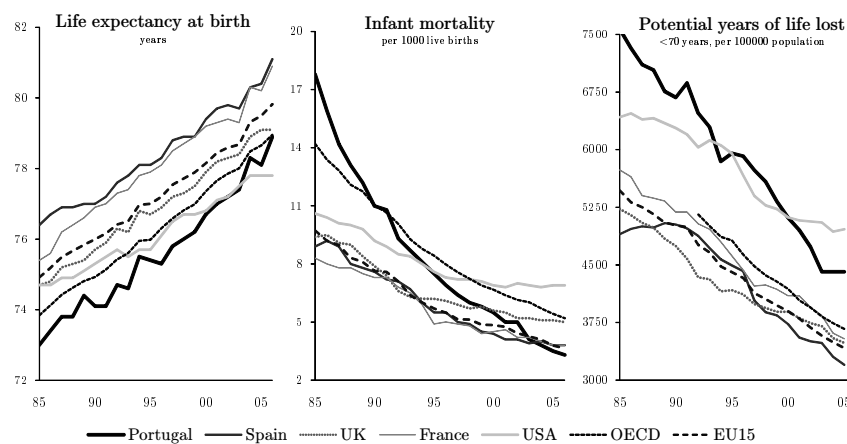
Source: OECD Health Data 2008.

Note: In the figure related to the public health expenditure, the OECD average excludes Belgium and Slovak Republic and the EU15 average excludes Belgium.

The growth of expenditure on health care is closely related with a substantial reduction of the gap in health status vis-à-vis the re-

maintaining OECD countries, especially regarding the mortality statistics (Figure 6.22). Nevertheless, Portugal still lags behind most of the OECD countries in several health status indicators. Joumard, André, Nicq and Chantal (2008) elaborated a cluster analysis based on population health status data for 2003, which resulted in the definition of three groups of countries. Portugal was classified in the intermediate level together with countries like Germany, United Kingdom and United States, worse than the group that included Japan and Spain, for example, and better than countries like Hungary or Mexico. Moreover, despite the improvements undertaken in the early 2000s the Portuguese population was still dissatisfied with the health care system.

Figure 6.22: Evolution of health status



Source: OECD Health Data 2008.

Note: In the figure related to the infant mortality, the OECD average excludes Korea. In the figure related to the potential years of life lost, the OECD average excludes Belgium, the Czech Republic, Mexico and Turkey, and the EU15 average excludes Belgium.

Efficiency of the Portuguese health care expenditure: some evidence

As shown in the previous section, in Portugal the financial resources directed towards health care reached an impressive level when compared to the country's income (based on both country's past history and international standards), leading to an improvement of the pop-

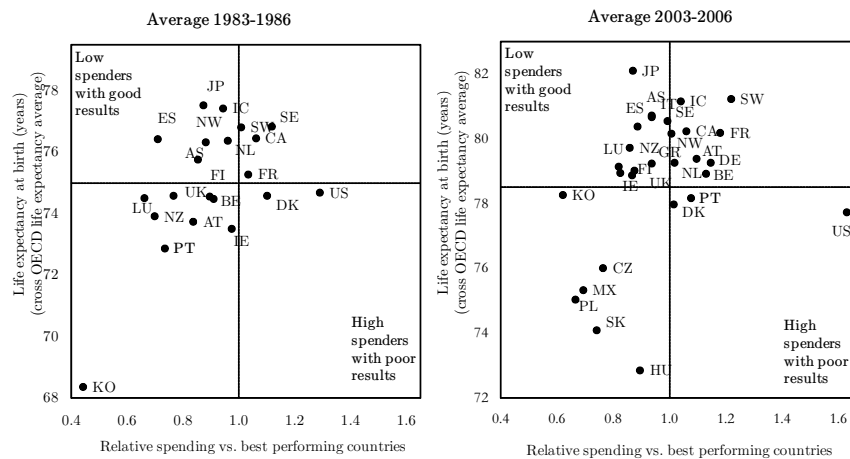
ulation health status. The question of whether the additional resources have been efficiently spent naturally arises, i.e. if the upgrade on the health status of the Portuguese population could have been achieved with fewer inputs.

A first overview of health care efficiency can be obtained by plotting in a graph the level of health expenditure-to-GDP and health status indicators. Using data for OECD countries, two variables were selected as indicators for health status, taking into account the economic rationale, country and time coverage: life expectancy and infant mortality.²⁴ A benchmark is computed as the average spending of the five countries that have achieved the highest health outcomes.²⁵ The idea is to assess whether the non-benchmark countries achieved their own results with less or higher use of resources. In order to incorporate the time dimension, Figures 6.23 and 6.24 include recent statistics (2003-2006) as well as the results for the period preceding the accession to the European Community (1983-1986). In regard to longevity figures, Portugal decreased its outcome gap vis-à-vis the OECD average, along with a steady increase of the level of resources (very significant even in relative terms). Thus, the assessment of its performance is not clear cut. Nevertheless, the figure provides some indications that Portugal reached an intermediate level of efficiency. For example, it performs better than the United States and worse than Ireland. Looking at infant mortality data, Portugal's efficiency seems slightly higher. Two decades ago, Portugal was a low spender with lower bound results while nowadays it reduced the gap and even exceeded the OECD average on that particular indicator. Nonetheless this may have been achieved at the cost of becoming a high spending country, exceeding the benchmark.

Efficiency can also be assessed using more sophisticated statistical approaches, such as the frontier methods. The results are quite diverse and the methodologies are not well established. Raty and Luoma (2005) used a simple framework based on the construction of an efficiency frontier by defining directly the best performing countries that allowed the elaboration of cross-country rankings. The estimation was conducted for a sample of OECD countries using data

²⁴Joumard et al. (2008) make an extensive analysis of available indicators and also concluded that although imperfect indicators they remain the best available proxies for the population's health status.

²⁵For each country, it is computed a ratio of its spending-to-GDP to the average spending-to-GDP of the five best performers. If it is less than one, the country spends less, while if it exceeds one, it spends more.

Figure 6.23: Health care spending and longevity

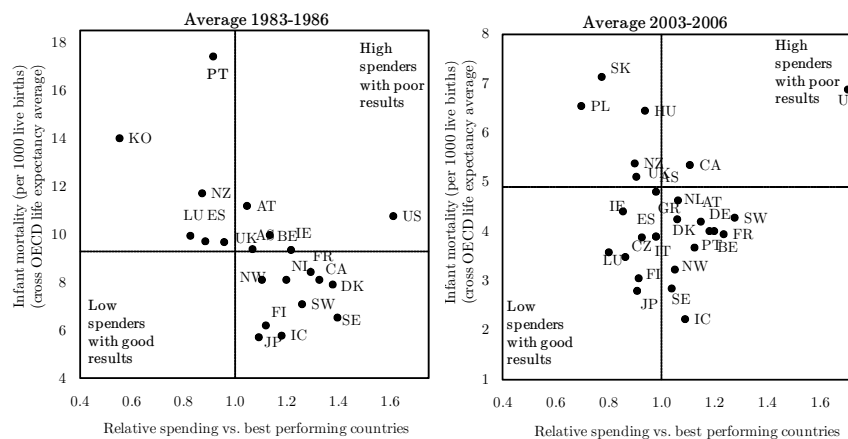
Source: OECD Health Data 2008.

Note: Spending on health care is measured as the ratio of each country to the average of the five countries with the highest life expectancy at birth. The benchmark changes across periods.

for the 1999-2002 period. The conclusions for Portugal are consistent with the previous procedures, showing a mid ranking position. This study is an interesting complement to the previous figures because they use the same output measures but instead of an aggregated monetary input (spending-to-GDP), the resources are measured in physical units (number of doctors and practising nurses).²⁶ It is noteworthy that since the results are similar, the option for monetary versus physical inputs does not seem crucially relevant when comparing the Portuguese health sector with its OECD counterparts.

Measuring performance by evaluating the way resources are converted into output/outcomes should go beyond the traditional analytical efficiency analysis. Efficiency is influenced by the degree to which health care financing and delivery systems have a good design of incentives and are publicly controlled. Although health care systems are quite diverse, OECD identifies three different models: public-integrated, public-contract and private insurance/provider.

²⁶More recently, Afonso and St.Aubyn (2006) and Spinks and Hollingsworth (2007) introduced new factors by taking into account environmental variables (non-discretionary inputs), such as income and education. The results, however, are not free from several important caveats.

Figure 6.24: Health care spending and infant mortality

Source: OECD Health Data 2008.

Note: Spending on health care is measured as the ratio of each country to the average of the five countries with the lowest infant mortality rate. The benchmark changes across periods.

Initially, the NHS combined public financing with the direct provision of health care (public-integrated model). This sort of arrangement is perceived to generate serious inefficiency problems and shows little responsiveness to population needs (Docteur and Oxley (2003)). Following countries like the United Kingdom, since the mid-1990s some decentralization has been gradually introduced in Portugal and nowadays integrated services (health care centres and some public hospitals) coexist with other entities which provide services under contract with the NHS. The reform initiated in 2002 - in which several public hospitals were gradually transformed into public corporations - is an important example of this trend. The hospitals that remained within the general government continued to work broadly with the same rules, whereas the new corporate hospitals started facing different conditions, in particular regarding management procedures and the relationship between the financing/purchaser entities and the providers of health care services. In their contract-based approach a target for the level of services to be provided and the corresponding payments are explicitly defined. Prior to this reform, two studies based on 1999 and 2001 data showed that an important share of hospital spending was avoidable

(Barros (2003) and Oliveira (2003)). The assessment of this reform in what regards the efficiency goal was already made and the results point consistently to efficiency gains (Comissão de Avaliação dos Hospitais SA (2006), Costa and Lopes (2005), and Moreira (2008)). Moreira (2008) uses a non-parametric efficiency method to compare the performance of the transformed hospitals with a control group (composed by hospitals that remained within the general government) before and after the reform (2001-2002 and 2003-2005, respectively). Taking into account the availability of data and the characteristics of Portuguese hospitals, the study considers a broad model that includes disaggregated inputs as occupancy, different categories of hospital staff and some proxies of pharmaceutical products and other products of medical consumption, and as output proxies, in-patient discharges, external consultations, day hospital sessions, urgency episodes and out-patient surgeries. Results show that important changes have occurred in the sector and it presents evidence of efficiency gains in the transformed hospitals vis-à-vis the control group, having, nevertheless, room for further improvements. Since public hospitals are responsible for a large share of overall expenditure on health this evidence is one plausible explanation for the previously mentioned efficiency gains in the health care system as a whole.

Organizational designs play a major role in the attainment of an efficient performance. In this regard, several points should be highlighted. The first one is that the Portuguese allocation of health care resources by functions is considerably different from the OECD average. In 2005, the ratio of personal medical care services to overall health expenditure comprises 61 per cent of curative-rehabilitative care, 1 per cent of long-term care and 10 per cent of ancillary services, which compares with 57, 11 and 4 per cent, respectively in the OECD (OECD (2007)). Moreover, in the same year, the share of public expenditure with health care allocated to prevention is just 1.4 per cent (3.1 per cent for the OECD countries, on average). These figures reflect a focus on health treatment, while it is known that moving towards prevention is often associated with more efficient outcomes. In fact, the Portuguese health care system invested relatively more on secondary services (for instance, top medical practices are easily found in several Portuguese hospitals) than in primary services, such as the ones provided in health care centres.

Another feature of the Portuguese health care organizational sys-

tem that raises more efficiency concerns is the overlapping coverage. The non-integration of the public subsystems into the NHS is problematic in terms of both equity and efficiency as they involve a more favourable treatment for particular groups and create supply-induced demand from providers and moral hazard behaviour by beneficiaries. The evidence seems to corroborate the relevance of the effects on efficiency since the increase in expenditure in the civil servants subsystem expenditure was much faster than the growth of total public health care spending and seems inappropriate given the percentage change in the number of beneficiaries (Oliveira and Pinto (2005)). Moreira and Barros (2009) produce some empirical evidence on the effect of the supplementary health insurance stemming from both insurance plans of public employees and private companies, suggesting the importance of the design of incentives in explaining the existence of inefficiency in health care expenditure. The study has the particularity of estimating the impact of health subsystems in different parts of the distribution of the endogenous variable, which is the number of doctor visits during three months. After controlling for health status, socioeconomic variables, seasonal and geographical effects, it shows that the additional coverage provided by the Portuguese subsystems is important in explaining the utilisation of health services. When the effects of the public and private health insurance plans are compared it is clear that the moral hazard derived from private subsystems is much higher than the one derived from the health insurance plan of public employees. An additional analysis for the youngest cohort shows that the estimated effects of both public and private health insurance treatment are higher than the ones for the full sample, possibly reflecting some accumulated health benefits of subsystems beneficiaries. The final report of a commission that recently assessed the sustainability of the NHS funding concluded, however, that there is no evidence that the additional consumption of health care services have impact on the self-assessment of health status. The same report, also studied the effects of double coverage on the decision of going to a general practitioner or to a specialist doctor, pointing to a higher consumption of specialist consultations among subsystems beneficiaries.

The analysis of expenditure on medicines is also important to evaluate the efficiency of the health care system. In the case of Portugal, it corresponded in 2006 to 2.1 per cent of GDP (excluding hospital consumption), which is a very high figure when compared with

other OECD countries (expenditure *per capita* is, however, below the OECD average). Over recent years, Portugal is attempting to curb the sharp rise of this kind of expenses. This was made, primarily, through the promotion of the use of generic drugs (with public information campaigns, changes in the co-payments rate and new rules on medical prescriptions) and the application of reference pricing for reimbursement, including protocols with the pharmaceutical industry (Barros and Simões (2007)). These changes in incentives of both consumers and producers seem to have very promising impacts on improving efficiency.

Also, the human resources management can be a source of inefficiency. For years the compensation system did not provide financial incentives for doctors to work efficiently in the public sector. Compensation of the health professionals in most public services was completely dissociated from their performance, since it depended on their professional category and length of service. In order to materialize the explicit policy objective of introducing some flexibility in management, since 1993 doctors were formally allowed to practice in both the public sector and private sectors (although this was already common). At the beginning of the nineties, wages of medical staff in the public sector were less than half of the EU average, while services provided by the private sector were priced on average 30 per cent above the EU as a whole (Oliveira and Pinto (2005)). In this context, the effects of this measure were completely contrary to its initial purposes: a small number of doctors opted for working full-time in the public sector, the control of public versus private activity was loose and the motivation of doctors to work efficiently in the public sector decreased (Oliveira and Pinto (2005)).²⁷ Nowadays, although some non-financial incentives (in particular, doctor status and pension schemes) are becoming less appealing, the reform launched in 2002 is expected to improve performance incentives and reduce inefficiency, mainly through the introduction of individual labour contracts (which in the meantime, was extended to all public sector in new hires), so that, for instance, public hospitals are allowed to hire personnel and apply different payment schemes. Besides remuneration incentives, there are some issues concerning the mix of specialist/general practitioners and nursing/medical staff.

²⁷ Also Bago d'Uva and Jones (2008) refer that another consequence of the measure was encouraging doctors to transfer patients from the public to the private sector.

In Portugal, human resources have been characterized by a strong emphasis on specialist hospital care and an insufficient number of general practitioners. The shortage of doctors in some specialist areas made the drawbacks of the system more evident, leading to the recruitment of a significant number of foreign doctors. This phenomenon is related to the fact that the creation of new posts for doctors and nurses within the NHS requires government's approval and medical schools had quite limited *numerus clausus*. Moreover, the ratio of practising nurses to practising physicians in Portugal is one of the lowest among the OECD countries.

Summarizing, a number of factors are relevant to explain the growth of health care expenditure in the last few decades. Some of the most important are the poor design of incentives for human resources, the non-accountability of providers and managers, the fast expansion of public subsystems expenditure and the increase in the medicine co-payments. Up to the early 2000s, there has been only minor improvement in efficiency. This was mainly due to institutional inertia and the lack of incentives for changing providers and consumers behaviour (Oliveira, Magone and Pereira (2005)). In the last couple of years, however, the strong growth of spending has been contained. The hospital reform launched in 2002, the development of new models of financing (which impose tighter budget constraints), the possibility for the private sector to play a larger role in service provision and the promotion of generic drugs, amongst others contributed to this outcome. Nevertheless, there is clear room for further efficiency gains in the health care delivery in Portugal. Future efficiency gains are the only way to offset cost pressures (driven from an ageing population and from technological progress) and simultaneously improving the health status of the population. To achieve durable results, a full implementation of ongoing reforms and some new measures (such as a more systematic approach in health care provision and the extension of the role of health technology assessment from medicines products to other health goods/equipments) are needed.

6.4.3 Efficiency in the education sector

The Portuguese education system

In the Portuguese educational system, compulsory education comprises nine years (primary and lower secondary education), divided

into three cycles: the first cycle covers the first four years, for children from the age of six onwards; the second cycle covers the 5th and the 6th year and the third cycle includes years 7th through 9th. The current level of minimum years of required schooling was changed from six (encompassing just the first and second cycle) to nine years in 1986.²⁸ Students who wish to enrol in university (tertiary education) have to complete three additional years of schooling (upper secondary education) and get approval in the 12th grade examinations.

In Portugal, as in the vast majority of OECD countries, the public system covers most of the student population, especially at low education levels. Portuguese public schools have central government financing, which pays for teachers salaries at the primary and secondary level and some other current and capital expenditure (local governments are responsible for the remainder).²⁹ The management and decision processes of public schools are highly centralized, especially in what regards to the common curricula, teachers hiring process and wage policy (until recently, essentially based on seniority). Schools only have partially discretion on the appointment of school directors and the students' evaluation methods. Regarding tertiary education, public universities have a higher degree of autonomy, but are also essentially financed by central government, since tuition fees play a minor role.

In a context of population ageing, the total number of students enrolled in education has decreased since mid-1990 (Table 6.6). This decline occurred along with the steady growth of the enrolment rates - percentage of population enrolled at typical school age - at upper education levels. For example, between 1985/86 and 2004/05, the share of student population enrolled in tertiary education increased more than fourfold. Nevertheless, Portugal, Luxembourg and the United Kingdom were the only EU countries in which, in 2006, more than 20 per cent of the population aged 15 to 19 is not enrolled in education (OECD (2008)). Besides the extension of mandatory education (enrolment rates are usually high up to the end of

²⁸The age at which compulsory education ends ranges from 14/15 in Korea, Portugal, and Turkey to 18 in Belgium, Germany and the Netherlands. In the other OECD countries it lies between these two extremes. In 2009, Portugal increased to 18 years old in order to cover the upper secondary level of education.

²⁹In the autonomous regions of Azores and Madeira, the regional governments are responsible for education expenditure of primary and secondary level, financing expenditure mainly through transfers from central government.

compulsory education and decline gradually over upper education levels), the increase in attendance at upper education levels is also explained by the success in reducing school drop out rates (Clements (1999)). Portugal presented one of the highest repetition and drop out rates among the OECD countries, reflecting the difficulties in advancing in school education. Although educational attainment has improved in recent generations, it remains well below the OECD average among adult population (Figure 6.25). In 2006, only 28 per cent of the Portuguese adult population aged 25 to 64 had completed at least upper secondary education (to be compared with the OECD average of 68 per cent). Considering the age group from 25 to 34, this percentage rises to about 44 per cent, though remaining well below the corresponding OECD figure of over 78 per cent. Also the performance of Portuguese students in recent international examinations has revealed poor competency levels. For example, in the 2006 OECD's Programme for International Student Assessment (PISA) for proficiency in mathematics of 15-year-olds, Portugal ranked 26th among 29 countries (Figure 6.25).

Table 6.6: Student enrolment in Portugal

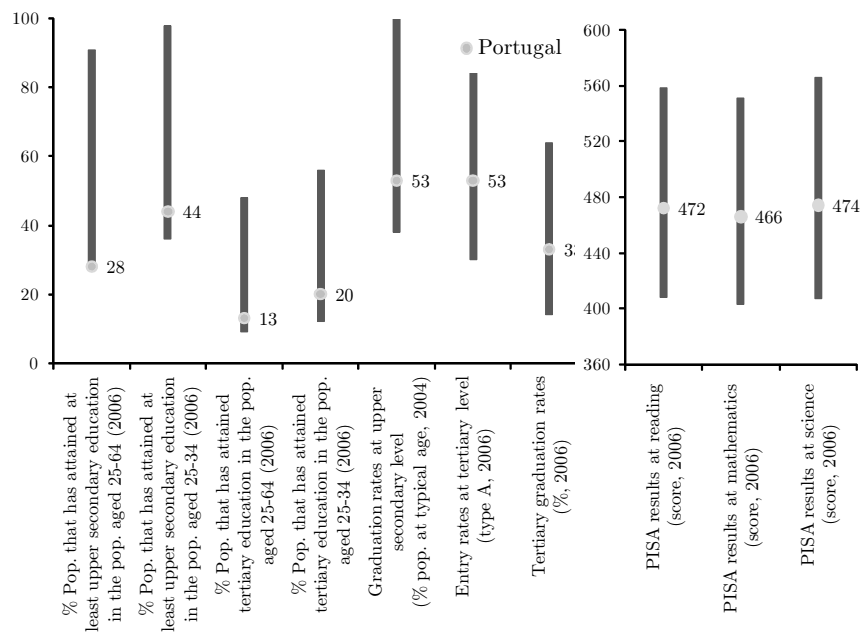
	85/86	90/01	95/96	00/01	04/05
Total students (10³)	2,103.4	2,190.9	2,327.5	2,260.2	2,138.6
<i>Public share (%)</i>	89.1	86.6	82.8	81.2	80.9
Enrolment rates (%)					
Pre-primary	26.7	47.1	55.7	74.8	77.4
Primary- basic 1	100.0	100.0	100.0	100.0	100.0
Primary- basic 2	60.7	71.7	88.1	87.0	86.4
Lower secondary- basic 3	41.0	58.3	80.8	86.8	82.5
Upper secondary	17.8	31.0	58.8	62.5	59.8
Tertiary	6.0	10.8	20.3	26.1	27.2
<i>Public share (%)</i>	84.9	73.3	63.8	70.6	75.0

Source: Ministério da Educação (GIASE - *Séries cronológicas: 30 anos de estatísticas da educação*), 2006.

Note: Enrolment rates are computed as the percentage of students at normal age attending classes per population at that age level.

In Portugal the ratio of expenditure on educational institutions³⁰ to GDP followed an upward trend in the last decades, although less

³⁰This indicator covers expenditure on schools, universities (including the spending on research and development) and other public and private institutions involved in delivering or supporting educational services. Includes instructional services and others, like housing and transport (when provided by the institutions).

Figure 6.25: Indicators of education outcomes

Source: OECD, Education at a Glance (2008).

Note: For each indicator, the length and position of the bar is obtained from the maximum and minimum values recorded by the OECD countries.

pronounced in recent years. In 2005 (the last year with information available) this ratio reached 5.7 per cent of GDP, of which 5.3 per cent were public outlays. The level of expenditure per student was slightly below the OECD average, although this represented a higher-than-average spending effort when measured against the Portuguese GDP *per capita* (for which the gap vis-à-vis OECD average is wider). Regarding outlays composition, the most prominent feature is the large share of teachers' compensation in overall expenditure, whereas both other current and capital expenses are relatively low.

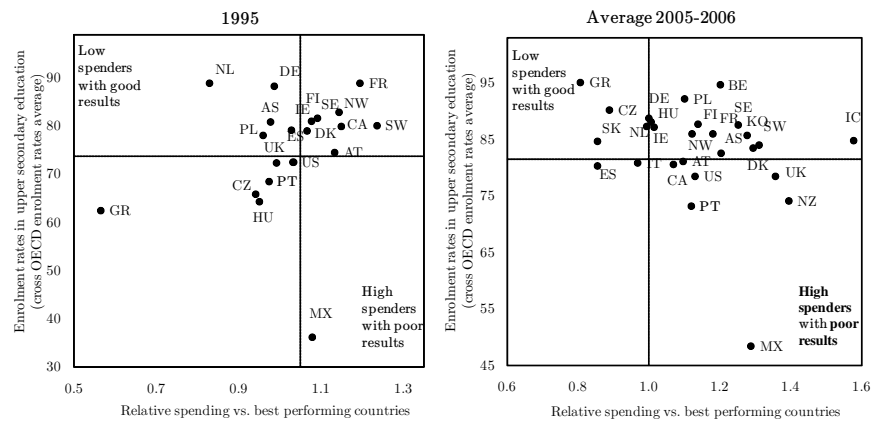
Efficiency of the Portuguese education expenditure: some evidence

The relationship between resources devoted to education and the outcomes achieved has been analysed in many studies in recent years both in terms of efficiency and equity. The previous descrip-

tion of the main features of the Portuguese education system gives little evidence about its efficiency. As mentioned, on the input side, the proportion of national income allocated to educational institutions increased over recent years, presenting, nowadays an amount slightly below the OECD average (or above if taken as a ratio of GDP *per capita*). On the output side, cross-country comparisons show that Portugal performs very disappointingly in international examinations, even though more people are completing upper secondary and tertiary education than ever before.

For a first overview of the Portuguese efficiency in producing education, Figure 6.26 plots together the enrolment rates (more specifically, percentage of full-time and part-time 15-to-19-years-old students in the population aged 15 to 19 years old) and the ratio of expenditure on educational institutions to GDP (excluding tertiary education). The data was taken for the OECD countries and a benchmark was computed as the average spending of the five countries that achieved the highest enrolment rates. Here, as in the health efficiency section, the idea is to determine if the non-benchmark countries use a lower or higher resource level. Note, that the fact that countries with similar levels of spending on education may reach different performance levels suggests that there is room for reducing inputs while holding outputs constant, or, on the contrary, for increasing outputs while holding inputs constant. In 1995, Portugal was among the group of countries with poor results that spend below the benchmark, whereas in recent years, expenses exceeded the value for the reference group and the enrolment rates (although higher) remained below the OECD average. From this exercise, it results that Portugal did not achieve sizeable efficiency improvements, and even worsened its relative performance.

The use of enrolment rates as output proxy raises several issues. It represents a “quantity” measure and often the literature suggests an approach more focused on outcomes that take into account the quality of education (Sutherland, Price, Joumard and Nicq (2007)). OECD’s PISA (2000, 2003 and 2006) scores are often pointed out in the literature as the ideal educational attainment proxy for cross-country comparisons. PISA is an internationally standardised assessment test administered to 15 year-old pupils (those who have almost reached the end of compulsory schooling in most countries), which aims at measuring the cumulative output of primary and lower secondary education. Its questions (in reading, mathemat-

Figure 6.26: Enrolment rates and spending

Source: OECD, Education at a Glance (2008).

Note: Enrolment rates are computed as the percentage of full-time and part-time 15-to-19-years-old students (from public and private institutions) in the population aged 15 to 19 years old. Spending is measured as expenditure on primary and secondary educational institutions as a percentage of GDP, being presented in the graph the ratio of each country to the average of the five countries with the highest enrolment rates. The benchmark changes across periods.

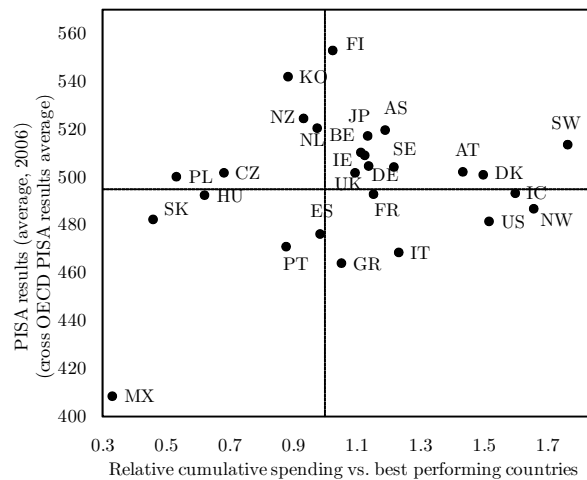
ics, science and problem-solving fields) are designed to capture real-life aptitudes and not just academic attainment. This indicator still has some drawbacks, like the fact that its scope is limited to education up to the age of 15 and to certain subjects. In a similar exercise to the one performed for the enrolment rates, the PISA results are plotted together with two different input indicators: cumulative spending on primary and lower secondary education per student³¹ and teaching staff per 100 students. Regarding the first indicator, the idea is to quantify the accumulated resources invested and outcomes achieved in compulsory education by comparing the average spending per student, over the period of primary and lower secondary schooling (between the ages of 6 and 15 years), with average student performance in PISA examinations. When compared with the spending inputs previously mentioned, the teacher-student ra-

³¹Spending per student is approximated by multiplying public and private expenditure on educational institutions per student (in 2002 at each level of education) by the theoretical duration of education (at the respective level), between the ages of 6 and 15 years (OECD (2008)). The results are expressed in USD using purchasing power parities.

tio has one important distinctive feature: it is a volume rather than a value indicator. Thus it allows the measurement of technical efficiency but not of cost efficiency.³²

The results for cumulative spending and teaching staff per 100 students are presented in Figures 6.27 and 6.28, respectively. According to Figure 6.27, Portugal's financial input indicator is slightly below the OECD average while its output is one of the lowest. As in the former exercise, the linear correlation between the input and output measures is not strong, being only a small part of the outcome variation between countries explained by the outlays. As expected the dispersion of the spending measure is higher than that obtained using a physical input indicator. Taking into account the teacher-student ratio, Portugal exhibits very poor efficiency performance. Indeed, it records one of the poorest PISA scores in conjunction with the highest teacher-student ratio.

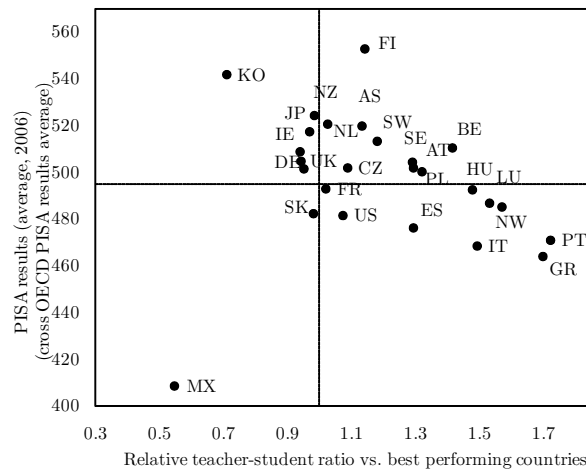
Figure 6.27: Pisa results and cumulative spending



Source: OECD, Education at a Glance (2008).

Note: PISA results are measured as the average of the scores on reading, mathematics and science. The inputs are proxied by the cumulative expenditure on educational institutions per student for all services over theoretical duration of primary and secondary studies, being presented in the graph the ratio of each country to the average of the five countries with the highest PISA results.

³²The assessment through spending indicators also depends on international differences due to disparities in unit labour costs and both quantity and price of other important resources available in schools, as computer resources.

Figure 6.28: Pisa results and teaching staff

Source: OECD, Education at a Glance (2008).

Note: PISA results are measured as the average of the scores on reading, mathematics and science. The inputs are proxied by the teaching staff per 100 students, being presented in the graph the ratio of each country to the average of the five countries with the highest PISA results.

As in the health sector, efficiency estimates on education derived from more sophisticated statistical methods are quite diverse and evidence on countries performance is still open to debate. Portugal is not an exception in this context.³³ In the efficiency frontier literature, only Clements (1999) is especially focused on the Portuguese education sector using international data. As far as studies based on disaggregated data are concerned, there is few efficiency analysis of education based on micro data (Oliveira and Santos (2005), Carneiro (2006) and Pereira and Moreira (2007)). For instance, Pereira and Moreira (2007) point towards the existence of technical inefficiencies at the school level by showing that an efficient use of the existing resources might increase examination scores (on average, by about 10 to 20 per cent). This result regards the assessment of the technical ef-

³³Diversity of estimates for Portugal's efficiency on education seems very dependent on the particular inputs and outputs chosen, in particular the decision on physical/monetary inputs, as well as different approaches for correcting the effects of environmental factors (such as *per capita* income and parental education attainment). Also Sutherland et al. (2007), with a comparison of country- and school-level estimates of technical efficiency, show that relative high efficiency scores usually found in country-level analysis are an artefact of the small sample size.

efficiency level of the Portuguese schools offering secondary courses by estimating a production frontier of school outcomes, measured by average school scores in the 12th grade national examinations, as a function of an extensive array of variables representing the relevant characteristics of schools and environmental factors. In turn, Clements (1999) analyses efficiency of education expenditure using a non-parametric frontier approach to compare several countries. Depending on the particular combination of input and output variables, Portugal ranks between 9th and 20th positions out of 20 countries compared. Wilson (2005) included Portugal in the sample, albeit without focusing on a particular country, providing a more comprehensive analysis by using student and school level data. Among 40 countries, Portugal (represented by 143 schools) was classified as particularly inefficient, being ranked between the 27th and 39th positions.

The discussion on how to achieve efficiency gains lies beyond the scope of this section. Nevertheless, some aspects that affect the relationship between spending and students performance will be briefly addressed. The first question that arises is whether public/private nature of the schools influences the results. International evidence suggests that differences in estimates of efficiency tend to be modest. For instance, Sutherland et al. (2007) point that the median public school is slightly less efficient than both the median government dependent private school and median independent private school and, schools that rely on public sources for most of their funding also tend to be slightly less efficient than other institutions. For the Portuguese case, Pereira and Moreira (2007) comparing the examination scores of secondary schools in public and private sectors, present evidence that the latter are more efficient than their public counterparts, although their individual performance is quite heterogeneous. Pereira and Moreira (2007) provide some guidelines pointing to the existence of potential efficiency gains from policy measures aimed at promoting the inclusion of some management practices common to the private sector, like teacher accountability and merit rewarding mechanisms, in schools that are under the control of the general government. International evidence on effects of institutions and resources on student performance (Fuchs and Woessmann (2007)) also suggest that students perform better in countries with more school autonomy, including personnel hiring. The dimension of education institutions also seems to be important. Sutherland et al. (2007) find

that smaller schools tend to be less efficient than larger schools. Also Pereira and Moreira (2007) estimates point to scale economies in secondary education, indicating potential gains from further concentration of resources.

Vis-à-vis the OECD average, one of the most distinctive aspects of the Portuguese education system is the organisation of the learning environment of the students in each school. The composition of outlays reveals a massive importance of teachers' compensation as a share of total expenditure on education (common to all levels of non-tertiary education). The OECD computes an interesting indicator about resource usage that decomposes the differences between teachers compensation cost per student (as percentage of GDP *per capita*) in each country and the OECD average, at the upper secondary level of education. Among OECD countries, Portugal presents the highest wage cost per student (20.9 per cent of GDP *per capita* in 2004), 10 p.p. higher than the average. This figure results from both volume and price effects. Compared to GDP *per capita*, teachers' salaries in Portugal are higher than the average. On the volume side, three factors are taken into account to explain the allocation of teachers' hours: teaching time, class size and instruction time. Portugal has both a number of teaching hours and class size significantly below the OECD average. The only effect that dampened the wage difference is instruction time for students, which is above average. This high spending on the education system is not coupled in Portugal with satisfactory outcomes. Following a frontier method, Pereira and Moreira (2007) indicate that the "quality" of teachers has more impact on output than "quantity": the change in the number of teachers per student tended to have less influence on output than differences in their characteristics (measured by seniority). In fact, it seems that there is a high proportion of Portuguese schools operating at a teacher-student level where output gains are quite small, which reflects, in particular, the fact that many schools have lost students over the recent years but did not adjust the number of teachers. Thus, enhancing the flexibility in the allocation of teachers could free resources without a noticeable effect on students' examination scores. Clements (1999) presents scattered evidence indicating that the wage bill may have squeezed other inputs like teaching materials and infrastructures. Thus, conversely to the importance of teachers' compensation as a share of total expenditure on education, current and capital expenses are quite low in rela-

tive terms. Pereira and Moreira (2007) suggest that potential savings from enhancing flexibility in the allocation of labour resources could be applied on non-personnel spending items. In what concerns to this problematic, the review of careers and assessment procedures can also be an important step towards increasing the efficiency (see Section 6.5.5 for more details).

Available evidence indicates that efficiency scores are significantly influenced by environmental factors (most notably parental education and local economic conditions) even more than direct school inputs. In particular, concerning the characteristics of the students, Carneiro (2006) presents evidence pointing to the possibility that the main factor driving inequality in the PISA scores of the Portuguese students is family background, whereas schools resources have only a limited explanatory power on educational achievement. Pereira and Moreira (2007) also show that the region where schools are located influences attainment: schools located in municipalities featuring high living standards and education levels achieve a comparatively better performance. In cross-countries comparisons, the factor “environment” justifies part of the Portuguese bad performance on efficiency assessments. In fact, the socio-economic environment of the student is the most difficult to influence, being sometimes only discretionary in the medium to long-run. In this context, Portuguese policy-makers should elect measures aiming at circumventing the constraints of an adverse environment as a first priority.

In conclusion, besides spending *per se*, the performance of Portuguese institutions in education production is much dependent on other factors, in particular, the nature and organisation and management of schooling within the system (e.g. layers of management and distribution of decision making, geographic dispersion of the population), the organisation of the immediate learning environment of the students (e.g. class size, hours of instruction), the quality of the teaching workforce and students characteristics (most notably their socio-economic background). In this context, efficiency gains can be more easily enhanced by adopting appropriate management practices and incentives in the education system, which can be achieved by changing personnel management, introducing minimum school size and establishing minimum student-teacher ratios and class dimensions across schools.

6.5 The public sector labour market in Portugal

6.5.1 Overview

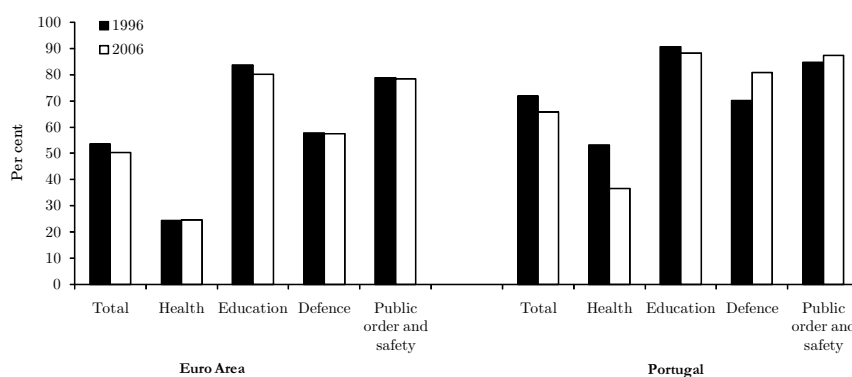
The previous section in this chapter was devoted to the assessment of efficiency of public expenditure in Portugal and, as mentioned, personnel management in general government has important implications in that regard. Indeed, given the labour-intensive nature of the services produced, wages are the key component of the production inputs spent by government. Figure 6.29 depicts the share of compensation of employees in the total amount of inputs spent in 1996 and 2006, broken down by major government function (defence, public order and safety, health and education). In Portugal, compensation of employees accounts for around 70 per cent of total public consumption (20 p.p. above the figure for the euro area). This share is lower than 50 per cent only in the case of health and such fact is partially explained by the decrease observed in recent years.³⁴ Therefore, factors affecting wages and personnel management in government have strong implications for the amount of resources used and, ultimately, for efficiency in the production of public services.³⁵

The operation of public sector labour markets has a number of distinguishing features vis-à-vis that of private markets. These features, particularized for the Portuguese case in Section 6.5.2, basically arise from the specificity of the decision making process and the characteristics of the services produced. In fact, the profit-maximization objective does not apply in general government and political considerations play a very important role in public decisions.³⁶ Other goals, such as promoting equity and social welfare, are equally an important part of the public decision making process. The nature of the public services has also implications for the operation of the respective labour market. In fact, government is the sole producer of pure public goods and often the main producer of merit goods such as education and health (though this latter point

³⁴This outcome is due to the transformation of several government hospitals into public corporations during the course of the period, leading to their classification outside general government in National Accounts (see Section 6.4 of this chapter).

³⁵The study of those factors is made by a branch of labour economics that deals with the operation of “public sector labour markets” (see, for instance, Ehrenberg and Schwarz (1986) and Gregory and Borland (1999)).

³⁶Borjas (1980), for instance, argues that governments may be seen as “vote-maximizing” entities.

Figure 6.29: Compensation of employees as a ratio to public consumption, by major government function

Source: Eurostat, *Newcronos* database.

has suffered important changes in recent years). By consequence, government is the only or the predominant employer in several markets and in such cases unions have an enhanced ability to restrict the supply of labour, for instance through strikes. The social importance of the services produced by government also adds to the bargaining strength of unions representing public employees.

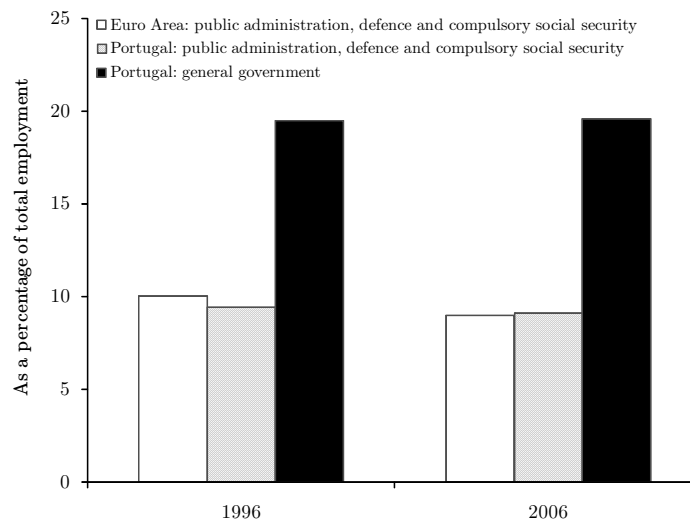
The abovementioned distinguishing features bring about differences in the distribution of wages in the two sectors. The literature on public labour markets studies, in particular, wage premiums (or penalties) associated with working in general government entities. These are wage differentials computed controlling for the characteristics of the labour force. Section 6.5.3 reviews some evidence about wage premiums for Portugal.

Public employment in Portugal represents a significant share of total employment. As depicted in Figure 6.30, it has remained around 20 per cent since mid-1990s. Considering the figures for employment in public administration, defence and compulsory social security³⁷, Portugal and the euro area feature similar shares. The role of government is, however, far more important for particular groups such as college graduates, as it is the employer of about half of the respective workforce. Section 6.5.4 addresses the issue of how the interaction between the private and public sectors in recent

³⁷This classification, that excludes the areas of health and education, is the only available for cross-country comparison.

decades has affected wages of highly-educated workers.

Figure 6.30: Employment in general government: comparison with euro area developments



Sources: Eurostat - *Newcronos* database, except for the figures concerning the Portuguese general government, that are based on data from DGAEP (2005) and National Accounts.

An important hallmark of the type of activities carried out by government is the difficulty to measure output, which translates into equal difficulties in measuring and rewarding the performance of workers. Section 6.5.5 presents evidence about the Portuguese situation, in particular in terms of rigidity of public wages, and mentions recent attempts to introduce flexibility mechanisms into the pay system.

6.5.2 General characteristics of the public sector labour market

In Portugal, as in other countries, public and private labour markets differ in many institutional aspects. On the one hand, the public sector has specific practices and rules governing recruitment and career advancement of workers and employment protection, which, considered as a whole, allow its characterization as an internal labour market. On the other hand, the wage setting process is quite different from the rest of the economy.

The Portuguese civil service is traditionally career-based. Entry to general government typically takes place at the lower levels of the career-path of each category of public employees. Vacancies for more advanced positions are mostly filled internally, by means of promotions or staff relocation. Among OECD countries, Portugal features one of the lowest degrees of openness of the recruitment process to external candidates. The level of openness varies across the rank of the positions, being relatively higher for top managers and experts (OECD (2009)). Recruitment procedures also differ according to the categories of public employees. In several cases, such as teachers, members of security forces and judges, the process is much centralized, being coordinated at the level of the ministry. For other categories of employees, services tend to have more autonomy in defining their own recruitment procedures.

The employment relationship in the Portuguese civil service used to have the form of appointment, guaranteeing full employment protection until the end of the career span. Recent legislation (approved in 2008) has confined appointment to a restricted core of public jobs and established the individual contract as the basic employment relationship, as in the private sector. In the past, public employees had specific and more favourable retirement conditions, both in terms of pension calculation and required length of service, but these conditions are gradually converging to the ones prevailing in the private sector. The entitlement to specific health care subsystems, although is a feature shared with several private industries (e.g. the banking sector) and large firms, also places public workers in an advantaged position in comparison to their private counterparts as a whole.

Wages in the Portuguese government sector are defined in nationwide wage scales. Advancement across them is, to a large extent, determined by seniority. It is worth mentioning that, until 2008, there were several specific scales, applying to different categories of public employees, that were divided into a number of grades, each grade including a number of steps. In the context of the revision of public employees' careers and remuneration procedures, the multiple wage scales have been replaced by a unique remuneratory scale (although specific wage scales still apply to certain special careers).

As to the annual wage update process, the literature (see, for instance, Marsden (1993)) proposes a classification along four benchmarks: unilateral employer regulation, fixed rule employer regula-

tion, free collective bargaining and independent pay review. The Portuguese situation is relatively near the unilateral employer regulation, but there is room for negotiation with the unions. Indeed, a pay actualization proposal by the government in office initiates the process and, although unions have the right to negotiate, the final figure does not necessarily result from an agreement between the two parties. The motivations behind government's proposals and the receptivity to demands made by unions often reflect electoral considerations and the room for manoeuvre in terms of the yearly budget constraint. Annual pay raises usually apply uniformly throughout categories of public employees.

In the private sector, by its very nature, wage setting is much more heterogeneous and responsive to the business cycle. It can adjust, for instance, to conditions prevailing in specific industries and regions. According to Du Caju, Gautier, Momferatou and Ward-Warmedinger (2008), Portugal belongs to the group of countries in which collective bargaining agreements are made predominantly at the industry level, but there is evidence that private employers have room to deviate from contractual wages, introducing an additional element of flexibility (the so-called wage cushion - see Chapter 3). It is also worth mentioning that several institutional features of the bargaining process and the lack of coordination among trade unions representing private sector employees tend to weaken their bargaining strength (Portugal and Centeno (2001)). This feature is likely to have been further accentuated by the decline in the unionisation rates over the last two to three decades, which has been much more noticeable in the private sector than in the public (see Cerdeira (2004), p.154).³⁸

6.5.3 Workers and wages

Workers' characteristics

Public sector workers considered as a whole have distinctive features relative to their private sector counterparts. Table 6.7 summarises key characteristics of the two groups for Portugal using data for 1999. The most striking discrepancy between the groups concerns the proportion of employees who have achieved college education, a figure that stands at about 40 per cent in the public sector

³⁸For additional details on the institutional features of wage bargaining in Portugal, see Chapter 3.

but at less than 10 per cent in the private. This reflects, *inter alia*, the fact that the occupations that prevail in government usually require higher formal academic qualifications. Public sector workers are also on average more experienced than their private sector counterparts, by around 3 years. This is in line with the time profile of public employment growth, which was particularly pronounced between the end of the 1960s and the end of 1970s (when the older generations currently in the labour market joined), and with the career-based nature of the Portuguese civil service. There are also obvious differences as to the occupational composition, reflecting the production activities that predominate in each of the sectors. It is worth noting, in this regard, the concentration of public employment in professional and upper intermediate occupations in the areas of education and health care. This reflects the quasi-absence of private production in those areas until recently. Other differences between the two sectors concern gender composition and geographical distribution: men predominate in the private sector while women are the majority in the general government. The concentration of employment in more developed areas is less marked in the public sector.

Wage distribution

The distribution of wages in the two sectors for 1999 is depicted in Figure 6.31. It shows a concentration of workers at the lower tail of both curves, but this feature is more marked in the private sector. The distribution referring to general government has several modes, reflecting the segmentation of wages according to the pay scales of the main categories of public employees (in force during the analysed period), whereas the one referring to the private sector has a peak around the mandatory minimum wage. Studies comparing public and private sector earnings distributions typically find greater dispersion in the latter sector (see, for instance, Gregory and Borland (1999)). Campos and Pereira (2009) show that, in Portugal, the dispersion at the central part of the distribution is comparatively smaller in the private sector, although the opposite holds for the distribution as a whole.

Still according to Campos and Pereira (2009)³⁹, in 1999 the Por-

³⁹The figures for wage gaps and premiums presented in this study are taken as a reference for Portugal, as they are based on more comprehensive datasets (the *Recenseamento Geral da Administração Pública* for the public sector and the *Quadros de Pessoal* for the private) relative to alternative sources. It is worth noting that the

Table 6.7: Characteristics of public and private sector employees in Portugal (1999)

	Public Sector	Private Sector
Age (years)	42.6	37.4
Male (%)	42.2	59.1
Education		
Years of formal education	11.0	7.4
College degree (%)	39.3	6.7
Experience (years)	24.2	21.4
Jobs located in more developed regions (%)	82.5	90.5
Occupation (%)		
Managers	1.7	3.0
Professionals and upper-intermediate		
Engineering and science	3.2	4.7
Health and Education	39.1	1.1
Law	1.5	0.1
Economics, management and other social sciences	6.9	7.5
Others	0.7	0.5
Administrative staff	12.0	14.5
Receptionists and ticket and similar clerks	0.7	2.5
Community services, including safety	15.1	7.3
Sales personnel	0.0	6.5
Qualified employees in agriculture and industry	6.4	39.2
Cleaning services and unqualified employees	12.7	13.3

Sources: Campos and Pereira (2009) and the 1999 waves of the *Recenseamento Geral da Administração Pública* and *Quadros de Pessoal*.

Notes: Data for the public sector excludes military personnel. Figures in percentage reflect the ratio to total employment in each sector.

tuguese public employees had salaries, on average, approximately 50 per cent higher than their private sector counterparts. A cross-country comparison based on 1995 data undertaken by Portugal and Centeno (2001)⁴⁰ indicates that, amongst euro area countries, Portugal features one of the highest public-private gross wage differentials for men, only surpassed by those of Ireland and the Luxembourg, and the highest for women.

precise figures for wage premiums depend on the methodology used in its computation, but the results are typically consistent across studies.

⁴⁰Portugal and Centeno used data from the *European Community Household Panel* of Eurostat. The comparison herein mentioned refers to unpublished auxiliary calculations.

Figure 6.31: Density functions for wages in the public and private sectors (1999)

Sources: Author's calculations of density function estimates using the Epanechnikov kernel, based on data from the 1999 waves of the *Recenseamento Geral da Administração Pública* and *Quadros de Pessoal*.

Wage premium

In Portugal, higher wages in the public sector are partially explained by differences in comparison to the private sector in terms of measurable characteristics of the labour force. In particular, figures in Table 6.7 point to larger endowments of general human capital in the case of public employees. Once those characteristics are controlled for, it is typically found a wage premium associated to working in the public sector in Portugal. In 1999, according to Campos and Pereira (2009), the premium amounted to around 15 per cent at the mean of the wage distribution (Table 6.8). Strauss and de la Maisonneuve (2007)⁴¹ provide evidence, based on 2001 data, of public wage premiums in most euro area countries (the exceptions are Austria, Belgium, Finland and the Netherlands). The figure for Portugal presented in this study was the second highest after that of the Luxembourg.

There are significant differences between premiums for specific groups of workers such as men and women and workers in more and less developed regions. The premium is higher for female em-

⁴¹This study used data from the *European Community Household Panel* of Eurostat as well.

Table 6.8: Public wage premium

Percentage	1996	1999	2005
Overall	8.6	14.5	16.9
Men	-2.6	5.1	6.2
More developed regions	-6.7	1.0	3.3
Less developed regions	17.9	27.2	25.8
Women	19.4	23.8	24.3
More developed regions	15.5	20.9	22.0
Less developed regions	50.4	48.6	42.6

Source: Campos and Pereira (2009).

ployees and for workers whose job is located in less developed areas. Pay disparities on the basis of the gender and location of the workplace appear considerably attenuated in the public sector. This feature results from the centralized nature of public pay, which applies nationwide regardless of gender and region. More generally, the public sector's smaller capacity to flexibly adjust to local economic conditions stems from the fact that its activity is bounded by specific constraints, concerning, for example, redistribution and non-discrimination. In spite of these features, there is evidence of gender-based pay discrimination in the public sector, as female employees are estimated to earn lower wages relative to males with the same observable characteristics. Centeno and Pereira (2005) document such phenomenon particularly for the upper quantiles of the distribution of wages (this is the so-called "glass-ceiling" effect).

As in other countries, in Portugal there is evidence that public employees with wages at the bottom quantiles of the distribution are in a particularly advantageous position vis-à-vis the private sector employees at the same quantiles. As one climbs up the distribution, the public wage premium decreases and there is evidence of penalties at the top, mostly stemming from results for male employees in more developed regions. This is in line with the fact that the premium is less significant for more educated employees (typically occupying the top of the wage distribution) than for their counterparts with lower education levels. Table 6.8 indicates a widening of the average public premium over the period 1996-2005, which chiefly concerned the upper quantiles of the wage distribution. In

fact, this recent evolution specially benefited college-educated public employees, in particular those at the beginning of the employment spell (Campos and Pereira (2009)).

An analysis by occupation for college graduates indicates a larger public premium in occupations in which general government is the predominant employer, such as teachers, doctors and nurses. This feature may be partly justified by the fact that certain tasks requiring particularly skilled employees and attracting higher wages, in areas such as health and tertiary education, are almost exclusively performed in government. As the private sector gains relevance in these areas, the premiums are likely to come down. Even taking these features into account, the premiums in such occupations also reflect the considerable bargaining power of the unions representing the respective workers, and the fact that they are associated with the provision of core public services. On the contrary, public employees in occupations in which both sectors share the employment have a penalty vis-à-vis their private sector counterparts. This is particularly noticeable in the case of occupations more sought after by the latter sector, such as economists, engineers, or IT and legal specialists. Hence, the existence of a premium does not reflect any deliberate policy by government designed to compete with the private sector for the recruitment of the best professionals.

6.5.4 College graduates: the interaction between public and private labour markets

The interaction between private and public labour markets is often studied from the perspective of how the rigidity and practices in government pay systems affect the behaviour of the corporate sector, as public and private employers compete for the same labour supply. There are several studies, such as Katz and Krueger (1991) and Borjas (2002), for the United States, that focus on the ability of government to keep up with wages offered by private employers. The interaction between the two markets is better observed and addressed for the case of college-graduated employees, given that the supply of highly-skilled labour is typically scarcer. This scarcity certainly holds in the case of Portugal, as indicated by one of the highest wage premiums to tertiary education among euro area countries (Strauss and de la Maisonnette (2007)).

The importance of government as an employer of college graduates in Portugal has come down over the last decades. This is ex-

plained by a gradual stabilization of the dimension of public services⁴² and, in more recent years, expenditure retrenchment. Indeed, Campos and Pereira (2009) present figures about the sorting of workers with higher education attainment between the two sectors over time and conclude that the proportion hired by government has decreased from more than two thirds of the total in the decade ending in the mid-80s to around one third in the decade finishing in 2005. This marked reduction also reflects an acceleration in the growth of the college-educated labour supply coming to the market, that, not being accommodated by the public sector, was absorbed by the private - although not necessarily in typical specialist occupations.

As previously mentioned, the public wage premium for college graduates has increased in recent years. This effect is particularly related to entrants in the labour market, a group for whom changes in the structure of wages tend to happen more rapidly. As a matter of fact, the wage premium for workers with less than 10 years of experience rose from a slightly positive value around 4 per cent, in 1996, to a sizeable figure of 18 per cent, in 2005 (Campos and Pereira (2009)). In the years prior to the mid-80s, a penalty seems to have existed. There is thus evidence of a steady increase over time in the public wage premium at the beginning of the employment spell, in particular in more recent years. This sort of evolution contrasts with a relative reduction of the government's hiring dynamics. This phenomenon is likely to result, in the first place, from the fact that public wages, in contrast to private, respond very little to market conditions. As the recruitment dynamics by government slowed down, the competition faced by firms for high-skilled workers weakened and, as a response, they are likely to have adjusted downwards the wage levels at the entry points. Indeed, an analysis by occupation presented in Campos and Pereira (2009) indicates that, although civil servants in jobs in which the public and private sectors share the employment face wage penalties, the latter have been decreasing. In the second place, the increase in the number of workers with college degrees joining the private sector could not be accompanied by the pace of creation of jobs usually occupied by them. Hence, many of these workers perform tasks typically associ-

⁴²Data presented in DGAEP (2005) shows that public employment, as a whole, rose annually by 5.5 per cent, on average, between 1968 and 1979; then by 3.2 per cent during the two subsequent decades, until 1999; and by 0.6 per cent in the more recent period 1999-2005.

ated with intermediate to low levels of education, thus commanding lower wages.

A further conclusion to be drawn is that non-wage factors, such as employment protection, earlier retirement and a more generous pension entitlement, have played an important part in the allocation of workers between the public and private sectors.⁴³ Indeed, these features have much enhanced the attractiveness of public jobs, making possible the coexistence in the past of a large intake of public employees with a wage penalty.

6.5.5 Wage rigidity and performance rewarding

The non-market nature of the activities in the public sector generally makes it difficult to assess the performance of employees. In most areas, the type of output produced does not allow the definition of quantitative indicators similar to those used for the assessment of private activities. Therefore, career advancement in the public sector has typically lacked flexibility and depended to a large extent on seniority. The need to replace the public employees that are reaching retirement age and to cut back public expenditure has made the introduction of incentives to improve individual performance and achieve efficiency gains a crucial concern. This is, however, not an easy task, as the introduction of performance-evaluation mechanisms focusing on particular goals or tasks may lead to distorted results (see e.g. the analysis based on the agency costs theory undertaken in Sandmo (2003)). In various OECD countries the modernisation of the public sector has mainly focused on the creation of performance management systems, and made performance assessment an important component of human resource decisions (OECD (2009)). This typically involves a stronger link between pay and career-advancement pace and performance, as the perception that the definition of wages is automatic tends to undermine the workers' commitment to the job. Schemes featuring the introduction of individual contracts specifying objectives and potential rewards and prizes based on achievements have been implemented in many countries (see Äijälä (2001)).

Evidence concerning wage rigidity can be drawn by looking at the compression of the conditional wage distribution. In Portugal, this distribution is more compressed in the public sector as a whole,

⁴³Note that retirement conditions and pension calculation rules in the general government are currently converging to those prevailing in the private sector.

and particularly for college graduates. Government seems to make a much more limited use of wages to reward differentiated individual performances. Campos and Pereira (2009) carry out an exercise focusing on the proportion of wage variability determined by observable characteristics, in order to indirectly infer the importance of individual-specific features which cannot be observed in the determination of wages. The same observable factors are considered for both sectors, including general human capital measures (education and experience), occupation, gender and location of the workplace. Results show that in the private sector a much greater proportion of wage variability is left unexplained, suggesting a more significant role of the rewarding of individual skills.

It is currently in progress the implementation in the public sector of a new career system, as well as new appraisal and remuneration procedures. This revision seems to go in the direction of giving managers greater autonomy, particularly in what relates to human resource management, enhancing the flexibility of hiring, firing and rewarding mechanisms, as well as holding them accountable for previously contracted goals. Moreover, the new public employment regime foresees the introduction of performance assessment mechanisms, and the creation of incentives both targeted at managers and workers. It is, nevertheless, too early to evaluate the practical implementation and results of this reform.

6.6 Concluding remarks

One of the key features of public finances in Portugal since the accession to the European Community was the creation of a modern tax system, very similar to the ones of most advanced economies. During this period, fiscal developments were also characterised by a sustained growth of current primary expenditure, essentially related with the dynamics of public pension systems and the expansion of compensation of employees. The latter partly stemmed from the increase in the provision of education and health services. Overall, consolidation efforts were minimalist, hampering the achievement of a sound fiscal position. At its best, the structural deficit hovered around 3 per cent of GDP.

From 1993 up to the end of the nineties, the decrease in interest payments resulting from nominal convergence and the prospect of participation in the euro allowed, in most years, a decline of the

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deficit in conjunction with an expansionary stance of fiscal policy. The unsustainability of this approach became clear in 2001, when interest expenditure ceased to decline and economic activity decelerated, leading to an excessive deficit. The policy package then adopted, though correcting the excessive deficit, basically failed in terms of fiscal consolidation as it relied too much on VAT increase and short-term measures, in particular temporary measures, while showing limited ambition on structural measures on the expenditure side.

In 2005, in the absence of sizeable temporary measures, Portugal incurred again an excessive deficit. The programme approved to correct it presented some similarities but also major differences vis-à-vis the 2002-2004 policy. On the one hand, it relied heavily, in a first stage, on tax increases and short-term measures on the expenditure side. But, on the other hand, no temporary measures were adopted and the programme put a stronger emphasis on major reforms on the expenditure side, in particular regarding public pension systems and public administration. In addition, the consolidation strategy benefited from the ongoing process of stepping up tax administration. In the short-term, it was a success as it allowed the closure of the excessive deficit procedure in 2007, one year ahead of the deadline initially set down, and changed to some extent the perception on the sustainability of Portuguese public finances. The structural deficit was, however, still significantly above the MTO, set at that time at 0.5 per cent of GDP.

Since 2008, fiscal developments in the euro area Member-states have been affected by the economic crisis, particularly in the last months of the year. In Portugal, the recent budgetary evolution has not differed substantially from that observed in this group of countries. A critical assessment of medium-term fiscal prospects in Portugal is, however, not clear cut. Four aspects are crucial in this respect. Firstly, the quantification of the impact of measures taken in 2006 and 2007 that have a permanent effect on the revenue and expenditure levels, but only a transitory impact on the rates of change (as, for example, the freezing of automatic progressions in careers, the limitation of early retirements, changes in unemployment benefit rules and the reduction in expenditure on medicine co-payments). Secondly, an evaluation of the additional effect that can be expected from the reforms launched over the last years taking into account the likelihood of their consistent implementation. Thirdly, the con-

firmation of the reversible nature of the fiscal stimulus measures approved and put into practice since mid-2008. Finally, the strictness of the constraints resulting from the Stability and Growth Pact and market reactions. A careful analysis of the fiscal position in 2008 suggests a high level of uncertainty and leaves many scenarios open.

The revision of the Stability and Growth Pact stepped up the relevance of Member-states' sustainability of public finances within the framework of EU's multilateral fiscal surveillance. The analysis developed by the European Commission regarding fiscal sustainability risks is based on the computation of synthetic indicators, depending fundamentally on the initial fiscal position and the growth prospects for age-related expenditure. The last projections of the Ageing Working Group for age-related expenditure until 2060, released in May 2009, show Portugal in the group of countries with prospects for a moderate increase in pension expenditure in the next decades, benefiting from the recent reform of public pension systems. In what concerns health care expenditure, however, the increase is slightly above the euro area and EU averages. Overall, Portugal is included in the group of Member-states with a medium-risk of fiscal unsustainability. Nevertheless, it is worth highlighting that the sustainability analysis carried out by the European Commission is incomplete as it does not take into account some major factors with a potential impact on future expenditure developments, like the accumulation of debt of public enterprises or the liabilities stemming from public-private partnerships contracts.

In most developed economies, general government is large as measured by public revenue and expenditure levels as a percentage of GDP. In this context, efficiency and quality of public finances have been, in the last years, a concern of European policy makers. Given the characteristics of non-market goods and services, empirical studies on the efficiency of their provision are methodologically complex and their results subject to many caveats. Most of them deal with the provision of health care and education services, both very important in terms of public expenditure and employment.

Regarding health care, in spite of significant differences in the approaches followed, most cross-country studies show Portugal as a mid-rank performer, with relatively high expenditure and good outcomes. The available evidence suggests that since early 2000s some effort was made on containing the strong growth of health care expenditure (the transformation of public hospitals into corporations,

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the reorganisation of the hospital-centres network and the measures concerning expenditure on medicine co-payments are important examples). However, large inefficiencies are still present in the system and, therefore, health gains and increased service level are still possible without extra resources.

Education is one of the main areas where the Portuguese public sector underperforms. Portugal's attainment levels only have parallel in low and medium-income countries. Some improvements were observed but a sizeable gap subsists vis-à-vis most other developed countries, even amongst the young generations. The problems of education in Portugal concern not only the quantity but also the quality of the provision, as the poor performance of the Portuguese students in international comparisons suggests. This issue is even more acute when the amount of financial resources spent is compared with other countries.

Although education and health care absorb a significant proportion of expenditure, it is worth mentioning that other functional areas may also have scope for achieving improvements in the use of public resources and contributing to fiscal sustainability.

The management of public employees has substantial implications in terms of enhancing efficiency in the provision of non-market services. Recent research for Portugal, based on microdata, points to the existence of a wage premium associated with public employment. The profile of this premium is such that it tends to benefit workers with lower education levels and, within college graduates, those in areas such as health and education in which the public sector is the predominant employer. These findings are, on the one hand, consistent with the relatively high level of public expenditure in those areas. On the other hand, they imply that the premium is not being used as a tool to compete with the private sector for the best professionals. Moreover, there is evidence of rigidity in the public sector's pay practices, given that the wage distribution is more compressed and individual skills are less important in the determination of wages than in the private sector. These features suggest that efficiency gains could be achieved by reinforcing the link between pay and career advancement and individual performance.

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Chapter 7

Financial integration, financial structures and the decisions of households and firms

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7.1 Introduction

The financial integration of the Portuguese economy, fostered by the participation in the euro area through the elimination of the currency risk premium, reduced the capital scarcity constraint and increased the portfolio diversification possibilities of economic agents. On the one hand, this translated into a higher equilibrium level of indebtedness of the non financial private sector, on the other hand, the share of securities issued by non-residents in domestic portfolios increased significantly.

Financial integration sustains significant mismatches between domestic supply and demand. The evolution of the Portuguese economy in the last decade illustrates this pattern, with the maintenance of a downward trend in the private sector's saving rate and

*This chapter benefited from contributions of other members of the Financial Stability Division of the Economics and Research Department.

a broad stabilisation of the investment rate. However, although allowing the economy to move to a higher and sustainable level of foreign and domestic indebtedness, financial integration in itself does not fully eliminate domestic distortions and inefficiencies.

The increased risk sharing that comes with financial integration expands the possibilities for agents to smooth temporary and idiosyncratic shocks to their income and wealth, namely enhancing the smoothing of household consumption. The banking system adapted fast to the new environment of structurally lower and less volatile interest rates and played a crucial role in these dynamics, namely through the recourse to financing in international markets, including in longer maturities, and by adapting the credit products offered to the private sector. Furthermore, risk sharing tends to prolong the reallocation of resources in the economy. Participation in a monetary union thus implies that the equilibrium adjustment of an economy will be smoothed and more prolonged over time. Even in the context of a financial crisis, a sound banking system and the absence of bubbles prevented sharp real adjustments in the Portuguese economy. Therefore the Portuguese case underlies the importance of the banking system in the economy. Indeed, ensuring a healthy and resilient banking system is critical, in particular in the current context of economic and financial crisis.

The aim of this chapter is to review the available evidence on the implications of the financial liberalisation and integration process in Portugal both for financial structures and for the decisions of households and firms. The remaining part of this chapter is organized in three sections. Section 7.2 addresses the issues related to financial markets and institutions, with a special focus on their role in the financing of the economy and their efficiency in financial intermediation. That section starts by analysing the liberalization process of the Portuguese financial system, in particular its interaction with the economic integration process and the changes introduced in the monetary policy operational framework and the financing of the public sector which led to the gradual elimination of the implicit tax on the banking sector. It also highlights the relevance of having established an appropriate regulatory and supervisory framework at the time of the liberalisation of the Portuguese banking system in avoiding the emergence of a banking crisis, a stylized fact characterizing earlier liberalisation episodes in many OECD countries. It then moves to the analysis of the financial integration process *per se* in two dimensions (prices and quantities), with a particular

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focus on the importance of the banking sector in the intermediation of international financing. In addition, it addresses the implications of the liberalisation and financial integration process for the increased role of financial intermediation which as in most continental Europe countries is dominated by banks. The structural changes in the funding of banks induced by the increased financial integration and the elimination of the currency risk premium are also dealt with. That section also tackles evidence on Portuguese banks' performance, including banks' distribution channel and labour/capital structure, banks productivity and competition. In particular, the results of empirical studies where a stochastic cost frontiers for banks operating in Portugal are estimated in order to assess banks' productive performance are discussed. The presence of cost reducing technological progress indicates that the adoption of a more efficient production technology has allowed the cost frontier to shift downwards through time. Moreover, the empirical results suggest that the deregulation and liberalisation process, including the participation in the euro area, acted as a catalyst to increase competition, particularly in what concerns the credit market.

Section 7.3 addresses the implications of the financial liberalisation and integration process for the decisions of households and firms. Concerning households, the section first describes the main trends in households' assets and liabilities using aggregate data and then compares these trends in Portugal with those observed in several European countries. A special focus is also put on distributional issues regarding households' finances, which are particularly useful to assess the vulnerabilities associated to the high degree of households' indebtedness. These issues are analysed using survey data that are also available for a group of euro area countries. As to firms, the section starts by analysing the composition of Portuguese non-financial firms' assets and how investment decisions of firms may have been related to their financial situation. It then turns to discuss the financing of Portuguese firms presenting results on the evolution of indebtedness, capital structure decisions and the relevance of maintaining banking relationships. Some results on the survival of firms are presented next. It ends with a discussion on the vulnerabilities arising from the indebtedness of the non-financial corporate sector. Finally, the chapter ends with some conclusions, including some remarks on the vulnerabilities of the Portuguese banking system in the context of the current economic and financial crisis.

7.2 Financial markets and institutions

7.2.1 The liberalization, financial integration and development of the Portuguese financial system

A bird-eye's view of the pre-liberalisation period

The tight regulatory conditions in which Portuguese banks operated until the early 1990's date back at least to the post-second World War period, when the Bretton Woods agreement was put in place. In broad terms, a large set of countries agreed to peg their currencies to the US dollar, which in turn was convertible in gold at fixed parity. In parallel, under this regime, the principles of free trade and the necessity of State intervention in many domestic sectors of the economy prevailed in most European countries. As such, by the time of the Bretton Woods collapse in 1973 and until the early 1980's, large chunks of the banking systems of many European countries remained State-owned and subject to strong restrictions on the scope of their activities in the domestic sphere, administrative barriers to entry both from domestic and specially non-domestic players and on their internationalization. The latter were related with tight capital controls, in some cases, only allowing banks to undertake the settlement of trade or foreign direct investment related activities (i.e., portfolio and short term international capital flows were severely limited). In other words, in general, banks were constrained on their asset allocation, pricing policies and by legally imposed segmentation of activities. For instance, some banks were given special privileges in particular activities, such as the mortgage market, the collection of savings from the public and the financing of corporate investment and in the geographic scope of their activities, mostly by means of within-country branching restrictions. A Europe-wide general move towards liberalisation and privatisation of the banking system (and the financial system at large, including the lift of any capital controls) started in the early 1980's, reflecting the commitments to foster the Single Market and the recognition that the protection from competition and the strong involvement of the State as a stakeholder in the banking system was conducive to inefficiency.¹

The liberalisation of the Portuguese banking system ended up to be relatively late when compared with other EU countries, reflecting, *inter alia*, the nationalisation of virtually all banks in 1975

¹For further details concerning developments in the international monetary system, see Eichengreen (1996).

following the 1974 revolution, and the subsequent macroeconomic instability that led to two IMF agreements (in 1977 and 1983). These agreements involved credit ceilings at the bank level in order to limit money creation, starting in 1977 (remaining compulsory until 1989 and prevailing in indicative form in 1990). In the case of the 1977 IMF agreement the aim was to stop the drain in foreign reserves. In turn, the main objective of the 1983 IMF agreement was to contain domestic demand, which was the main driver of an escalating current account deficit, against the background of persistent public deficits. In addition, a crawling peg regime consisting of a pre-announced effective devaluation was in place since 1977, alongside capital controls.² Under the monetary policy regime set up in 1977, credit ceilings were the main tool used to sterilise the monetisation of large government budget deficits.³ In fact, banks had no alternative use for their excess reserves than place them with the *Banco de Portugal* at below-market rates. In turn, the central bank was a direct holder of public debt, which was also remunerated at below market rates. This set up brought about large allocative distortions, associated to the implicit tax imposed on the banking sector, which, on the one hand, was partly passed on to the non-financial private sector and, on the other hand, left the government without market discipline to contain its spending. In parallel, the opening of banking to the private initiative and the sector's privatisation faced Constitutional hurdles only possible to overcome by qualified majority in Parliament. This was reflected in the first amendment to the 1976 Constitution in 1982 (allowing private banks and insurance companies to start activity) and in the second Constitutional amendment in 1989 (suppressing the irreversibility of the 1975 nationalisations).

Initial steps towards financial liberalisation

In the market environment that prevailed until the mid-1980's, State-owned banks eroded their capital base due to direct or indirect financing of the government at below-market rates and to misman-

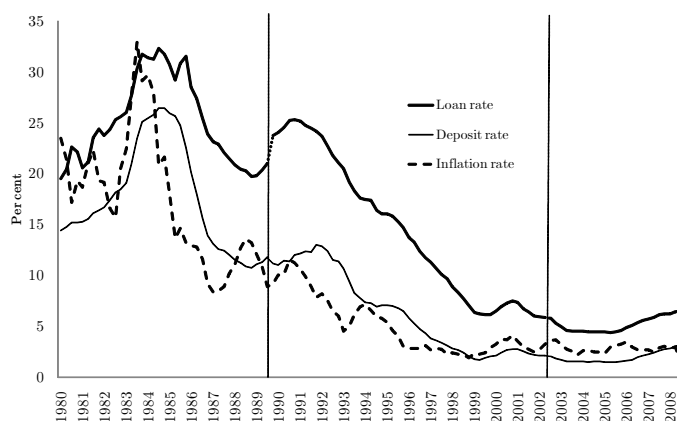
²The crawling peg consisted on a pre-announced monthly rate of depreciation vis-à-vis a basket of currencies of major trading partners, but it was punctuated by a few discrete devaluations, as well as technical adjustments to reflect abnormal changes in bilateral exchanges rates of those trading partners.

³For a detailed characterisation of the monetary and exchange rate policy of the *Banco de Portugal* before the euro area, see Abreu (2001, 2003, 2005).

agement stemming from political interference and inefficiency arising from lack of competitive forces. This translated into poor credit risk assessment and accounting policies, into the accumulation of non-performing loans and, ultimately, into low profitability. However, in the second half of the 1980's, the liberalisation of interest rates and the gradual remuneration of excess reserves at rates more in line with market rates, allowed State-owned banks to rebuild their capital base, preparing them for privatisation, while exposing them to competition from a handful of small (but rapidly growing) private banks. The latter started to operate in late 1984 and prospered in this environment, as a result of their lighter cost structure and flexibility. Also from the mid-1980's onwards, monetary policy was tighter in the sense that it implied higher nominal (and real) interest rates providing the incentives for the rise of savings of the private sector, in particular households. This situation contrasts with that observed from the early 1970's to mid 1980's, when real interest rates had remained negative (Figure 7.1 and Figure 7.2).

The liberalisation process was catalysed by the move towards the EU accession in 1986 and the associated acceleration of economic integration, involving the gradual phasing out of capital controls, which was completed by the end of 1992. By that time, it was recognised that the lack of a credible commitment to fiscal discipline and, in particular, the monetary financing of the public sector, were not compatible with a reform of the financial sector conducive to its full liberalisation. In fact, in such a situation, either banks would directly and/or indirectly finance the public sector and pass on the burden to the private sector or the monetisation of public deficits would imply domestic demand pressures adding to the ones stemming from strong capital inflows.

Even though the start up of private banks and insurance companies as from 1984 was a major milestone in the liberalisation process, the operating environment was still a long way from one based on free market principles. In fact, both the banking system liberalisation and the change in the conduct of monetary policy from the direct control of liquidity to an operational framework based on market instruments were delayed by the lack of consolidation of public sector accounts and the prevalence of monetary financing of the public deficit. In this sense, it should be noted that by the end of 1989 it was increasingly evident that credit ceilings were becoming ineffective due to the growth of non-monetary credit institutions and in particular lending by non-resident subsidiaries of Portuguese banks

Figure 7.1: Nominal bank interest rates and inflation

Source: *Banco de Portugal*.

Note: Estimated synthetic interest rates in operations with the resident private sector on outstanding amounts. Up to December 1989, estimation based on the flows of interest payments/received divided by the average corresponding outstanding amount of the instrument. Between January 1990 and December 2002, aggregates are based on the interest rates published in the Economic Bulletin of December 2003 of the *Banco de Portugal*. From 2003 onwards, aggregates are based on direct reporting to the *Banco de Portugal*.

Figure 7.2: Real ex-ante deposit interest rates

Source: *Banco de Portugal*.

Note: Real rates obtained from nominal rates as defined in Figure 7.1 and deflated by the 12-month ahead change in the CPI.

to resident non-financial corporations. Furthermore, banks were still subject to limits on interest rate setting with their customers, even though these were phased out between 1984 and 1992.⁴ In fact, all deposit interest rates were liberalised in 1984, except those concerning deposits with more than 6 months but less than one year maturity.⁵ On the one hand, these deposits represented the bulk of the deposit base of the incumbent State-owned banks and, on the other hand, administrative restrictions on branching remained in a context in which geographic proximity to customers was determinant to collect deposits.⁶ Hence, an effective competition in this market from entrants was still limited. In what concerns lending rates setting, ceilings on some classes of credit operations were lifted in 1985, although temporarily re-imposed from 1986 until 1988. In the latter years all the lending rates were liberalized. It should be mentioned that three banks had indirect special privileges in the mortgage market. In fact, the remaining banks had to comply with stricter restrictions on their funding structure. Further, when granting mortgages, banks had to give preferential treatment to customers holding a special type of housing savings account, a market in which the three above mentioned banks had an historical advantage. In parallel, consumer credit was strongly constrained, with heavy taxes leading to a virtually prohibitive price.⁷

In addition, still in the 1980's several measures were taken to foster deeper and more transparent money and government debt markets aimed both at facilitating the investment and the trading of banks' liquidity, as well as creating alternative financial instruments for the placement of private savings. In this regard, one of the earliest measures was the creation of a Treasury bills market in 1985, which represented the starting point for a public debt market. The importance of this instrument rose rapidly, with its out-

⁴Floors to savings deposits remuneration were reintroduced in 1986 and ceilings to demand deposits in 1989. The latter aimed at shielding incumbents with a widespread branching network from aggressive competition from entrants. Both were lifted in 1992.

⁵Concerning 6 month to 1 year deposits, interest rate ceilings were in place up to 1984. Thereafter, a floor to the rates of these deposits was imposed, in order to provide incentives for private savings, in a context of banks excess liquidity.

⁶See Cabral and Majure (1993), Barros (1995) and Barros and Leite (1994) on the strategic importance of branches as a mean to generate product differentiation by incumbents.

⁷Until 1994, consumer loans stamp duty tax amounted to 7 percent of the loan amount to be paid at the time of its granting.

standing amount representing nearly 3.5 percent of GDP by end-1985 and almost 13 percent of GDP in late 1987. In tandem, there was a progressive liberalisation of capital flows, including foreign direct investment and the acquisition of securities issued by residents and quoted in a national stock exchange, both as early as mid-1986. However, the full liberalisation of spot and forward foreign exchange markets was gradual and restricted initially to credit institutions. Furthermore, capital outflows, including, for instance, portfolio investment of residents, was authorised only in early 1989 and restricted to institutional investors.⁸

The privatisation process

Privatisations and the smooth transition of the conduct of monetary policy from direct intervention in credit growth to a regime based on the use of market instruments to manage short-term inter-bank interest rates played a crucial role in the liberalisation of the Portuguese financial system.

The privatisation of the Portuguese banking sector only started in 1989 but continued at a fast pace. In fact, the bulk of privatisations occurred in the first years of the 1990s, being virtually completed in 1995. The market shares of the State-owned banks (in terms of the banking system's assets) decreased from more than 74 per cent in 1990 to around 24 per cent in 1996, remaining stable from then on, as illustrated in Figure 7.3. The market share of the public banking group that still prevails corresponds to that of *Caixa Geral de Depósitos*.⁹ During the 1990s some foreign groups were already operating in Portugal, with a total market share running from 3 percent in 1991 to 7 percent in 1999. Among them were branches or subsidiaries of large European universal banks, such as *Barclays Bank*, *Banco Bilbao Vizcaya*, *Crédit Lyonnais*, *Deutsche Bank* and *Santander*. The increase in the market share of foreign banks in 2000 (amounting to 9 per cent) was largely due to the acquisition of a large domestic bank - *Banco Totta & Açores* - by a foreign bank - *Santander*. Along with the deregulation of the market, an increase in the concentration of the Portuguese banking system was observed, followed by a consolidation trend. This conclusion relies on the evolution of the 3 and

⁸For a detailed chronology of measures taken in the liberalisation of capital flows see Banco de Portugal (1993), chapter VI.

⁹It should be acknowledged that *Caixa Geral de Depósitos* was not nationalised in 1975, in contrast to the other State-owned banks which were privatised after 1989. Rather, it is State-owned since its creation much before the revolution.

5-bank concentration indices (C3 and C5, respectively, on the left-hand scale) and the Herfindahl Hirshman Index (HHI, on the right-hand scale), all derived from banks' total assets, and displayed in Figure 7.4.¹⁰ According to these indicators, there was a first period of consolidation until 1996, as the privatisation program progressed. From then on, concentration remained relatively stable even though deep changes in the shareholding structure and control of some of the largest banks were observed in 2000.¹¹

Monetary, exchange rate policies and changes in prudential supervision in the run up to EMU¹²

Within European countries, direct barriers to trade in goods and services have been lifted in the 1960's calling for further meaningful steps of economic integration, namely in the financial domain. In fact, the idea of a European Monetary Union (EMU) dates back to the late 1960's, with initial proposals to implement it in 1980, e.g., the so-called Werner Report dated 1970. However, political hurdles and the need for the creation of the adequate infrastructures both at the supranational and at the domestic level delayed the process until a new impetus came through in the late 1980's. In the meantime, the Exchange Rate Mechanism (ERM) of the European Monetary System (EMS) was created in 1979, allowing for the participating countries' currencies - eight of the nine European Community countries, the exception being the United Kingdom - to fluctuate around a central parity subject to realignments, which were supposed to progressively become less frequent alongside the nominal convergence advances. In fact, after 1987 no realignments were made and the system remained relatively stable until it started to face renewed pressures in the early nineties. Against the background of a global economic recession market speculation emerged about countries' commitment to maintain their currencies within ERM bands, leading to the widening of the bands from 2.25 per cent to 15 per cent.¹³

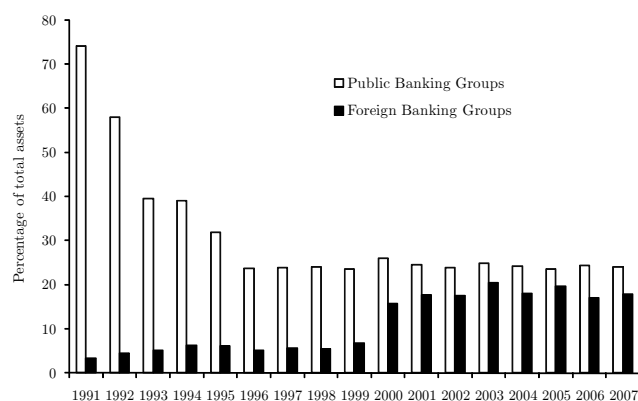
¹⁰For the k -largest banks of a market with n banks, $C_k = \sum_{i=1}^k s_i$ and $HHI = \sum_{i=1}^k s_i^2$, where s_i is the market share of bank i . Also note that the unit of observation is the economic banking group, rather than the banking legal entity.

¹¹Conclusions about the market share of State-owned banks, foreign penetration and market concentration are similar if market shares are computed using information on credit rather than on total assets.

¹²Further details on this topic can be found in Abreu (2001, 2003, 2005), Costa (1998), Brito and Correia (2000) and Rebelo (1992), among others.

¹³Before that, the British pound and the Italian lira announced the floating of their currencies.

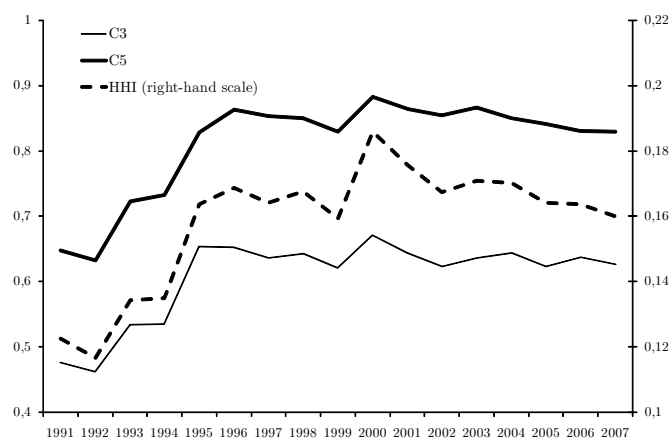
Figure 7.3: The importance of public and foreign banks in the Portuguese banking system



Source: *Banco de Portugal*.

Note: The unit of observation is the banking group, which may comprise more than one legal incorporated institution.

Figure 7.4: Concentration in the Portuguese banking system



Source: *Banco de Portugal*.

Note: The unit of observation is the banking group, which may comprise more than one legal incorporated institution.

In parallel, a new political impetus had been in place to further deepen European monetary integration. The so-called Delors Report of 1989 and the endorsement of the Maastricht Treaty by the 1991 European Council, subsequently transposed into national Law by most EU countries, envisaged the creation of the EMU, with a centralized monetary authority characterised, among other features, by independence and strict prohibition of any type of government monetary financing. The EMU was to happen within a decade, in three stages of increasing commitment to abide to those rules at the national level and to achieve nominal convergence of the participating countries. Stage I started in 1990, prescribing the full lift of capital controls, with a few countries still struggling to abate inflation (including Portugal) being allowed to delay this decision. In exceptional cases, any country could re-impose capital controls, as was the case during the 1992/1993 ERM crisis. Stage II of the EMU started in 1994, with the creation of the European Monetary Institute, an institution which would give rise to the European Central Bank and had roles of oversight of national policies in order to encourage its convergence and the viability of the euro area. It was initially set that a majority of countries was required to meet the Maastricht criteria in order to advance to the creation of the monetary union (Stage III). However, this condition was later relaxed so that Stage III would begin even if only a minority of countries qualified.

Meanwhile, the Portuguese economy, which had experienced a vicious cycle of a crawling peg against a basket of currencies of its main trading partners, high inflationary pressures and monetisation of government deficits made a remarkably quick transition to participate in Stage I of EMU. This process involved the modernisation of monetary policy instruments from credit ceilings to interventions through open market operations, the change in the regime governing compulsory reserves and the reform of the *Banco de Portugal* Statutes to reinforce its independence and limit the possibility of government monetary financing. Along with developments in the stance and operational framework of monetary policy, significant changes were introduced in the exchange rate policy, with the end of the crawling peg in October 1990. These proved to be crucial for the control of inflation and to prepare the economy for the nominal convergence process required for euro area participation, as inflationary pressures and difficulties in controlling domestic liquidity intensified in the late 1980s, which translated into the interruption of the disinflation process. Moreover, in the early 90's, the role of the

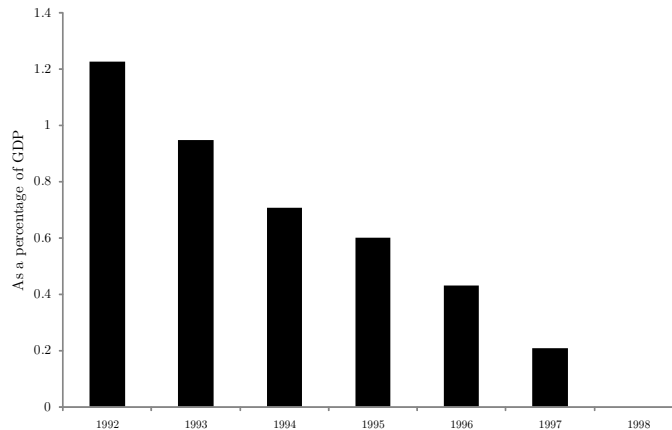
Banco de Portugal in the supervision of financial institutions was also reinforced.

In what concerns the regime governing compulsory reserves, a coefficient of 17 per cent was established in March 1989, whereas a higher degree of homogeneity in terms of the financial institutions and of the financial instruments subject to compulsory reserves was introduced in May 1990. In March 1991, an uniformisation of the rate of remuneration of reserves associated with different types of deposits was introduced, with rates set at values close to interbank money market rates. Hence, although the average remuneration was still clearly below market rates, the remuneration of reserves above a threshold level set at the date of the change in the regime was fixed at 16 per cent, with the aim of gradually reducing the implicit tax arising from reserves requirements. The change in the regime governing compulsory reserves was accompanied by a joint operation involving the government, the *Banco de Portugal* and a set of credit institutions, taking place in two stages, the first of which took place in December 1990 and the second in March 1991. This operation consisted in a major issue of public debt - accounting for 12 per cent of GDP - for placement with the banking system, the main objective of which was to absorb the excess liquidity kept by Portuguese banks with the *Banco de Portugal* in the form of voluntary reserves, which arose from the need to sterilize the monetisation of public deficits. On the dates of these public debt issues, credit institutions were allowed to mobilize their term deposits at the central bank and *Banco de Portugal* certificates in advance, by the amount subscribed of public debt. In this way, the government was no longer financed by the *Banco de Portugal* at below market interest rates, but rather by debt placed with the banks at the prevailing market interest rates. This operation decreased the government's reliance on central bank financing and increased the implicit interest rate of public debt - as referred to in section 6.2 - allowing banks to have a remuneration more in line with market values for their idle reserves. A portion of the newly issued public debt was used to fund the early redemption of foreign public debt.

In November 1994, a reduction of the reserve requirements ratio to 2 per cent, in line with the one in force in other European Union Members States, was established and contributed to an additional reduction in the implicit tax charged to banks. Actually, from 1991 onwards although compulsory reserves still carried an implicit tax on banks, the new regime allowed for its gradual decrease, as the re-

muneration of marginal reserves was close to market interest rates, leading through time to an increase in the average rate of remuneration of reserves (Figure 7.5). Note that in 1994 the liquidity released due to the decrease of the reserve requirements ratio was absorbed by the *Banco de Portugal's* issues of Deposit Certificates, although part of them was not remunerated. In 1999, there was no longer an implicit tax on banks excess liquidity, as the non-remunerated Deposit Certificates were redeemed at end-1997 and, after euro area participation, reserves started to be remunerated at the ECB rate on the main refinancing operations.

Figure 7.5: Estimate of the implicit tax associated to reserve requirements



Source: *Banco de Portugal*.

Note: Up to November 1994 the implicit tax takes into account that only a part of reserve requirements were remunerated and the fact that the remunerated part of the reserves accrued interest somewhat below money market interest rates.

As mentioned above, another important measure concerning monetary policy was the revision of the *Banco de Portugal's* Organic Law in 1990, conferring the central bank a greater independence in the conduct of monetary policy, *bearing in mind the broader national interests and responsibilities arising from the Portuguese economy's active participation in the process of economic and monetary union*.¹⁴ The central bank became prohibited from financing the State, apart from the use of a non remunerated current account (with a limit fixed at 10 per cent of the State's current revenue of the previous year) and from the underwriting of Treasury bills upon negotiated conditions.

¹⁴Banco de Portugal (1991).

In the beginning of the 1990s, the *Banco de Portugal's* role in the supervision of financial institutions was also reinforced as a consequence of the new Organic Law in a context of institutional and regulatory changes envisaged at an international level involving in particular the transposition of EU Directives into national legislation. This process was relatively rapid in most cases without either formal or operational derogations. That was the case of the Second Banking Directive (89/646/EEC), which was designed to open up the single European market to the banking sector by the end of 1992. The implementation of this directive made possible to credit institutions authorized in any member state the establishment of branches and to provide cross-border services throughout the Community on the basis of the fundamental principle of home country supervision - obtaining the so-called "single passport". Furthermore, it established the principle of universal banking. Hence, any banking institution headquartered in the EU gained access to a much larger market, potentially broadening their geographic relevant market, blurring the national frontiers and eliminating the limits to the scope of their activities (except insurance business). Reflecting most 1988 Basel recommendations on capital adequacy (Basel I), the Own Funds and Solvency Ratio and the Second Consolidated Supervision Directive defined bank regulatory capital and laid down the minimum prudential ratios banks are subject to (in force on January 1, 1993). At the national level, there were changes to the provisioning regime applied to banks and a transition period was set with a minimum solvency ratio of 4 per cent in 1990, rising gradually to 8 per cent as from January 1, 1993. The Large Exposures Directive limits the exposures to individual risks, or an aggregate exposure of connected risks, which can be taken on by a single bank or banking group at a consolidated level. The objectives of completing the internal market and providing the necessary framework for the safe and sound operation of a single financial market were also achieved in insurance, as the Third Insurance Directive introduced the "single license" for both non-life and life insurance. Concerning investment services, the possibility of non-bank investment firms carrying out investment business and providing additional services was established in the Investment Services Directive, which came into force in 1996. This directive established the ground of an internal market for the three major financial services: banking, insurance and investment services. All those EU Directives were transposed into Portuguese

national Law in due time, with the only derogation being the prohibition of credit institutions to deal directly in the stock market, without the intervention of a broker or dealer company.

In this context, one should stress the importance of the establishment of an appropriate regulatory and supervisory framework at the time of the liberalisation in the Portuguese banking system, as reported in the literature concerning the linkage between crises and financial liberalisation. Kaminsky and Reinhart (1999) report that around 75 per cent of the crises which they analyzed were preceded (within five years) by financial liberalisation. Hence, it is remarkable to note that the liberalisation process undergone by the Portuguese financial system - which occurred later than in most OECD countries - managed to obtain efficiency gains (reflected in terms of prices, variety and quality of services provided), while avoiding a financial crisis, despite the marked changes in the composition of banks' assets. In fact, when conditions for increased risk taken by banks arose, the rules for the creation of sufficient buffers were already in place.¹⁵

The new form of regulation of banks' activity was of extreme importance as the elimination of credit ceilings allowed for the increase of banks' credit to assets ratio thereby increasing the average credit risk of their portfolio, as excess liquidity placed with the *Banco de Portugal* and in Government debt securities was gradually used to finance the expansion of credit to the private sector. In fact, the

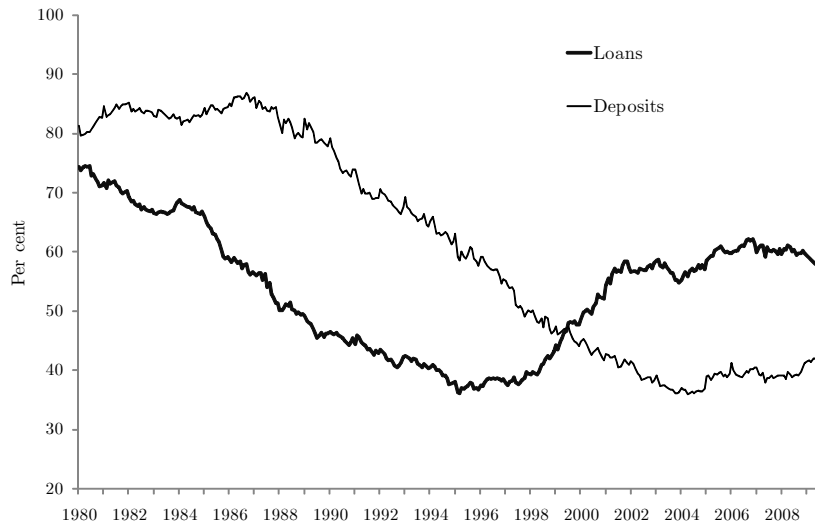
¹⁵In this context, it is worth mentioning the failure of *Caixa Económica Faialense* and *Caixa Económica Açoreana* - two small regional banks - in the mid 1980s and early 1990s, which was, in both cases, mainly due to fraudulent behaviour of their management and hardly related to the financial liberalisation process. Therefore, it did not affect the stability of the system. In 2008, two small institutions required the authorities' intervention, respectively *Banco Português de Negócios* and *Banco Privado Português* (see Box 4.1 *Banking supervision in Portugal in the cases of the Banco Português de Negócios (BPN) and the Banco Privado Português (BPP)* in Banco de Portugal (2009)). In the first case, there is strong evidence of fraud and the bank was nationalised to avoid the very likely systemic implications to the rest of the banking system, given both its traditional retail-base intermediation business and its presence in international funding markets. In the second case, the intervention included the appointment of a new board by the *Banco de Portugal* in a bank with core business in wealth management and facing difficulties in making due payments. Both cases surfaced in the context of the 2008 global financial crisis. Finally, it should also be mentioned that, in 2007, news emerged on *Banco Comercial Português* following public complaints regarding specific aspects of its activity (see Box 4.1 *Oversight of Banco Comercial Português: some issues on the controversy surrounding public complaints in 2007* in Banco de Portugal (2008)). However, neither the prudential limits regarding its solvency nor the regular operation of the institution were ever at stake.

importance of loans to the non-monetary sector in banks' balance sheet decreased throughout the 1980's, as a result of credit ceilings (Figure 7.6).¹⁶ Further, it continued to decline up to the mid 1990's due to the unfavorable cyclical developments in the economy and to the prevalence of high real interest rates stemming from the tight monetary policy, despite the continuously declining nominal interest rates since 1992. Afterwards, and until the early 2000's, the share of loans in total assets edged up, against the background of declining nominal (and real) interest rates in the run up to EMU, and of the low interest rate environment that prevailed in the initial years of the euro area. As an implication, in Portugal the share of loans in banks' balance sheet is among the highest among euro area countries, as illustrated in Figure 7.7 using data for 2006.¹⁷ The increase in the weight of loans in Portuguese banks' balance sheet reflected the decrease in banks' holdings of public debt and of interbank assets, the latter defined in Figure 7.8 as including banks' liquidity placed in central bank instruments. In parallel, the importance of deposits from customers, which represented a very high share of banks' balance sheet up to the early 1990's, decreased markedly until the mid 2000's, reflecting the emergence of new funding sources for banks and of alternative saving instruments for households, as discussed in the section on structural changes in banks' funding.

The technological progress and the intensification of the European integration process that had as a milestone the participation of Portugal in the euro area at the end of the 1990s, paved the ground for the development of a more efficient financial system. In this context, the performance of the Portuguese financial system was the outcome both of the internal development and liberalisation and of the European financial integration process, which were closely interconnected. Hence, following the liberalisation process that began in the 1980s, the second half of the 1990s was a consolidation stage, with reforms conducted to prepare for the participation in the euro area.

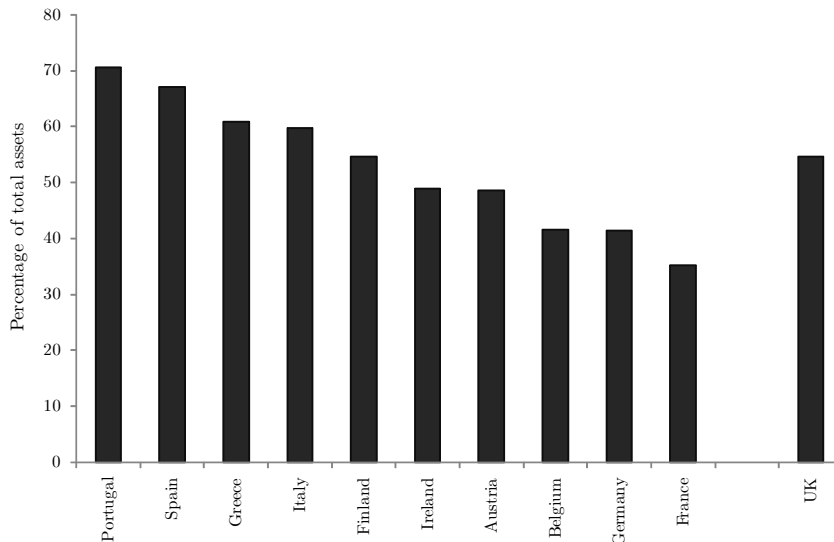
¹⁶The decline in the share of credit in banks' balance sheet in this period reflects to some extent the circumvention of credit ceilings and not necessarily a decline in the availability of funds to the non-financial private sector.

¹⁷One should keep in mind that international comparisons concerning data from banks' balance sheets should be made with caution, due to differences in countries' institutional frameworks and in reporting standards, in particular concerning credit securitisation operations.

Figure 7.6: Loans and deposits as a percentage of banks' total assets

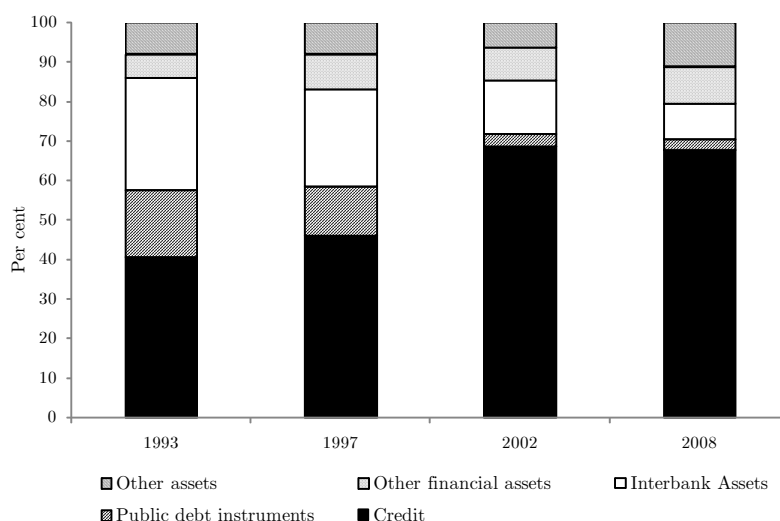
Source: *Banco de Portugal* (Monetary and Financial Statistics).

Note: Loans and deposits granted by banks to the non-monetary resident sector (excluding central government). Data on a non-consolidated basis concerning banks' domestic activity.

Figure 7.7: An international comparison of bank loans as of 2006

Source: ECB "EU Banking Stability Report - November 2007".

Note: Data on a consolidated basis.

Figure 7.8: Structure of Portuguese banks' total assets

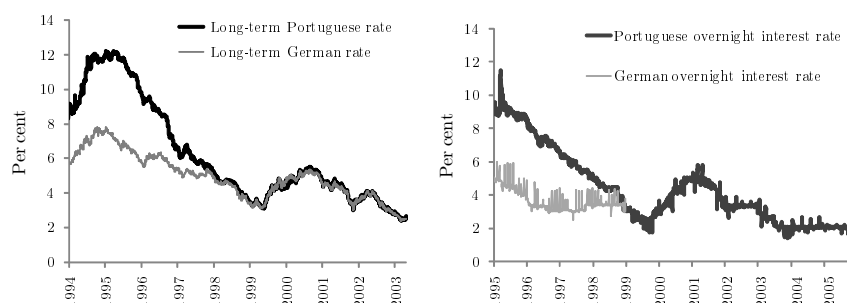
Source: *Banco de Portugal*.

Note: Data on a consolidated basis.

Developments in financial integration

As described above, the core institutional changes needed to attain European financial integration were completed at the time of the creation of the euro area. The degree of financial integration actually achieved can be illustrated in two dimensions. On the one hand, a convergence of the prices of the assets with similar risk/return profiles is expected among the economies participating in the integration process. On the other hand, more similar portfolio structures across these economies are anticipated. As such, financial integration would mean that resident economic agents would hold increasing proportions of foreign assets in their portfolios and a higher share of assets issued by resident economic agents would be held by non-residents. In this way, higher gross flows and positions of financial assets and liabilities vis-à-vis non-residents would be observed as a result of deeper financial integration.

In what concerns the "price dimension" of the Portuguese financial integration within the European context one of the most compelling features was the convergence of interest rates to the lowest level among future euro area members. This marked the participation in a new regime characterized by lower and less volatile interest

Figure 7.9: Convergence of interest rates

Source: Bloomberg and *Banco de Portugal*.

Note: On the left panel, yields of 10-year government bonds of Portugal and Germany are used. Both bonds were issued in 1993. On the right panel, the overnight Portuguese interest rate is the mean implicit in operations involving Portuguese banks and the overnight German interest rate is the money market rate reported by German banks.

rates, which proved to be important for the establishment of a Single European market for financial services. On the right-hand side of Figure 7.9 the convergence of the Portuguese overnight rates to the ones prevailing in Germany is shown. The left-hand side of Figure 7.9 displays the convergence of 10-year Portuguese government bonds yields towards the level observed in Germany. The sharp reduction in the Portuguese currency risk was translated into the convergence between the yield on Portuguese government bonds and that on the corresponding bonds issued by the German government which was mostly evident from 1995 onwards (Figure 7.10).

The cross-country standard deviations of government bond yields constitute another "price based" indicator of European financial integration. As shown in Figure 7.11, the standard deviation of the 10-year government bond yields for countries belonging to the euro area exhibited a substantial decrease in the second half of the 1990s, stabilizing at low levels in the eve of the start of the euro area. The dispersion in the bond yields increased during the current financial crisis which has erupted in mid-2007, reflecting an increased differentiation of the risks associated with public debt issues across different euro area countries. Against the background of heightened uncertainty and volatility in the financial markets, this higher dispersion is associated with an increase in the credit risk and in the liquidity risk of public debt issues, even though liquidity and credit

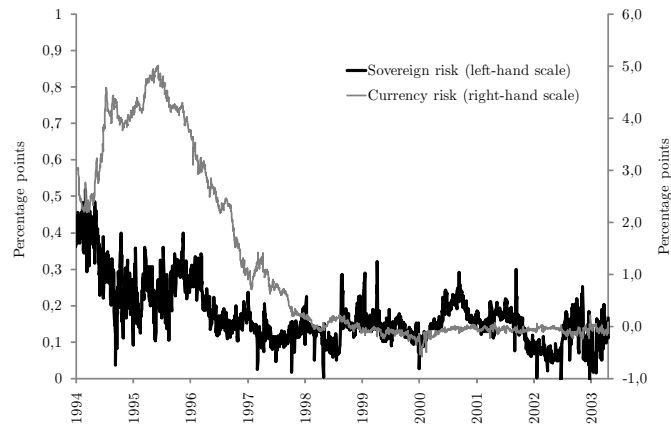
risk are hard to disentangle in such a context. The reasons for this increase include the deterioration of the government accounts and the partial transfer of the risk from the financial sector to the public sector, as government guarantees for issues of debt by financial institutions were provided. The turbulence in the financial markets, along with difficulties in wholesale market financing, has also contributed to the increase in the liquidity risk premium. For these reasons, the increase in cross-country standard deviation of government bond yields should not be read directly as a sign of the reversal of the European financial integration process, in the sense that no changes occurred in the institutional framework in which the euro area economy is based. In fact, to a large extent, the increase in the dispersion of public debt yields across euro area countries should have been temporary, as signs of a normalization of the situation in financial markets were reflected in a decrease in this measure of dispersion between March and September of 2009.

In what concerns the "quantity dimension" of financial integration, and in parallel to the fading out of currency risk, against the background of the participation in the euro area, the proportion of Portuguese public debt held by non-residents also increased, as illustrated in Figure 7.12. Further, this process continued after the euro area inception, so that at the end of 2008 the proportion of the Portuguese government debt held by non-residents stood at around 80 per cent, which compares with less than 50 per cent in 1999. One of the elements contributing to explain the increase in non-residents holdings of Portuguese government debt is the emergence of pan-European trading platforms, such as the MTS. This ensures a higher degree of standardization of products and procedures among countries, turning the trading of public debt easier and with a lower associated cost.

The changing composition of mutual funds' portfolio shows further evidence of financial integration. In fact, as from the beginning of the 2000's the amount invested by Portuguese mutual funds in securities issued by non-residents became larger than the amount invested in securities issued by residents, as illustrated in Figure 7.13. This was a result of the introduction of the euro and the ensuing elimination of foreign exchange risk vis-à-vis euro area countries, which led to shifts in mutual funds' asset composition towards securities with a high degree of liquidity within the euro area.

During the second half of the 1990's, increasing financial integration and the elimination of currency risk associated with the par-

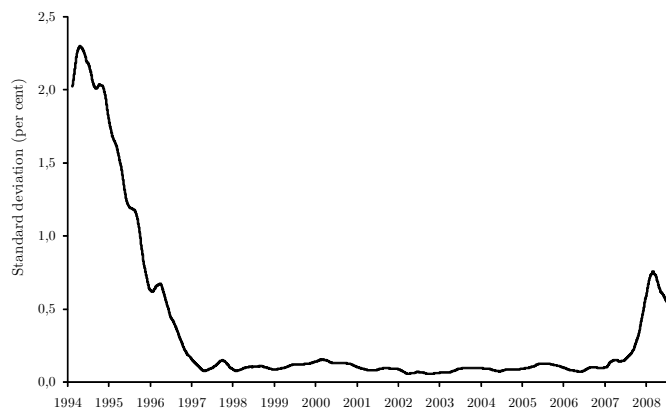
Figure 7.10: Decomposition of the interest rate spread between currency and sovereign risk



Source: Bloomberg, Budensbank and *Banco de Portugal*.

Note: Currency risk corresponds to the difference between the yield of a Portuguese government bond and the yield of a Eurobond issued by the Portuguese government in DM. The sovereign risk corresponds to the difference between the just mentioned yield and the yield of a German government bond. All bonds are 10-years bonds expiring in 2003.

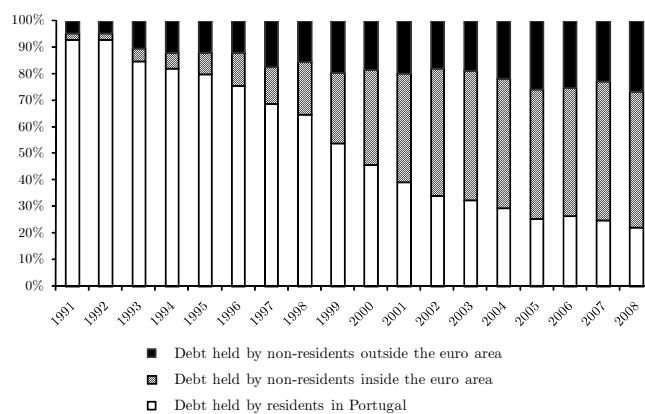
Figure 7.11: The cross country dispersion of 10-year yields in the euro area



Source: Bloomberg and *Banco de Portugal*.

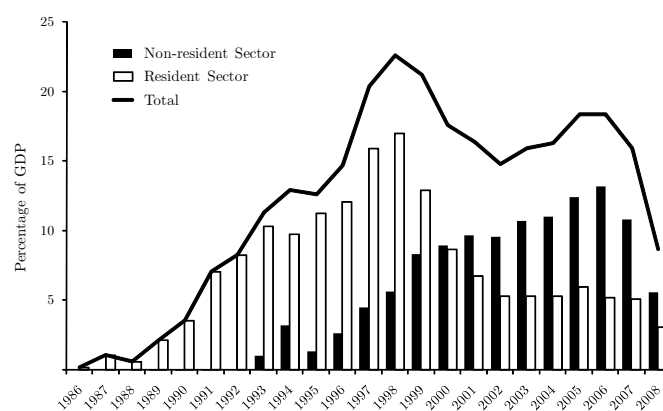
Note: 60-days moving average of the standard deviation across 10-years Government bonds from Germany, Portugal, Italy, France, Spain, Belgium, Ireland, Netherlands, Finland, Austria and Greece (after January 2001).

Figure 7.12: Portuguese government debt — Breakdown by residency of the holders



Source: *Banco de Portugal*.

Figure 7.13: Mutual funds — Breakdown by residency of asset issuers



Source: Statistics Portugal, CMVM and *Banco de Portugal*.

Note: Money market funds are not included.

ticipation of Portugal in the euro area, expanded the opportunities for risk sharing both inter-temporally and among economic agents in different economies in the euro area. In fact, domestic demand rose much faster than income leading to a wider current plus capital account deficit. Moreover, the relatively stable investment to GDP ratio was accompanied by a declining trend in the domestic saving rate, which is a clear manifestation of the increased financial integration and of the decline in the risk premium.¹⁸ These developments translated into increasingly negative net foreign assets.

In this context, during the last decade, there has been a significant growth both in Portugal's assets and liabilities relatively to the non-resident sector, reflecting strong movements of internationalization and financial integration, as illustrated in the left panel of Figure 7.14. Foreign assets held by other monetary financial institutions, which mainly include banks, have remained relatively stable, whereas this sector's foreign liabilities increased sharply, corresponding to the intermediation of the non-financial private sector's increasing gross debt. As mentioned above, the general government has also increased the funding obtained from the non-resident sector, as the public debt market developed and financial integration progressed. Considering each sector's net foreign assets, a significant change in each sector's contribution to the Portuguese economy's external financing is clear, as illustrated in the right panel of Figure 7.14. In fact, while in 1996 the general government and other resident sectors (which include households, non-financial corporations and non-monetary financial institutions) took the primary role, the contribution of the latter sector rapidly decreased, as opposed to an increase in that of other monetary financial institutions.¹⁹ More recently, against the background of the financial turmoil which erupted in the summer of 2007, both the level of foreign assets and liabilities declined as a percentage of GDP. Indeed, in 2008, as the financial turmoil intensified, a larger current and capital account deficit was financed by a strong decline in foreign assets, since foreign liabilities have also decreased. However, this profile

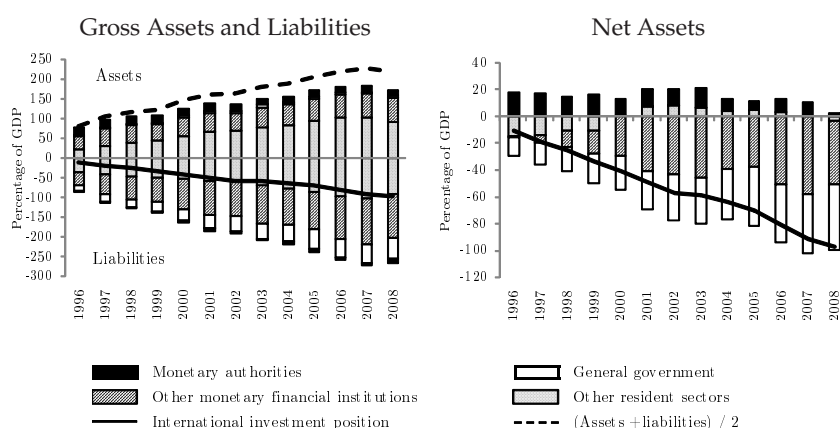
¹⁸See Chapter 2 for details on developments in consumption, investment and saving in Portugal during this period.

¹⁹The relatively low value of net foreign assets held by "Other resident sectors" in recent years reflects, on the one hand, considerable values of net foreign assets held by non-monetary financial institutions and households (17.0 and 13.7 per cent of GDP in 2007) and, on the other hand, the net foreign debt held by non-financial corporations (30.4 per cent of GDP in 2007).

was no longer observed in 2009.

Hence, over the last decade, the relatively concentrated Portuguese banking sector, characterized by universal banks which took advantage of technological progress, of increasing financial integration and of the elimination of the currency risk premium, provided an important contribution to the international financing of the Portuguese economy. In turn, this allowed for private consumption growth to remain relatively sustained, in a period of clearly slower GDP growth (after 2000).

Figure 7.14: International Investment Position



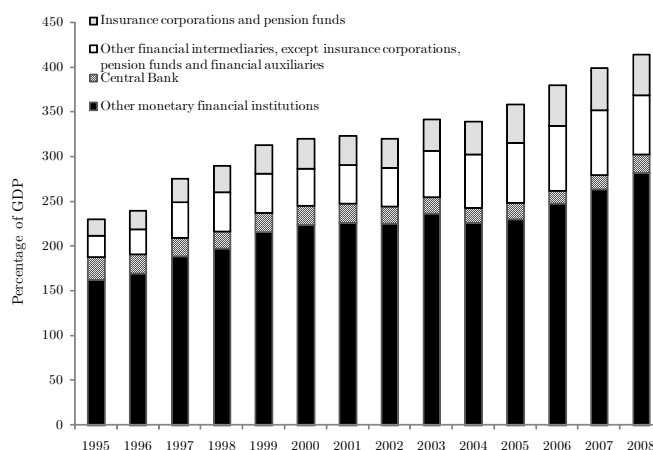
Source: *Banco de Portugal*.

Note: Other resident sectors include households, non-financial corporations and non-monetary financial institutions.

Along with the increased *financial integration* one should stress the importance of *financial development*, which was catalyzed by financial integration and had as driving forces financial liberalisation, financial innovation as well as technological innovation and organisational improvements. The observed increase in the importance of financial intermediation, the structural changes at the market level, the modernization of the distribution channels, the introduction of new financial products and the change in banks' funding structure are manifestations of the financial development which occurred since the beginning of the 1990s.

Financial intermediation and the structure of the financial system

The liberalisation of the banking sector translated into an increasingly important role for financial intermediation. In fact, financial

Figure 7.15: Financial system structure

Source: Eurostat.

Note: Financial assets as a percentage of GDP. Non-consolidated values.

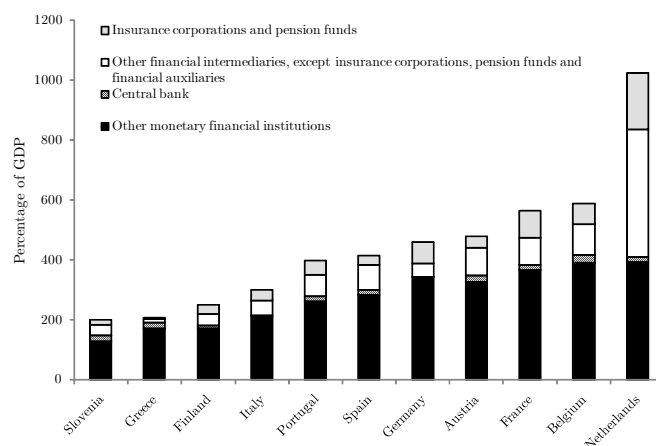
assets as a percentage of GDP increased by about 80 percentage points in Portugal in the period from 1995 to 2008, a pattern that was also observed in most OECD countries (Figure 7.15). Notwithstanding this, and taking into account 2007 data as a percentage of GDP, the size of the Portuguese financial system is below most of the euro area countries with a value close to Spain and, to a lesser extent, Austria and Germany (Figure 7.16). However, the importance of loans to the non-financial private sector as a percentage of GDP is comparatively higher in Portugal than in most euro area countries (Figure 7.17).²⁰

Concerning the structure of the financial system, Portuguese banks hold the bulk of the sector's assets, a feature that is common to most continental Europe countries. Nevertheless, the proportion of financial assets held by banks has been gradually decreasing (Figure 7.15). As such, at the end of 1995 banks held around 80 per cent of total financial system's assets, which compares with less than 70 per cent in 2007. In 2008, as a consequence of the financial turmoil, which implied capital losses in the portfolios of non-bank financial institutions (such as mutual funds and pension funds) and led to portfolio reallocations towards less market sensitive assets such as bank deposits, an increase in the proportion of assets held by banks

²⁰The individual countries figures may reflect differences in the accounting of securitized loans, which should however not significantly affect conclusions.

FINANCIAL MARKETS AND INSTITUTIONS

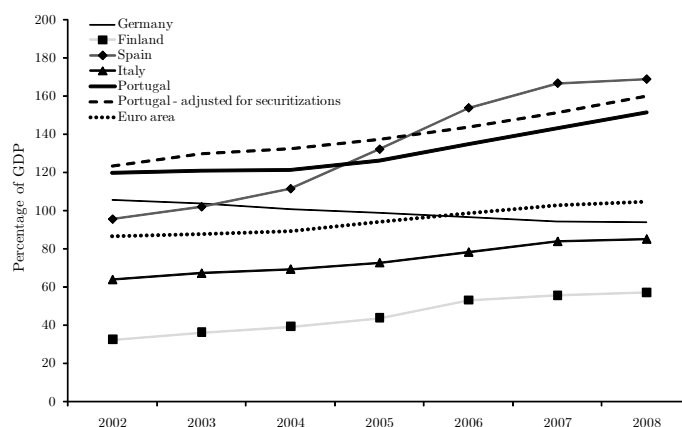
Figure 7.16: Size and structure of the financial system in the euro area countries in 2007



Source: Eurostat.

Note: For Italy and Germany the series "Other monetary financial institutions" includes the central bank. Ireland was excluded from the graph because of its extremely high value (above 1600 percent of GDP). Data for Luxembourg is not available.

Figure 7.17: Bank loans to the non-financial private sector



Source: AMECO and ECB.

Note: The definition of the euro area reflects changes in composition as new countries join in.

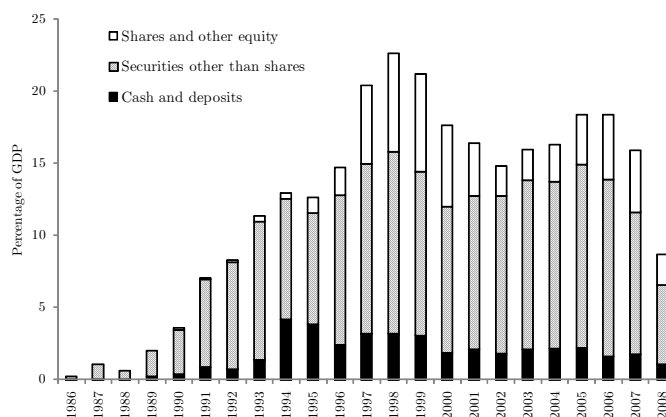
was observed. To sum up, developments in the banking sector are of utmost importance to financial intermediation in Portugal, as it tends to be the case for other euro area economies.

In parallel, the mutual fund industry in Portugal was steadily increasing from an almost inexpressive role in the mid 1980's to around 22.5 percent of GDP in 1998. Afterwards, it trended down to 15 percent in 2007. The effects of the financial crisis that showed its most acute consequences in 2008 implied a further reduction to slightly less than 9 percent of GDP in 2008 (Figure 7.13 and Figure 7.18). Concerning the mutual funds' portfolio composition, debt securities are the most important instrument, while the importance of shares and other equity, albeit rising in the second half of the 1990's up to 30 percent of total asset's value, have fluctuated in line with equity prices (Figure 7.18). It should be mentioned that the proportion of shares and other equity includes the investment in other resident mutual funds, thus overestimating the true direct investment of mutual funds in stock markets. A special reference should be made to the rise in the investment in shares and other equity from 1996 to 1997, which represent in great part the rising importance of the "funds of funds", i.e. those funds with investment policy dedicated essentially to holding other funds. The amounts invested in cash and deposits, from the beginning of the 1990s, ranged from 10 per cent to 16 per cent.

The increase in the amount invested in mutual funds resulted from a change in household's savings allocation, motivated both by banks' funding strategies and by financial innovation, as new investment products offering different risk and return profiles were introduced in the market.²¹ Hence, the last two decades witnessed an evolution from standardized saving accounts and time deposits to more tailor made investment products, creating the possibility of investing in a wide spectrum of assets, such as mutual fund shares and pension funds. From the beginning of the 1990s there was a clear increase in the importance of mutual funds as well as of life insurance and pension funds, against a decrease in the importance of currency and deposits. These developments point to a decrease in direct banking intermediation of private sector savings, even though banks hold significant positions in asset management firms. Nonetheless, against the background of the financial crisis

²¹More details in this regard are presented in section 7.3.1 on households' financial decisions.

Figure 7.18: Mutual funds assets — Decomposition by financial instrument



Source: Statistics Portugal, CMVM and Banco de Portugal.

Note: Money market funds are not included.

which erupted in the Summer of 2007, an increase in the weight of deposits was observed.

Figure 7.19 shows the importance of market capitalization in terms of GDP for the same euro area countries presented in Figure 7.17. Stock market capitalization, as shown in Figure 7.19, fluctuates according to the booms and downturns of stock market prices, which exhibited an upward movement until 1999, decreased until 2002 and increased thereafter up to 2007. In 2008 a sharp decrease of the stock market capitalization was observed, which reflected the crisis in international financial markets. Further, euro area countries present a lower stock market capitalization as a percentage of GDP than the United Kingdom and the United States. Among the euro area countries, the highest figures are observed in the Netherlands, Finland and France. In turn, Portugal shows one of the lowest ratios of stock market capitalization to GDP amongst the euro area countries, a feature which is consistent with the relatively small number of quoted firms and the prominent role of banks in financial intermediation in the Portuguese economy. In contrast with the strong bank indebtedness of Portuguese firms and households, the market capitalization of bonds issued by Portuguese entities (including General Government) as a percentage of GDP stood below the euro area av-

erage in 2008.²² Moreover, government bonds made up for a significant share of the total bond market's capitalization. Indeed, in the beginning of the 1990's Portuguese government bonds accounted for more than 45 per cent of the bond market's total capitalization. This high proportion in the early 1990's was related with the liquidity sterilization operation mentioned above (accounting for around 12 per cent of GDP) which took place in the context of the changes introduced in the monetary policy's operational framework. During the late 1990's and early 2000's, it decreased substantially to a level lower than 40 per cent. This trend was later inverted, with the ratio reaching values above 55 per cent in the second half of the 2000s.

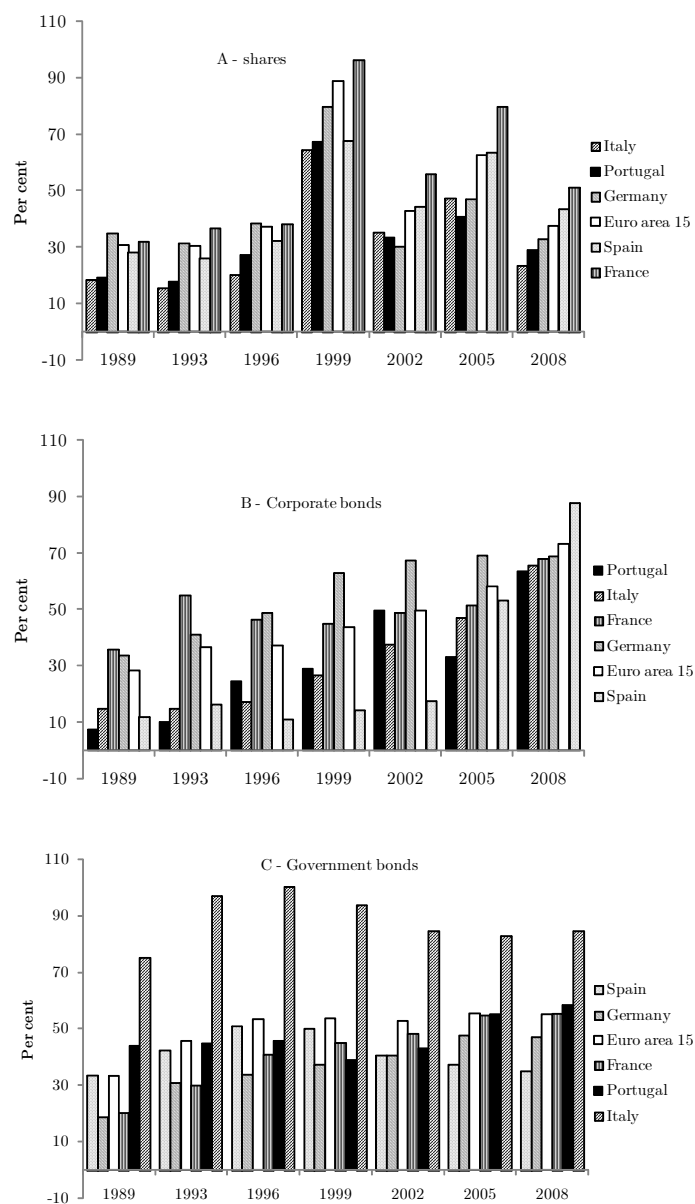
However, even though the market capitalization of the Portuguese bond market is small as compared to other euro area countries and bank loans as a percentage of GDP are higher in Portugal than in the euro area, from 2005 onwards Portuguese non-financial corporations do exhibit a smaller proportion of loans on financial debt than the euro area average.²³ Actually, considering a wider aggregate of bank financing to the corporate sector, encompassing loans and commercial paper held by banks, the share of bank credit on financial debt of Portuguese non-financial corporations exhibits a similar pattern to that of the euro area (Figure 7.20). Moreover, the share of bank loans on financial debt has been decreasing in the second half of the 2000s, while short-term securities increased its importance as a funding instrument of non-financial corporations.

Structural changes in the funding of banks

From the late 1990's onwards, the increasing net borrowing requirements of the non-financial private sector were accommodated, to a large extent, through the banking system. This was made possible through significant changes in the funding structure of banks which allowed strong credit growth in excess of the collection of customers' deposits, as illustrated in Figure 7.21. In a first step, as the funding gap with customers increased, banks made use of their relatively large pool of government debt securities and excess liquidity placed with the *Banco de Portugal* inherited from the 1980's credit ceilings regime. Further, with the participation in the euro area, Portuguese banks gained access to a large funding market free

²²One should, nonetheless, keep in mind that commercial paper, which is not traded in public bond markets, is an important funding source for Portuguese non-financial firms.

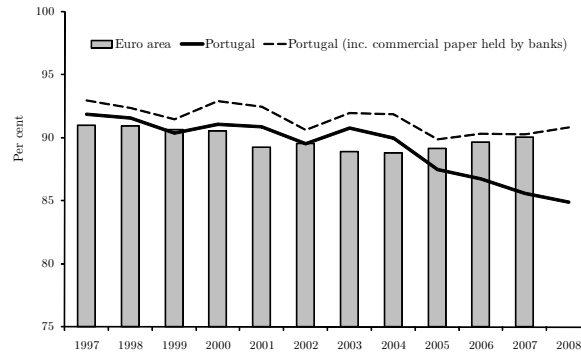
²³If Luxembourg and Ireland are excluded from the analysis.

Figure 7.19: Market capitalization as a percentage of GDP

Source: ECB

Note: End-of-year market capitalization.

Figure 7.20: Proportion of bank loans in financial debt of non-financial firms

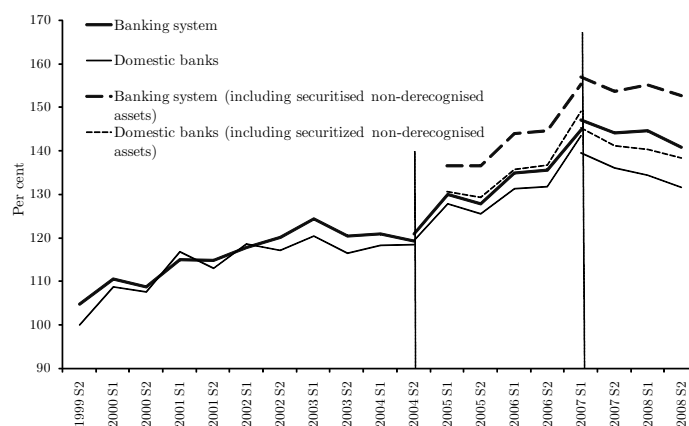


Source: Eurostat and *Banco de Portugal*.

Note: Loans as a percentage of the sum of bonds and loans. Non-consolidated values. Europe: average ratio for euro area countries excluding Luxembourg and Ireland.

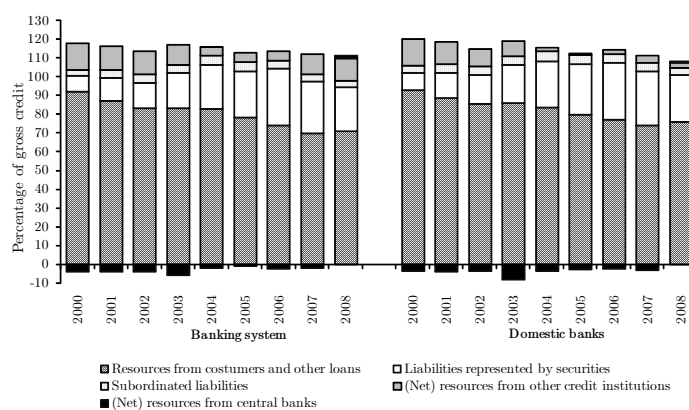
of exchange rate risk. Initially they made recourse to the interbank market to fulfil their funding needs. As it was increasingly clear that these funding requirements were to a large extent structural, banks increased the average maturity of their wholesale market funding, tapping extensively the European Medium Term Notes, a standardised pan-European debt securities market that emerged just after the third stage of EMU. Against the background of an increasing share of wholesale market debt in banks' funding there was a decrease in the share of customer deposits, which, however, remained the most important source of funding, as illustrated in Figure 7.22.

In parallel, the securitisation of loans originated by Portuguese credit institutions started in 1997, but due to the lack of specific national legislation on securitisation its importance remained minimal and confined to the outright sale of non-mortgage loans to foreign vehicles. From 2000 onwards, rapid growth of mortgage securitisations started, supported by a Portuguese specific law. In such a framework, securitisation added to the already existing market funding instruments at the disposal of Portuguese banks. There are a few elements in the Portuguese legislation and prudential regulation that provided incentives for the bank which grants the loan in the first place (the originator) to assess and follow adequately the creditworthiness of the borrowers. On the one hand, banks have to remain the servicers (collectors of payments and processors of

Figure 7.21: Credit to deposit ratios

Source: *Banco de Portugal*.

Note: The 2004 break in the series is due to the introduction of the International Accounting Standards, which also implied a redefinition of the banking institutions that were analyzed. The 2007 break corresponds to an enlargement in the number of institutions analyzed. Estimates of securities issued by banks but placed with their customer base are included in the item "resources from customers".

Figure 7.22: Funding sources of the banking system

Source: *Banco de Portugal*.

Note: In 2004 there is a series break due to the introduction of the International Accounting Standards, which also implied a redefinition of the banking institutions that were analyzed. In 2007 there is an additional series break, which corresponds to an enlargement in the number of institutions analyzed. Estimates of securities issued by banks but placed with their customer base are included in the item "resources from customers".

information about borrowers) of the securitised loan, keeping untouched the relationship with the customer. On the other hand, the prudential treatment of securitisations is designed to avoid perverse incentives for the originating banks leveraging on ever increasing risk taking. As such, when residual risks remain for the bank which originates and sells the loan, for instance when retaining the tranche with the highest subordination (the so-called equity tranche) banks have to apply a weight for the purposes of computing risk-weighted assets that does not allow in most cases for a significant freeing up of capital. As a consequence, the development of the securitised market for operations involving loans originated by Portuguese credit institutions was to a large extent motivated by liquidity considerations, rather than economising on the existing capital base.

The swift intermediation of funds from abroad to the non-financial private sector in a context of a declining saving rate of households is a symptom of a loose role of the so-called bank lending channel of monetary policy in the case of the Portuguese economy in the period under review. The concept of a bank-lending channel was first introduced and modelled by Bernanke and Blinder (1988) and assumes that loans and bonds are imperfect substitutes. In such a setting, the credit made available by banks to the economy depends on the level of deposits, the latter being dependent on monetary policy impulses. This effect would be the largest, the lowest the capacity of banks to replace changes in their deposit base with funds from capital markets. Hence bank-based economies would be more prone to exhibit a dependency between loans granted by banks and deposits. This could potentially be the case of Portugal, where banks represent more than three quarters of the financial intermediation and control indirectly, through dedicated subsidiaries, the greatest part of the mutual funds and pension funds markets. For Portugal, there is formal empirical evidence on the bank lending channel for the period before the inception of the euro area. In fact, Farinha and Marques (2001) test for the relevance of the bank lending channel for Portugal for the period between 1990 and 1997 estimating directly the banks' supply curve. This study concludes for the existence of a stronger relationship between loans and deposits for less capitalized banks, whereas banks' size and liquidity are not found to be relevant in determining the importance of the lending channel. However, as stated above, in the context of the participation in the euro area, more recent developments in funding markets should have contributed to reduce the importance of the

bank lending channel, at least until the international financial crisis that started in the summer of 2007. Those strains in wholesale international debt markets led to difficulties in banks' financing in these markets, which along with households' higher demand for financial instruments with return less vulnerable to market fluctuations, led to a higher reliance of banks on deposits for their funding needs.

7.2.2 Evidence on Portuguese banks' performance

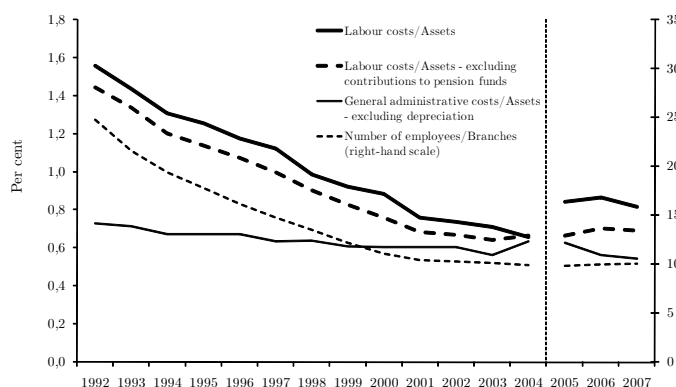
Banks' distribution channel and labour/capital structure

The significant institutional changes observed in the Portuguese banking system since the early 1990's, involving the liberalisation and privatisation process and increasing financial integration and technological developments, have led to deep changes in banks' activity and in their production function.

During this period, the distribution channels used by banks underwent major changes. Concerning banks' branching structure, a move from a relatively small number of large branches to a larger number of small branches was observed so that, as shown in Figure 7.23, the average number of employees per branch more than halved between 1992 and 2003, stabilizing thereafter. While the geographic density of the branch network has increased substantially, thus increasing customer proximity, the autonomy of each branch has decreased as many activities were centralized. Moreover, technological progress has allowed for the emergence of new distribution channels, which contributed both to the provision of a better service for customers, thus potentially increasing demand, and to a decrease in banks' marginal costs, since automation and substitution of labour allows for lower costs per operation and for greater flexibility. Also, as automated technologies are adopted, economies of scale are more prone to emerge, due to an increased proportion of fixed costs in total costs.²⁴ Furthermore, technological transformation can contribute to enhance the transmission of monetary policy, to the extent that it acts as a catalyst for increased price competition.

Even though in 1985 Portugal was among the last western European countries to put in place an Automated Teller Machine (ATM) network, the system has developed rapidly and nowadays is among the most sophisticated in Europe. Portuguese banks have adopted a cooperating stance in the development of the ATM network, by

²⁴Developments in Portuguese banks' returns to scale and marginal costs are discussed below in the section on banks' productivity.

Figure 7.23: Developments in banks' use of labour

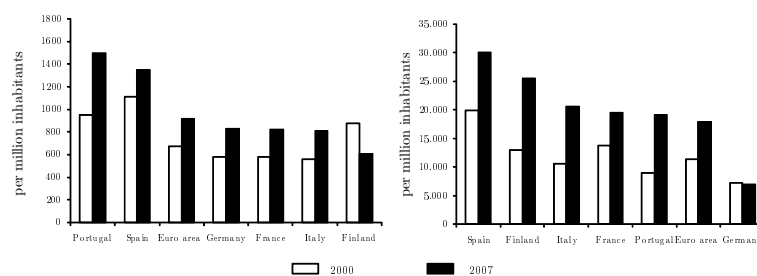
Source: *Banco de Portugal*.

Note: The break in the series in 2005 was due to the adoption of the International Accounting Standards, which particularly affected labour costs.

creating a third party company - SIBS - in which retail banks have a stake as a shareholder to operate the network. Hence, there has always been full compatibility, so that customers of any bank can benefit from the full network. Furthermore, use of the system is free of charge for customers (being partially funded by advertising since 1993) and Portugal currently has both the highest density of ATM's per inhabitant in Europe (left panel of Figure 7.24) and offers the most comprehensive range of functions. More recently, there have also been remarkable developments both in the range of services provided and in the volume of transactions through phone banking and internet banking, the latter also becoming an important means of market segmentation and information diffusion. Increasing automation was also reflected in a rise in both the number and the value of transactions performed through cards with a debit and/or credit function, as there was a considerable increase in the number of available point-of-sale (POS) terminals (right panel of Figure 7.24).

In fact, the importance of credit/debit cards payments measured in terms of GDP has evolved in line with Finland, one of the earliest movers in using automated distribution channels, and has been clearly higher than in the euro area as a whole (Figure 7.25). In parallel, the number and value of transactions performed by cheques, has been decreasing sharply. Nonetheless, cheques still accounted for close to 47 per cent of the total value of transactions in 2007 (which

Figure 7.24: Payment terminals. Number of ATMs (left panel) and number of POS (right panel)



Source: Payments and Settlement Systems Statistics, European Central Bank.

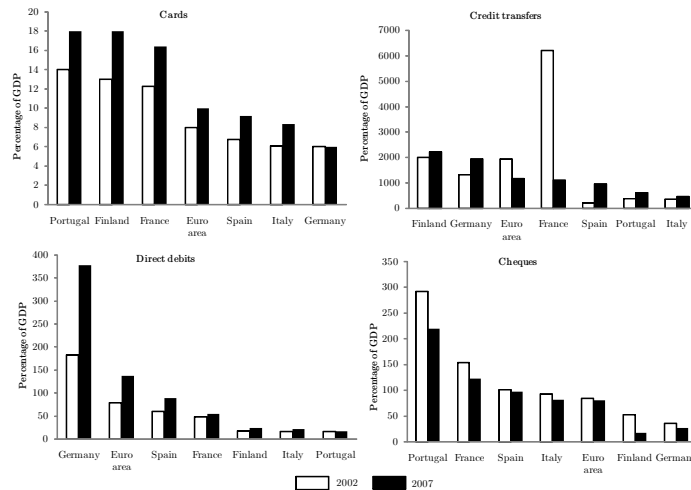
Note: The definition of the euro area reflects changes in composition as new countries join in.

compares with around 80 per cent in 2001), which is a relatively high value within the European context. Hence, given the advanced infrastructures in place in Portugal, there seems to be much room for a higher use of other electronic means of payments, especially in what concerns credit transfers and direct debits, which are relatively underused when compared with other euro area countries.²⁵

As illustrated in Figure 7.23, these developments were reflected in banks' cost structure through a clear decreasing trend in the weight of labour, either measured by the ratio between labour costs and total assets or by the ratio between the number of employees and the number of branches. However, as discussed above, the decrease in the ratio between banks' number of employees and branches partly reflects the decrease in the average size of banks' branches, which are not necessarily more productive than large branches. Further, banks' search for increased productivity has led them to outsource many activities which were previously done in-house, so that the decrease in the ratio between labour costs and assets should overestimate true productivity gains.

The ratio between banks' operational costs (staff costs, administrative costs and depreciation) and their gross income, commonly known as the cost-to-income ratio, is among the most commonly analysed indicators of bank performance. As seen in Figure 7.26, this ratio does not show a clear trend for the Portuguese banking system between the mid 1990's and 2008. Considering the deep changes that

²⁵The main forms of credit transfers include both conventional and variable standing orders, generally used by firms to pay their suppliers and employees.

Figure 7.25: Use of retail payment systems

Source: Payments and Settlement Systems Statistics, European Central Bank.

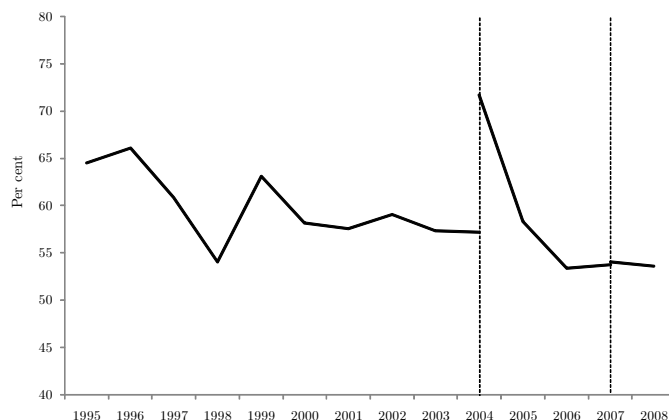
Note: Due to a change in the reporting framework, 2007 data for Germany and France are not comparable with those reported for 2002. The definition of the euro area reflects changes in composition as new countries join in.

the Portuguese banking system underwent during this period, this might at first seem surprising. However, one must keep in mind that this ratio is an indicator of banks' efficiency in generating income (which is why it is typically used by bank managers in order to gauge performance). Hence, extracting conclusions concerning productive efficiency based on this indicator may yield misleading results since profitability is a poor measure for banks' output, as it is affected by the degree of market power.

In turn, Portuguese banks compare well with the eleven founding euro area countries in terms of the cost-to-income ratio, with only Spain, Finland and Ireland showing lower values in 2005 and 2006 (Figure 7.27). Moreover, due to the comparatively low importance of financial market-related operations in the generation of income, the value of this ratio for major Portuguese banks is much less volatile than the one exhibited by the largest European banks, which are much larger and operate at a pan-European level.²⁶

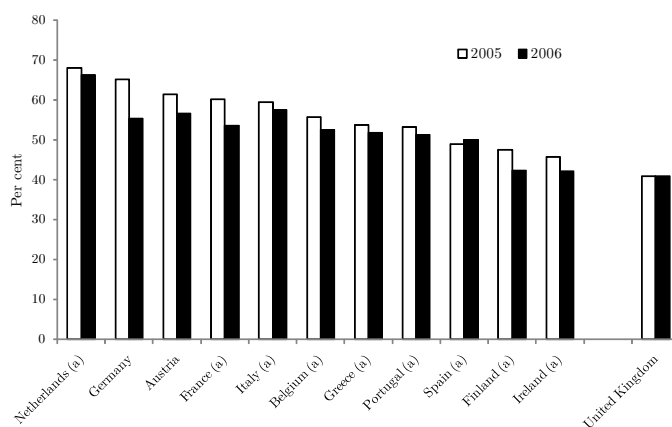
The accounting based performance measures presented are com-

²⁶Data for 2008 are not shown since, due to the international financial crisis which erupted in the summer of 2007, this ratio has reached exceptionally high values for countries in which banks' income is more dependent on market fluctuations.

Figure 7.26: Cost-to-income ratio

Source: *Banco de Portugal*.

Note: The series break in 2004 is associated with changes in accounting standards and in the reporting population while the series break in 2007 is associated with an increase in the number of reporting institutions.

Figure 7.27: Cost-to-income ratio of selected EU banks

Source: ECB "EU Banking Stability Report - November 2007".

Note: (a) Countries that have adopted the IAS/IFRS at the time of the publication of the source of the data.

monly used essentially due to their ease of computation and allow for some insights to be drawn on developments in productivity. However, due to the limited information used in the computation of each indicator, they must be interpreted with some caution in order to avoid misleading conclusions, since developments in these measures do not necessarily follow changes in productivity. Hence, in order to adequately assess developments in productivity, a more structured econometric approach is required.

Throughout the 1990's and early 2000's there was a marked decrease in Portuguese banks' financial margin, indicating that the liberalisation process and technological developments have contributed to decrease banks' costs and/or to increase competition (Figure 7.28). The relevance of low intermediation costs is assessed in Antunes (2008) who, in the framework of a general equilibrium model calibrated for the US economy, finds that the GDP of a small open economy would decrease by around 15 per cent if the intermediation margin were to be a multiple of four relatively to the one prevailing in the US. In parallel, an increase in Portuguese banks' commission income was observed, partly reflecting a decrease in cross-subsidization, since during the early 1990's most services were provided without an explicit charge associated, which banks compensated for with a higher financial margin. These developments should in principle lead to a more efficient functioning of the financial system, in the perspective that cross-subsidization distorts incentives for the choice of consumption of each type of service. This decrease in distortions can happen regardless of the possibility of banks' bundling of different services, if transparency in the provision of each service is ensured and if bundling does not promote an anti-competitive environment (e.g. by magnifying consumers' switching costs among service providers).

The developments observed during the 1990's allowed for the convergence of Portuguese banks' intermediation margins to values closer to those exhibited by their euro area counterparts, albeit remaining among the countries with comparatively higher financial margins, defined in Figure 7.29 as the ratio of net interest income to total assets. However, one should keep in mind that intermediation margins are dependent on banks' asset and liability structure, so that direct comparisons across different countries can yield misleading results if they are interpreted as a measure of the spreads applied by banks on the intermediation of funds to the non-financial sector. In fact, Portugal has a high ratio of customer loans to total assets and

a relatively low importance of interbank activity, which should bias its financial margin upwards. The financial margin is also affected by the weight of demand deposits in banks' balance sheet, since customers - especially households - tend to accept a low remuneration in this type of deposits in exchange for the underlying payment and immediacy services. Further, the remuneration of demand deposits in Portugal is relatively low in the euro area context, which may be associated with the wide range of functionalities provided by the Portuguese retail payment system to which consumers have universal access with no direct charges.

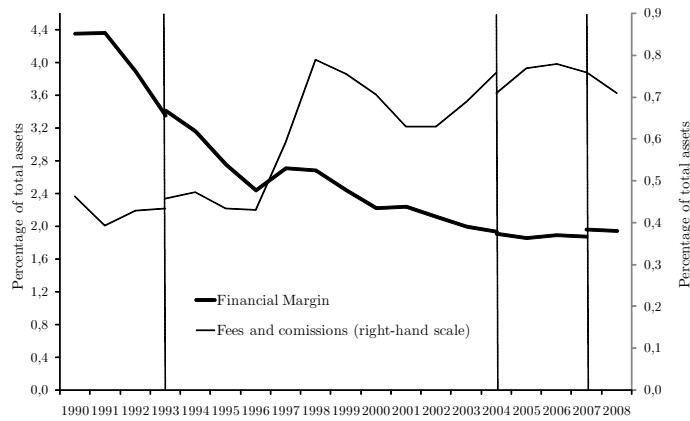
Figure 7.30 presents figures on the interest rate spread between loan and deposit rates concerning operations with the non-financial private sector across countries, computed using data from a period of stable interest rates in order to ensure that data is more comparable across countries. Due to the arguments explained above, the spread between loan and deposit interest rates allows for a better assessment of true intermediation costs than the financial margin as exhibited in Figure 7.29. Moreover, when the former measure is used the Portuguese financial system emerges among those with median intermediation margins, suggesting that Portugal is among the euro area countries where banks allow for a swifter intermediation of funds.

Banks' productivity

Against this background, Boucinha, Ribeiro and Weyman-Jones (2009) estimated a stochastic cost frontier for banks operating in Portugal during the period ranging from 1992 to 2004 in order to assess banks' productive performance.²⁷ Banks are modelled as firms whose main activity is to act as intermediaries in the economy, by granting loans using funds obtained through customer deposits, wholesale debt and equity. Using results from duality theory, banks are regarded as firms who minimize labour, capital and funding related costs, subject to the production of a given amount of loans and other earning assets and to the maintenance of a minimum level of equity. This specification includes all the main components of banks' costs, so that the presence of different cost structures (i.e., incurring higher labour costs in order to optimize the funding structure and thus reduce funding costs or having lower labour

²⁷The reason why more recent data is not used is that in 2005 the larger banks operating in Portugal adopted the International Accounting Standards, so that data until 2004 is not comparable with the more recent data.

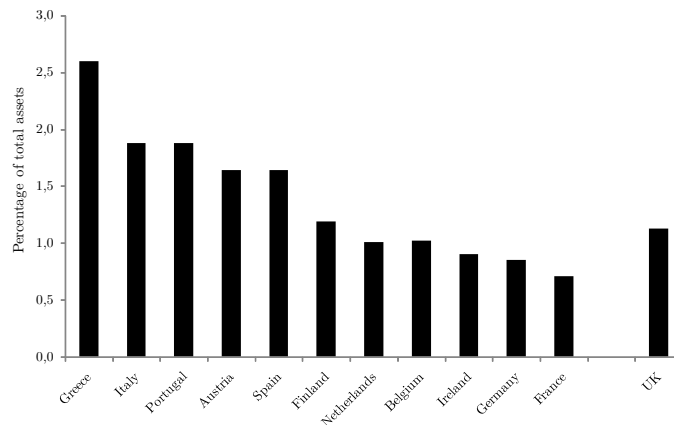
Figure 7.28: Developments in the financial margin and in commissions and fees charged by Portuguese banks



Source: *Banco de Portugal*.

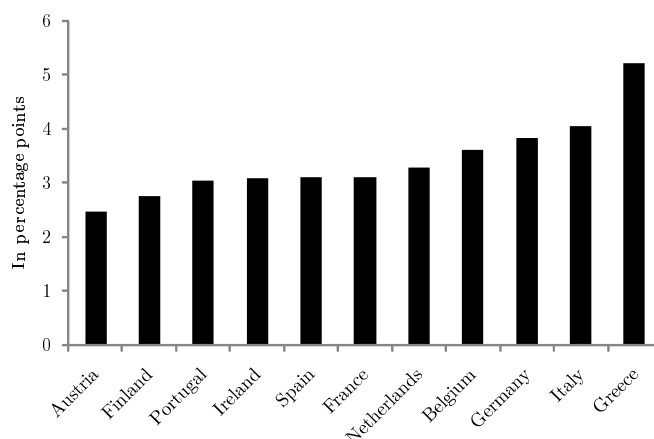
Note: The series break in 1993 reflects the change from individual to consolidated accounts, whereas the one in 2004, reflects the adoption of the International Accounting Standards and the one in 2007 reflects a change in the sample of institutions covered.

Figure 7.29: An international comparison of financial margins as of 2008



Source: ECB "EU Banking Stability Report - November 2007".

Figure 7.30: An international comparison of the spread between bank loan and deposit rates

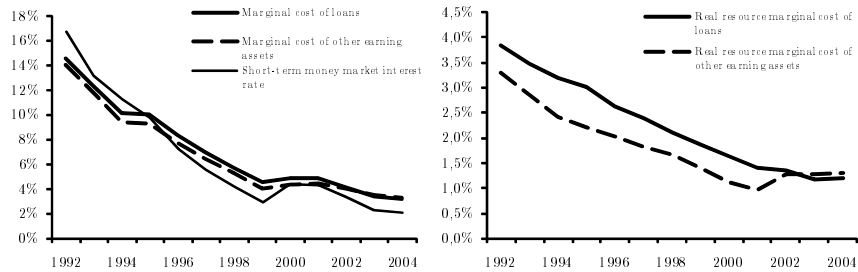


Source: Eurosystem MIR interest rate statistics.

Note: Spreads calculated as the difference between synthetic bank loan and deposit interest rates on outstanding amounts in operations with resident non-financial firms and households denominated in euros. Average over the period July 2003 and December 2005.

costs which are offset by higher general administrative costs due to outsourcing) should not yield misleading interpretations concerning banks' relative performance. The decision to include equity in the cost function as a fixed rather than a variable input in which firms optimize is justified by the hypothesis that, due to regulatory and rating/reputation objectives, banks are likely to hold a higher level of equity capital than that which would solve their static maximization problem, so that there is an inequality constraint to the value of equity which is binding at the optimum. Further, as is true for most studies in this literature, this approach fails to grasp all the services provided by banks which consume resources, such as income generating business for which there is neither an on or off-balance sheet equivalent measure.

As shown in the chart on the left panel of Figure 7.31, Portuguese banks' marginal costs in the production of loans and other earning assets were found to follow to a large extent the decline in the nominal interest rates observed throughout the period under consideration. Still, as shown in the right panel of the same figure a significant part of the decrease in total marginal costs is explained by a reduction in the real resource marginal cost, indicating that true

Figure 7.31: Developments in Portuguese banks' marginal costs

Source: Boucinha et al. (2009).

operational cost savings were present.

Banks' capital structure was accounted for in the analysis by including equity as a fixed input in the cost function. This procedure allowed for the computation of estimates for banks' shadow cost of equity. Since there is a constraint to the minimum level of equity that banks must hold and the cost function is derived under the framework of a static optimization problem, this estimate should be interpreted as a lower bound to banks' true willingness to pay for equity capital.²⁸ Not surprisingly, the estimates obtained for the shadow cost of equity are lower than levels compatible with usually accepted equity risk premia, even though it follows quite closely the developments in market interest rates.

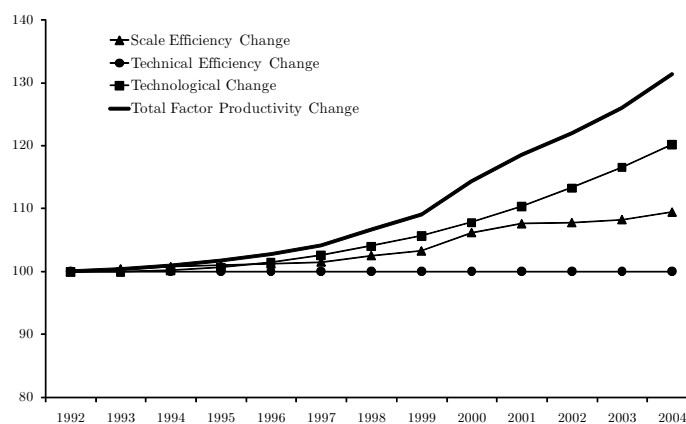
On average, Portuguese banks were found to operate with a cost inefficiency level around 9 per cent, indicating that they could theoretically produce the same output incurring only 91 per cent of their actual cost. Despite the fact that no significant changes to cost efficiency were found, there is some heterogeneity in the bank specific cost efficiency estimates, which range from 84 per cent to 99 per cent. The magnitude of cost reducing technological progress was found to increase through time, standing at 2.2 per cent at the (weighted) sample mean and at 3.2 per cent in 2004. Accounting for banks' capital structure, significant scale economies were found, especially in the more recent period, so that while in 1992 a one percent increase in banks' output would on average lead to a 0.97 percent increase in total costs, the corresponding value for 2004 is 0.93 percent. The

²⁸In fact, banks' funding costs depend on their "capital" of reputation, which does not solely depend on each period's actions.

results also indicate that there are cost advantages from the joint production of loans and other earning assets.

Developments in total factor productivity are presented in Figure 7.32, which also includes the three separate effects which contribute to changes in productivity. The presence of cost reducing technological progress indicates that the adoption of a more efficient production technology has allowed for the cost frontier to shift downwards through time. In turn, the fact that no significant changes to cost efficiency were recorded, suggests that banks have adopted the more productive technology at a similar pace, so that the distance between each bank and the frontier defined by best practices has remained constant. Since Portuguese banks' exhibited increasing returns to scale and production increased throughout the relevant period, there was a movement towards a more efficient point in the cost function, which also contributed to increase productivity. Hence, the consolidation process should have been at least partly motivated by the opportunity to increase productive technology. One should note that the concept of total factor productivity as estimated by the authors, unlike the simple performance indicators shown above and marginal costs, is not affected by changes in input prices, so that the results in Figure 7.32 are not driven by the exogenous decrease in interest rates reflected in banks' funding costs.

Figure 7.32: Decomposition of total factor productivity (index 1992=100)



Source: Boucinha et al. (2009).

Combining these results, the authors concluded that the total factor productivity growth of Portuguese banks, despite being relatively slow in the early 1990's, increased progressively during the

period under consideration, reaching a value above 4 per cent in 2004. Between 1992 and 2004, the total increase in the productivity of Portuguese banks was found to amount to 31 per cent and technological progress was found to be its main driver.

Previous empirical results on the efficiency of Portuguese banks include the work by Mendes and Rebelo (1999), Mendes and Rebelo (2000), Pinho (2001), Canhoto and Dermine (2003), Lima (2008) and Lima and Pinho (2008). The majority of these studies estimate translog cost function using Stochastic frontier Analysis (SFA), while in the one by Canhoto and Dermine (2003) a non-parametric frontier is estimated using Data Envelopment Analysis (DEA) and Mendes and Rebelo (2000) employ both methodologies.

Even though the above mentioned studies use different empirical and theoretical approaches to the modeling of banks' activity and cover different time periods (starting in 1987 and ending in 2004), all but the one by Mendes and Rebelo (1999) find that the productivity of Portuguese banks has increased. However, as expected given the differences in the approaches, they do not agree on the levels of X-inefficiency. The identification of shifts in best practices and changes in the distance at which banks operate from the efficient frontier also varies across studies according to the methodology employed. In fact, some studies do not allow for the distinction of the two effects, since the frontier is assumed to be constant over time, so that all productivity changes are attributed to changes in cost efficiency. Further, Pinho (2001) and Mendes and Rebelo (2000) find that state-owned banks tend to perform worse on average whereas Canhoto and Dermine (2003) find that banks which were created after 1984 and foreign banks perform better than older banks which operated under the previously prevalent tightly regulated market conditions, including state-owned banks. Further, Mendes and Rebelo (2000) and Lima (2008) find that mergers contributed to increase banks' performance.

Competition in the Portuguese banking system

The assessment of competition in the banking sector has also deserved considerable attention, both from an academic and a policy point of view. The common reasoning is that higher competition is desirable as it translates into lower prices, by reducing sellers' mark-ups and with it the associated dead-weight-loss. Furthermore, higher competition is believed to favour efficiency (in the words of

Hicks (1935), "The best of all monopoly profits is a quiet life") and to increase the variety/quality of products (firms do not only compete in prices).

However, banks are special firms in that they are highly leveraged by nature, and thereby particularly subject to potential moral hazard problems. The main example is that shareholders of highly leveraged firms may have incentives to undertake projects with higher risk - even if they do not yield higher expected profits - since, due to limited liability, shareholders of such a firm still receive all the profits from a successful project but share the loss of an unsuccessful one with debt holders. This issue is of capital relevance from a policy point of view since bank failures may generate systemic risk, with severe effects on the real economy. In fact, as shown in the previous section, deposits comprise the dominant portion of banks' funding, and a substantial proportion of total deposits may be retrieved on sight. Hence, the unfunded suspicion of a bank's insolvency may actually cause the bank to fail.²⁹ The occurrence of such a phenomenon is likely to erode depositors' trust in other banks, so that the failure of one bank would then lead to serious problems for all banks. In such a situation, banks are also likely to find difficulties in accessing wholesale funding markets, so that they would have to decrease lending and, as a consequence, both firms and households would then lack financing leading to a contraction in consumption and in investment.

Hence, in the specific case of banks, competition may end up to be too strong, so that gains in prices and product variety/quality are offset by higher risk of failure. In fact, excessive risk taking, either due to a strong pressure to obtain high returns or to poor risk management and lack of adequate coverage for potential losses, was at the basis of the recent international financial crisis.

This specificity of banks' activity explains why the banking sector is still today one of the most heavily regulated sectors in the economy. However, changes in the operational framework of monetary policy and in the regulatory framework have created a setting which allows for the functioning of the banking sector as a competitive market. More recently, against the background of the international financial crisis that erupted in the summer of 2007 and of the consequent concerns of the materialization of systemic risk due to

²⁹This is actually the example of a "self fulfilling prophecy" provided by Merton (1968).

banks' failure, there have been efforts at the international level to develop new regulatory practices which are able to meet the challenges brought about by the strong financial innovation which, during the last years, has been reflected in the creation of a large number of increasingly complex financial instruments, which are often opaque and hard to value properly, alongside the emergence of unregulated highly leveraged financial institutions, which were found to be too interconnected with banks. Further, due to moral hazard, there are incentives towards excessive risk taking by bank managers, which motivated a recent debate concerning the need to increase the capital requirements associated with high risk operations and to limit compensation packages which provide managers with incentives towards excessive risk taking and bias them to sacrifice long term profitability in order to increase immediate profits.

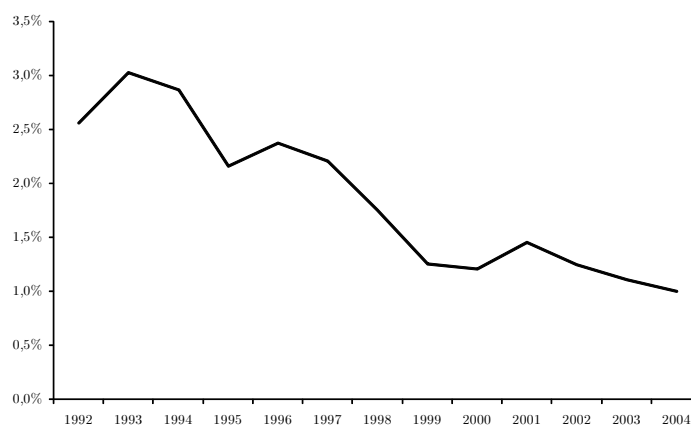
The initiatives to foster the Single Market for financial services have been in the policy agenda striving for greater transparency and explicit rules preventing banks and other financial institutions from exploiting their higher bargaining power and the comparatively lower knowledge of retail customers about the characteristics of financial contracts. In what concerns the Portuguese case, a few related measures are worth mentioning, such as the setting of maximum fees that bank are allowed to collect on early repayment of mortgage loans (aiming at reducing switching costs, which tend to hamper competition), rules on the rounding of interest rates on variable-rate loan contracts, a normalized framework for banks conveying pre-contractual information for customers on consumer credit (transposition of the 2008/48/EC Directive) and the provision to potential borrowers in a variable-rate mortgage contract of the estimated impact on the monthly instalment arising from a significant increase (defined as 2 p.p.) in the index interest rate. Further, against the background of a European-wide effort to promote financial integration and of technological advances which allowed for the processing of bank transfers electronically, so that the costs banks incur in processing bank transfers within the euro area should not be too different from the ones involved in domestic interbank transfers, Regulation 2560/2001/EC states that, as long as the IBAN and BIC codes are supplied, since the first of July 2003 banks are no longer allowed to charge more on transfers to euro area countries up to 12 500 euros than on domestic interbank transfers. This threshold value was increased to 50 000 euros in January 2006.

The privatisation and liberalisation process that the Portuguese

banking system underwent, along with the narrowing of interest margins and technological innovation motivate the common knowledge idea that there was an increase in competition during this period. However, there was also an increase in concentration, whereas the decrease in interest rate spreads has been at least partially offset by an increase in commissions, thus decreasing cross-subsidization. Hence, anecdotal evidence and observation of raw data are insufficient to assess the competitive behaviour of Portuguese banks during this period.

A classical measure of competition is the price-cost margin, since firms' ability to set a price above marginal cost is the most direct manifestation of the exercise of market power. As described above, Boucinha et al. (2009) estimated a cost function for Portuguese banks for the period ranging from 1992 to 2004, and computed estimates for banks' marginal costs in the production of loans. The authors then subtract this marginal cost to each bank's interest rate on loans in order to obtain a measure of the price-cost margin for this market which, as shown in Figure 7.33, has decreased throughout the period. However, one must bear in mind the limitations of using the price-cost margin as a measure of competition for the banking sector, since interest rates also need to cover for loan losses, which have decreased significantly throughout the period under scrutiny.

Figure 7.33: Estimated price cost margin in the Portuguese loans market



Source: Boucinha et al. (2009).

Aiming at uncovering more formally some of the issues related to competition in the Portuguese banking system, Boucinha and

Ribeiro (2009) applied the non-structural test developed in Panzar and Rosse (1987) to the Portuguese bank loan market using a sample ranging from 1991 to 2004. This approach consists on specifying hypothesis tests concerning the elasticity of banks' revenue with respect to input prices.

The study concludes that on average, over the period from 1991 to 2004, Portuguese banks do not seem to have operated either under perfect competition or under perfect monopoly, but rather consistently with long-run monopolistic competition. Furthermore, both private and domestic banks seem to have competed more aggressively on average than the banking system as a whole, and perfect competition may not be rejected for these two types of banks.

An investigation of changes in competitive behaviour throughout the period suggests that competition was relatively weak between 1991 and 1996, even though the results suggest that domestic and especially private banks exhibited slightly higher competitive behaviour. An adjustment period followed between 1997 and 2000, in which results concerning both the banking system as a whole and the group of private banks are inconclusive, since long run equilibrium is rejected. However, for domestic banks the hypothesis of behaviour consistent with perfectly competitive long run equilibrium is not rejected for this period. In the more recent period, ranging from 2001 to 2004, strong competition was observed, and it is possible that domestic banks have competed more aggressively than expected in the framework of a static model with no distortions. In sum, the results of this study suggest that the deregulation and liberalization process experienced by the Portuguese banking sector, including euro area participation, catalysed an increase in competition, particularly in what concerns the credit market.

Hence, empirical results concerning the Portuguese banking system indicate that during this period competition became stronger, whereas productivity increased. Together, these developments are consistent with the stable profile of the cost-to-income ratio shown in Figure 7.26 if increased competition has limited banks' ability to increase their gross margins.

Insights on the degree of competition may also be obtained from the analysis of the interest rate pass-through from money market rates to retail rates. In fact, under certain assumptions (including separability of variable costs by activity and of loan and deposit demand), changes in money market rates should be fully transmitted at a rapid pace to retail rates under perfect competition.

Antão (2009) characterizes the interest rate pass-through of the Portuguese banking system between January 1990 and December 2002, using bank level data on different types of loans and deposits. Changes in money market rates are found to be fully transmitted to loan rates but not to deposit rates. However, since, on the one hand, the pass-through parameter for loans can be more than one due to credit risk and, on the other hand, a low pass-through for deposit rates may, particularly during the earlier period, be partly justified by minimum reserve requirements, this result does not necessarily imply that the loan markets are more competitive than deposit markets. Nonetheless, results point to stronger competition in the segment of loans to the corporate sector than in that of loans to households. Results on the speed of adjustment indicate that, in general, deposit interest rates adjust faster than loan rates, which may in part be related to the decreasing trend exhibited by interest rates during the period under consideration.

This study also identifies some determinants of the heterogeneity in the degree of the long-run pass-through and in the speed of adjustment. Loan products where concentration (as measured by the HHI index) is higher, present a higher speed of adjustment to changes in interbank rates, albeit also exhibiting a less complete pass-through. In turn, higher market shares are found to contribute to a slower speed of adjustment in both loan and deposit market rates.

7.3 Households and firms' decisions

7.3.1 Households

Household finances changed substantially over the last two decades. Changes were seen in a variety of dimensions namely the increase in both assets and liabilities sides of households balance sheets. These changes have had consequences both from the analytical and policy points of view, given the importance of financial decisions in determining households' economic behaviour.

In Portugal, against the background of the liberalisation process that prepared the economy to the economic and financial integration in Europe, a number of demand and supply factors led to the expansion of households' debt at rates above those of disposable income. During the 1990s, Portuguese households' financial assets also grew faster than disposable income. In the European context,

in 1995, Portugal showed one of lowest ratios of debt to GDP, but exhibits currently one of the highest. In terms of the ratio of financial assets to GDP, Portugal and the generality of euro area countries kept in broad terms their relative position.

There is some consensus that the changes observed in Portuguese households' balance sheets have been to a large extent driven by the adjustment process of Portuguese economic agents in response to structural changes. First, the access to an enlarged market contributed to a rise in the level of income which was perceived as being permanent. Later, with financial and monetary integration, households also reacted to the prevalence of lower and less volatile interest rates. In this context, it is likely that liquidity constraints were eased for a large number of households who were able to access the credit market. This helps to explain why private consumption kept growing at rates above GDP and the declining trend in the saving rates observed in the last decade.

Microeconomic data is crucial to fully understand these developments mainly because it permits a separate analysis of the behaviour of indebted households that is only feasible with this type of data. In fact, the analysis of distributional aspects is crucial for a better understanding of the trend observed in aggregate debt described above. The availability of relatively comparable micro level survey data for a group of euro area countries, including Portugal, is very useful to analyse the distributional issues in an international perspective.

As mentioned above, one of the advantages of micro level data is that it permits to distinctly analyse the indebted households. According to these data, around 30 per cent of Portuguese households participate in the mortgage market. This places Portugal in an intermediate position in a ranking of euro area countries for which this information is available, the maximum being reached by The Netherlands, with 38 per cent, and the minimum corresponding to Italy, with 12 per cent. Another advantage of micro data, in particular survey data, is that it enables the analysis of the distribution of debt according to households' characteristics, namely income and age. According to survey data for the above mentioned group of euro area countries, the participation in the mortgage market increases with income, the percentage of households with a mortgage in the lowest income quartile being rather limited, except in the case of The Netherlands. The median ratio of mortgage debt to income is above 100 per cent in Portugal, Greece and Spain but it is much

higher for the Netherlands. The distribution across income and age classes is similar in all the countries, the ratio being highest for the lowest income and age classes. Available survey data also suggest that debt service ratios related to mortgages have been kept relatively low in the euro area, the situations of higher vulnerability being limited to a relatively small percentage of households.

Knowledge about the distribution of households' debt is crucial to assess the vulnerabilities associated to the current situation, where the high degree of aggregate households' indebtedness emerges. For several reasons, mainly related to different specificities of the mortgage market relative to the US, a subprime crisis did not develop in Portugal or in any other European country, even in those where the house price boom was larger than in the US. However, the direct consequences of the financial crisis and the economic recession that followed have spread at a global scale. In Portugal, the increasing trend of default rates in the credit market raised the concerns that a growing number of households might not be able to continue servicing their debts.

It should be stressed that some mitigating factors are likely to counterbalance those concerns. Survey data has been particularly useful in this respect, by providing evidence that the situation is less fragile than what could be inferred by the high level of households' aggregate indebtedness. In fact, in Portugal, considering only indebted households, the median debt service ratio in the case of loans for house purchase stands below the figures for the euro area countries for which comparable data are available what is partly explained by the prevalence of longer maturities in housing loans. Another positive feature characterizing the Portuguese situation is the relatively low fraction of households in the lowest income quartile that has a loan for house purchase. In addition, the youngest households, who are highly indebted and have high debt service ratios, present a lower debt service ratio than in the other countries and their debts are in many cases ensured by parental guarantees. The debt to assets ratio is relatively high in Portugal, but this is to a large extent related to the fact that in some euro area countries, namely in Spain, house prices were highly inflated. As for loans for purposes other than house purchase, where default rates are higher and rising sharply, survey evidence shows that in most cases they are likely to be secured against the value of the goods they were used to purchase. Moreover, reflecting the perception that these loans involve a higher degree of risk than mortgages and that this difference

widens during recessions, the spreads imposed on this type of debt are much higher than in the case of housing debt and have recently been particularly intensified.

It is well known that recessions and/or low growth periods tend to last longer when they emerge as a consequence of a banking crisis. Nevertheless the ultimate consequences of the recent financial crisis that was followed by a deep economic recession are still very uncertain. It should be mentioned that the nature and extent of this crisis has led to unprecedented levels of coordinated intervention of the authorities in the various dimensions such as monetary and fiscal policy and specifically directed to the financial sector. Though some of these measures already had an immediate impact, the full assessment of their benefits and costs is still unclear. The huge government budget deficits that have been created will take long to be absorbed. Additionally, some distortions may have been introduced in product and labour markets. These are also likely to shape the recovery. On the financial side, it is likely that banks will have to adapt to a more regulated environment. The ultimate consequences will depend on the implementation of new regulation and how banks will react. In the context of the financial crisis, the Portuguese banks were able to adjust to the increasing risk premiums in the international wholesale markets and benefited from a remarkable rise in customer deposits. During 2009, a fall in risk premiums was observed, but they remained higher than before the financial crisis.

This section first describes the main trends in households' assets and liabilities using aggregate data and then compares these trends in Portugal with those observed in several European countries. A special focus is also put on distributional issues regarding households' finances, which are particularly useful to assess the vulnerabilities associated to the high degree of households' indebtedness. These issues are analysed using survey data that are also available for a group of euro area countries.

Main trends in aggregate households' assets and debts

At the aggregate level, relatively long series on the various components of Portuguese households' balance sheets are available.³⁰

³⁰See Cardoso and Cunha (2005) for the methodology and the series. Some methodological aspects and the series are revised and updated in Cardoso, Farinha and Lameira (2008). The financial series are mainly based on National Financial Accounts, enabling international comparisons, particularly with European countries.

These are very helpful in identifying the main trends observed in the components of aggregate household wealth and indebtedness throughout almost three decades. With European integration, back in 1986, the prospects of higher future income coming from the real catching-up process boosted households' consumption and investment. These effects were reinforced by the expectations of participation in the euro area that reduced uncertainty and created expectations of lower and less volatile interest rates. During the 1990s, in particular in the second half, the demand for housing was particularly dynamic and a large number of previously liquidity constrained households entered the debt market, mainly as a result of the reduction in nominal interest rates.

The evolution of wealth and debt of Portuguese households may also be seen against the background of the major institutional changes that impacted the behaviour of economic agents in Portugal, including the banking sector.³¹ In particular, these changes allowed the banking sector to quickly adjust to the increased credit demand from the private non-financial sectors. The process started with the reopening of the banking sector to private initiative and a gradual liberalisation of a highly regulated financial sector took place, until capital movements became completely freed up in 1992. The liberalisation process enhanced competition and innovation and enabled a more efficient functioning of the banking system and capital markets. This encouraged an expansion of both financial assets and liabilities held by the non-financial sector in particular by households. Measured in percentage of disposable income, the evolution of these aggregates was very rapid (Figure 7.34). Growth was slightly faster in the case of financial assets so that the net financial position of the sector increased gradually. At that time a significant fraction of households was still credit constrained.³²

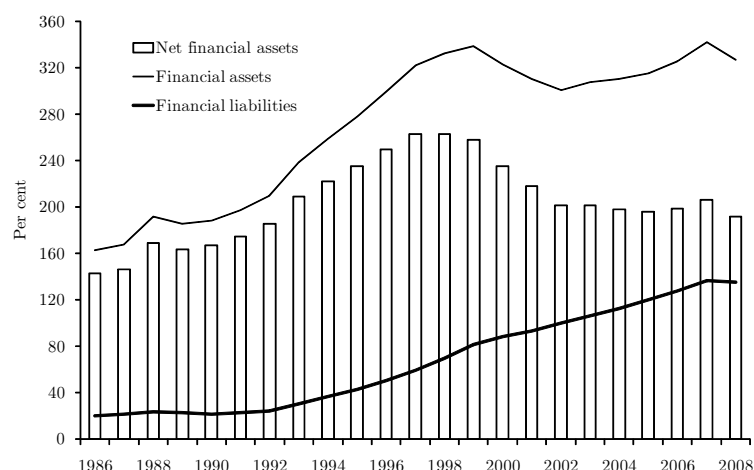
After 1992, in the context of the convergence process that preceded the participation in the euro area, both indebtedness and financial assets in percentage of disposable income grew at a much faster pace than before. In that period, the marked decline in nominal and real interest rates was one of the main factors explaining sustained credit growth. This decline definitively contributed to broaden access to credit, letting in the market a much wider range of households than in the previous decade.³³ Financial assets increased

³¹See section 7.2.

³²See Luz (1992).

³³See Farinha (2003, 2004).

Figure 7.34: Households' financial assets and liabilities (in percentage of disposable income)



Source: National Financial Accounts and National Accounts.

at a higher rate than liabilities until 1999 and consequently net financial assets also kept growing. In this period, the weight of financial assets in households' total wealth also increased.

After 1999 indebtedness continued to grow at rates well above those of disposable income, in such a way that net financial assets, as a percentage of disposable income, presented a decreasing path until 2002 and remaining relatively stable after that date. The value of financial liabilities at the end of 2008 accounted for 135 per cent of disposable income (100 per cent in the case of housing loans).

As to the comparison with European levels, it should be stressed that in 1995 the level of indebtedness of Portuguese households was still amongst the lowest in Europe (Figure 7.35). However, its path was one of the steepest so that it reached more recently one of the highest levels. On the contrary, in terms of the ratio between financial assets and GDP, the selected countries kept in general their relative positions. Despite the convergence of interest rates, the evolution of indebtedness ratios presented different profiles across European countries. In fact, households' propensity to borrow can vary across countries due to many factors such as cultural attitudes (for instance moral judgement on debt), the specificities of legislation (as for example the scale of tax deductibility of interest expenses or the prevalence of special credit regimes) or the functioning of the rental

market. Moreover, for several reasons, banking practices concerning for instance the type of interest rate (fixed versus variable rate), the restrictions on duration and the fees on early repayment, loan to values and the possibility of refinancing the loan against house price rises remain different across euro area countries.

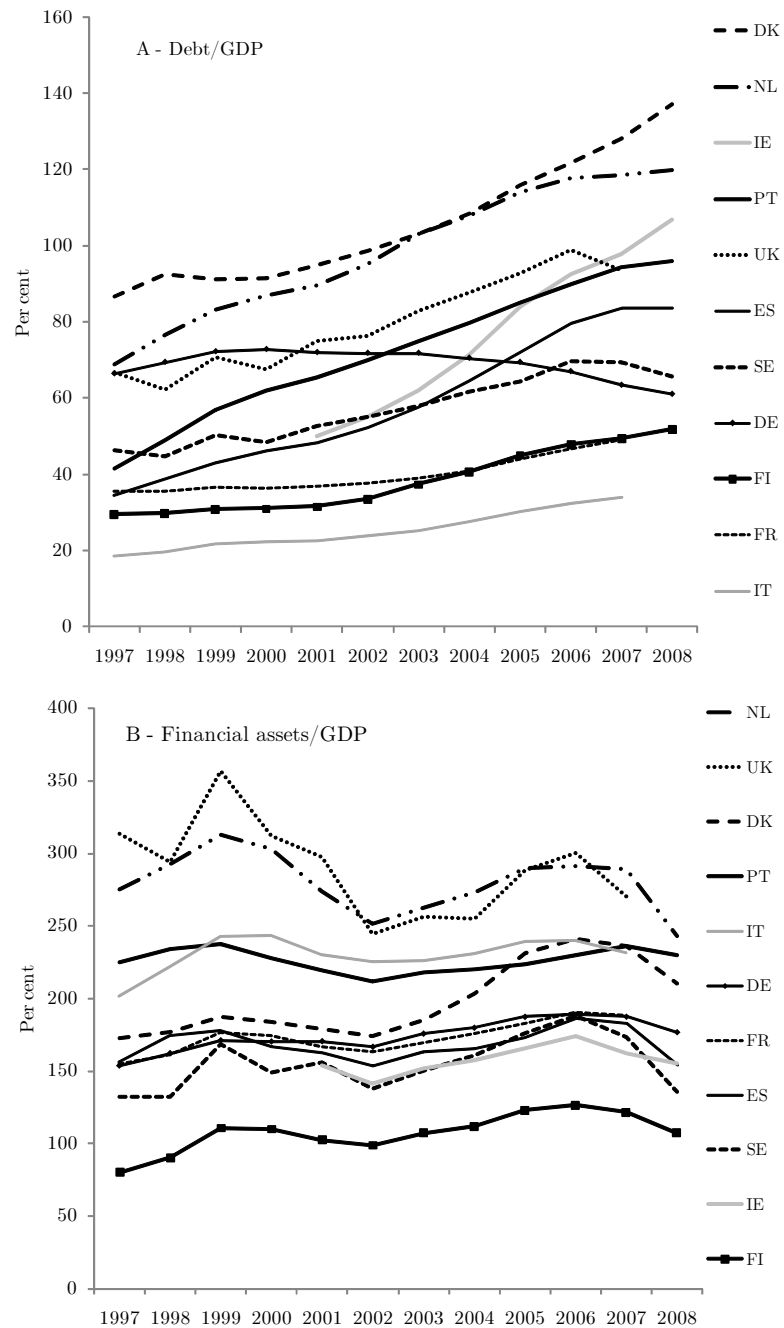
Composition of households' wealth

After 1995, housing was no longer more important than financial assets in households' balance sheets (Figure 7.36). However, it still dominates all the other single broad items in households' assets. In Portugal, the importance of housing wealth is closely related with a relatively high rate of owner-occupied residences, which is around 74 per cent, above the euro area average that stands at 62 per cent.³⁴ Moreover, in Portugal, an increasing fraction of households is also owner of a secondary home. According to the Household Wealth and Indebtedness Survey (*Inquérito ao Património e Endividamento das Famílias*, hereinafter referred to as *IPEF*) this fraction was 10 per cent in 2006, which compares with 3 per cent in 2000.

A strong regulation of prices in the market for privately rented housing, dating back to the late 1940s in the case of the two main cities – Lisbon and Oporto – was responsible for a shortage of supply and high rents in new contracts. The sluggishness of courts in enforcing contracts partly explains why the rental market remained inefficient even after some deregulation took place. Demand for owner occupied housing in turn was reinforced until 2002 by a system of subsidised housing loans. After that date, banks were able to adapt credit conditions in order to mitigate the effect that the elimination of subsidies on interest rates had on households' debt service. The importance of housing wealth differs among countries, being a result of cultural factors as well as institutional and legal arrangements. Germany, for instance, records the lowest rate of homeowner occupancy in the euro area (43 per cent) in apparent contradiction with the level of housing relative to income, which is explained by the large proportion of German households investing in housing for rental purposes. Spain with the highest owner occupancy rate (86 per cent) also records the highest level of housing in percentage of disposable income (Figure 7.37). Sharp rises in real estate prices largely explain the disproportionate change between 2000 and 2006 in the Spanish case.

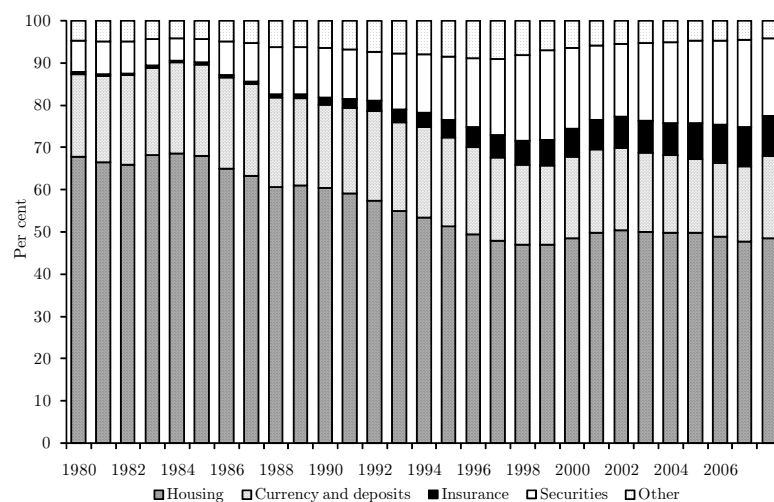
³⁴See European Central Bank (2009).

Figure 7.35: Debt/GDP and financial assets/GDP of households in selected european countries



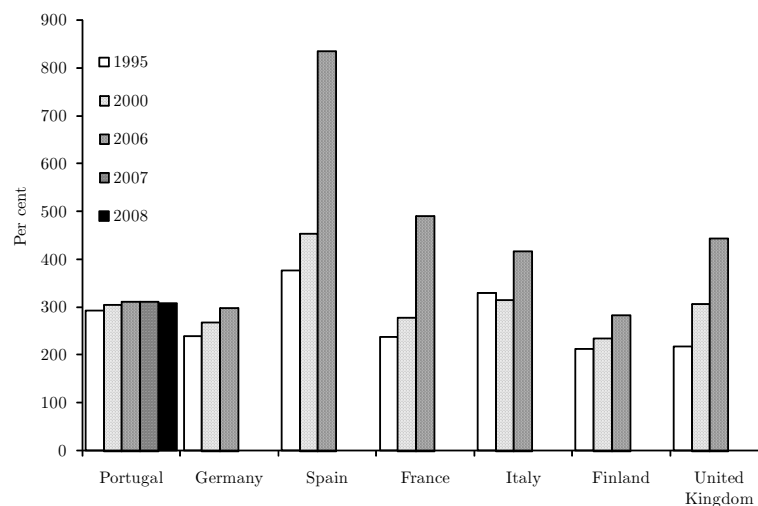
Source: Eurostat.

Figure 7.36: Composition of households' total assets



Source: Cardoso et al. (2008) and Banco de Portugal (2009).

Figure 7.37: Housing wealth in percentage of disposable income in selected European countries



Source: Cardoso et al. (2008) and Banco de Portugal (2009).

Financial wealth as a percentage of disposable income showed an upward trend during the 1990s. With the reopening of the banking system to private initiative, new institutions and new financial products rapidly emerged, inducing important changes in the composition of households' portfolios. Although deposits remained the most important component of households' portfolios, their weight decreased from nearly 70 per cent in 1986 to less than 40 per cent in 1998, and remaining relatively stable afterwards (Figure 7.36). Boosted by liberalisation, non-bank financial institutions flourished in Portugal since the mid 1980s. Practically non-existent in 1986, mutual funds have expanded during the 1990s. Liberalisation also contributed to the rapid development of the insurance industry during the late 1980s and early 1990s especially in the life insurance segment, which had started from a very low base. On the demand side, the decline in interest rates induced demand for riskier and more profitable instruments. Investments in life insurance have gained increasing importance since the beginning of the 1990s as they have been gradually perceived as a necessary complement to public social security schemes. Moreover, closed pension funds have been created mainly for the case of workers of the financial sector.³⁵ The evolution of life insurance also reflects the fact that this type of insurance is required by credit institutions for house purchase loans.

In Portugal, small family-run firms have a significant weight in the economy so that Portuguese households have a large amount of unquoted equity in their portfolios. Consequently the weight of shares and other equity is high by international standards though the weight of quoted shares is low. The process of privatisation of nationalised companies significantly contributed to the boom in the trading of shares and the increase in the Portuguese stock market capitalisation and turnover. The great majority of privatisation operations involved capital market transactions that contributed to the broadening and deepening of the market. This process stimulated households' participation in the stock market for which also contributed the easier access to credit. This is the way to reconcile the sharp growth in financial assets with a relatively lower growth of income and stable or decreasing saving rate.

³⁵Pension funds have also been created to ensure the payment of pensions of retirees from large state-owned companies, some of which have in the meantime been integrated in civil servants pension scheme. In the private sector, some companies have also created closed pension funds as a complement to the protection provided by the general social security scheme.

The change in the outstanding amount of an asset, particularly in the case of the assets that are traded in the market, reflects not only transactions but also changes in its valuation mainly due to price fluctuations. In the case of quoted shares these changes in prices represented a significant part of the total increase in the value of assets in 1998 and 1999. In contrast, between 2000 and 2002 and again in 2008 price changes contributed negatively to the variation in stocks (Figure 7.38). As expected price fluctuations are less pronounced in the case of mutual fund shares whose portfolio also includes debt securities.³⁶ In 2008, the strong decrease in the stock of mutual fund shares held by households was largely due to transactions despite the significant change in prices that has also occurred.

Figure 7.39 presents the weight of various instruments in total financial assets in 1997 and 2007, for a group of euro area countries for which more detailed national financial accounts data are available. In 2007, the share of currency and deposits in Portugal was one of the highest among the selected countries. Regarding shares and other equity, Portugal shows the lowest figure in the case of quoted shares, but in the case of unquoted shares and mutual fund shares presents similar figures. The weight of insurance and pension funds remains significantly below some European countries namely the Netherlands and France as well as some EU members outside the euro area.

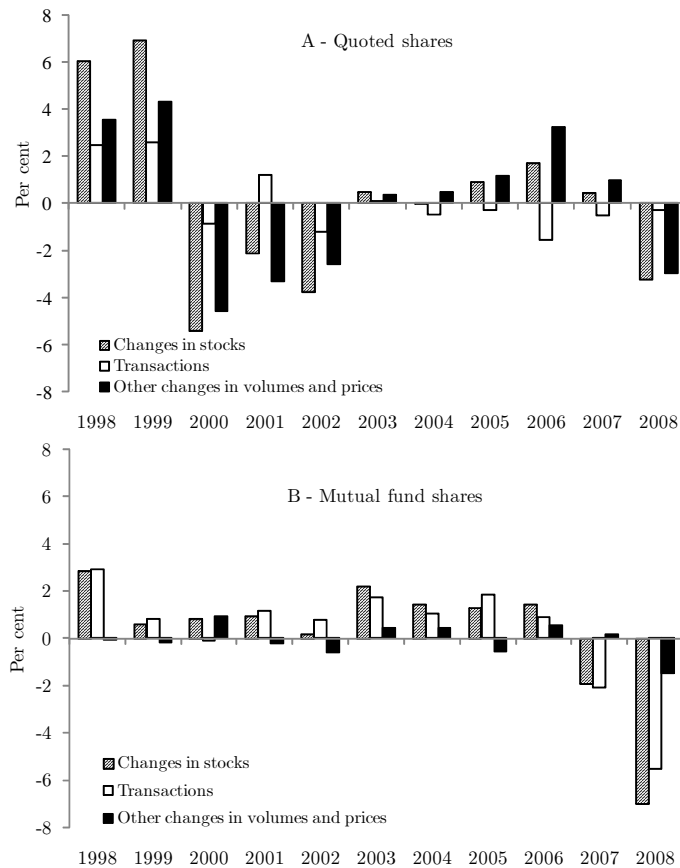
Comparing the composition of financial assets in 1997 and 2007, there is evidence of some convergence in the structure of households' portfolios in the various European countries considered. In fact, a decrease in the share of currency and deposits occurred in the majority the European countries considered, whereas the proportion of insurance technical reserves increased. It is worth mentioning that the composition of household balance sheets changed in 2008 as a consequence of the financial crisis, with deposits substituting for quoted shares and mutual funds shares.

Distribution of households' wealth

Micro data, that is data collected at the household level, sometimes with details on individuals, are crucial in providing distributional detail on data covered by aggregate statistics at the macro level. In particular, micro data can provide information about the

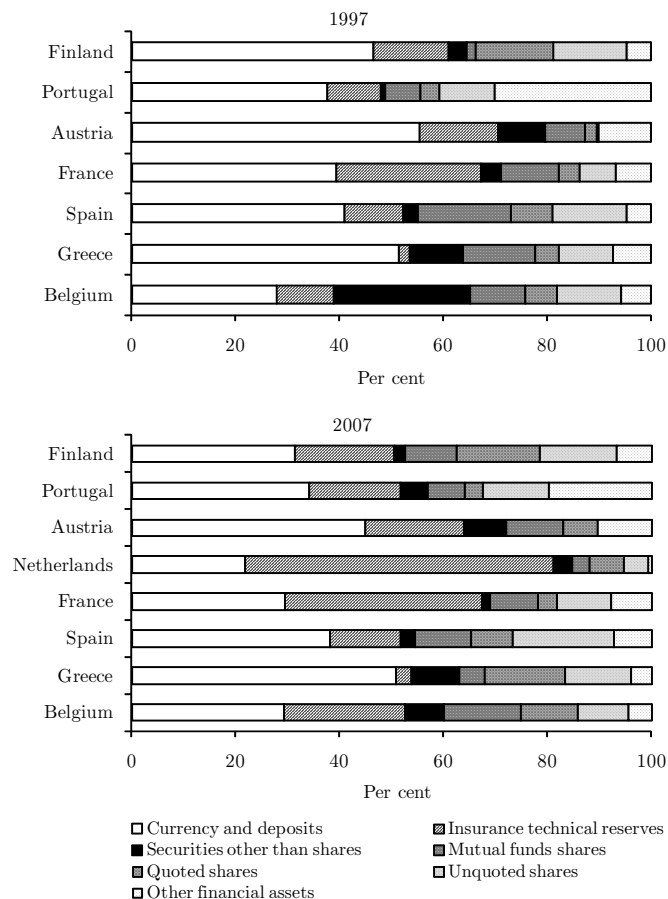
³⁶For details on the composition of mutual funds see section 7.2.

Figure 7.38: Shares and other equity in percentage of GDP: decomposition of the changes



Source: Statistics Portugal and *Banco de Portugal*.

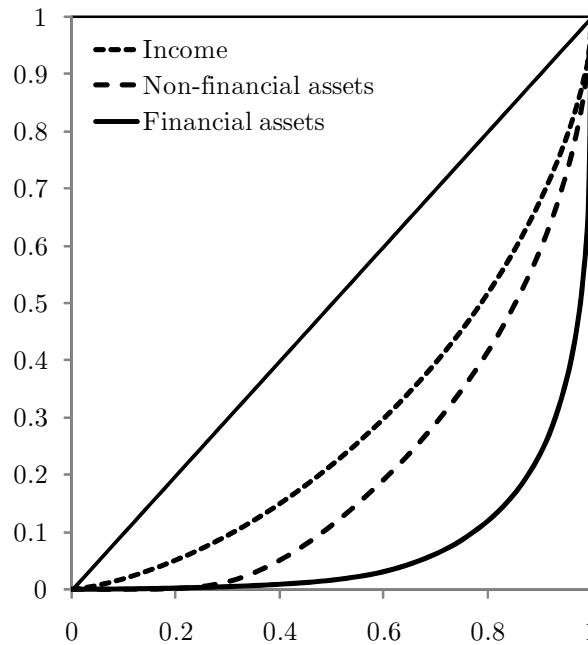
tails of the distributions that may be extremely relevant, in particular in the case of variables such as income or wealth, which have very skewed distributions. Micro data on households' finances can be collected from various sources. Administrative data for instance has the advantage of covering a large fraction or even the entire population. The Credit Register database of Banco de Portugal, for example, is an important source of administrative data, as it collects information on all outstanding amounts of debt held by individuals in all credit institutions operating in Portugal. The main problem with the use of micro data from administrative sources for analytical purposes is that data of this type only cover the features for which they

Figure 7.39: Composition of financial assets in selected European countries

Source: Eurostat.

have been designed. Moreover, matching individual data from different sources is hindered by very strict legal obstacles. Survey data can solve these problems by collecting a comprehensive set of variables at the household level. Survey data on households' finances have been successfully collected in Portugal every six years since 1994 through the *IPEF*. This survey has been carried out by Statistics Portugal and Banco de Portugal on the basis of a randomly selected sample taken from the population of Portuguese households.

The analysis that follows is based on the results of the *IPEF* which covers data on household wealth, debt, income as well as data on other socio-economic and demographic characteristics. The data

Figure 7.40: Lorenz curves

Source: *IPEF*.

from the *IPEF* show that the distribution of wealth, in particular financial wealth, is indeed highly skewed, that is a large proportion of aggregate wealth is held by a small fraction of the population. A synthetic representation of this fact may be provided by the Lorenz curve, which graphically shows the relative proportion of wealth (income, etc.) held by a certain proportion of the population. The inequality of the distribution can be assessed by the deviation from the diagonal, which in turn represents perfect equality (Figure 7.40). This Figure shows that wealth is clearly more asymmetrically distributed than income. This is particularly striking in the case of financial wealth. For instance, according to these data, around 40 per cent of financial assets are held by the 1 per cent wealthier (measured by holdings of financial assets) whereas the 1 per cent with higher income earn approximately 10 per cent of total income.

Heterogeneity in economic behaviour of households becomes even more apparent when it comes to decisions concerning participation in asset markets. In fact, observed portfolios are very heterogeneous in terms of the list of assets that they include. In particular,

stock market participation tends to be limited to a relatively small fraction of the population with specific characteristics. The identification of the factors leading to differing participating rates in the stock market (or in the housing market) is a policy relevant issue.

The effect of demographic and socio-economic variables on the probability of holding specific types of wealth can only be identified through the estimation of a model, that is, the magnitude and statistical significance of the effect of one variable can only be assessed if the model controls for the effect of the other relevant variables. Survey data can be particularly useful to achieve this aim, as it enables relating wealth data with other demographic and socio-economic household characteristics such as their income or the age of their members.

The estimation of a probit model is an adequate methodology for the analysis of participation in the market of a certain asset, which may be represented by a 0/1 variable. Using data from the 2000 and 2006 editions of the *IPEF*, households' participation in the housing market, the market for deposits and the stock market are analysed. The explanatory variables considered in the model are household income and net wealth and age, level of education and labour market situation of the household head. The models also include family size and region of residence as control variables. The explanatory variables are measured as dummy variables, that is, they take only the values one or zero, depending on the type of household. Therefore, the estimated effects shall be interpreted as differences vis-à-vis the omitted category, that is respectively households whose reference person is between 30 and 40 years old and has completed basic education and is an employee, belongs to the third income class (formed by those between the 25 and 50 percentiles) and the third net wealth class, residing in the North region and formed by three persons.

Table 7.1 presents some selected results from this analysis.³⁷ The marginal effects of income, net wealth, age, education and labour market situation on the probability of holding the household main residence, the probability of holding bank deposits and on the probability of holding financial assets which are traded in the market are available.³⁸ The model was run on 2000 and 2006 data for compari-

³⁷These are the results of still unpublished research, which are available from the authors upon request.

³⁸In models of limited dependent variable, such as probit, differently from the linear model, the marginal effect of an explanatory variable is not given by the estimated coefficients but by a positive function of the estimated coefficients.

son and Table 7.1 also presents a t-test of the equality of coefficients in the two years.

The results that are presented suggest that the probability that the household is the owner of the main residence is the highest for the lowest income level, and is the lowest for the highest income level. It peaks at the age class comprising individuals between 30 and 40 years old. This probability increases with net wealth, is the highest for the lowest education level and the lowest for the highest education level. It is larger for employees.

Regarding the probability of holding deposits³⁹ the results suggest that it is larger for the highest income classes, it increases with net wealth and is larger for the highest age classes. Furthermore, it is lower for the first level of education and decreases with family size. It does not depend on the labour market situation.

Finally, the probability of holding market securities (that is bonds or shares, including mutual fund shares) increases with income, net wealth and the level of education. It increases with age up to the 50-60 age class. It is the largest for self-employed and the lowest for retired.

Moreover, comparing the results of two waves of the survey, the results also suggest that the probability of being the owner of the main residence and the probability of holding market securities increased between 2000 and 2006 whereas the probability of holding more traditional financial assets did not change between the years under analysis.

Households' liquidity constraints and wealth effects

There are questions for which the answer can highly benefit from knowledge about distributional aspects that can only be assessed with micro-level data. There are key policy questions about economic behaviour of households for which knowledge about distributional aspects is of the essence. The international financial crisis that started in 2007 demonstrated that households' indebtedness and vulnerabilities to shocks may have a crucial impact on financial stability and has thus further emphasized the importance of understanding household finances. A research topic that has been receiving increased attention relates to the effect of wealth on consumption. The literature has long established a positive relation be-

³⁹Deposits also include "certificados de aforro" that are government debt certificates placed with households, which are close substitutes of deposits.

Table 7.1: Probability of holding a house, deposits or shares: selected regression results

Explanatory variables	Probability of being owner of household main residence			Probability of holding deposits			Probability of holding shares, etc.		
	Marginal effect			Marginal effect			Marginal effect		
	2006	2000	Difference	2006	2000	Difference	2006	2000	Difference
Income: dummy class 1	0.049 ***	0.122 ***	**	0.011	-0.036		-0.056 ***	-0.023 **	
Income: dummy class 2	0.020	0.079 ***	**	-0.006	-0.015		-0.016	-0.027 ***	*
Income: dummy class 4	-0.032 *	-0.017		0.006	0.043 **		0.038 ***	0.011	
Income: dummy class 5	-0.032	-0.111 ***	*	0.044 **	0.035		0.088 ***	0.029 ***	
Income: dummy class 6	-0.059 **	-0.100 ***		0.077 ***	0.133 ***		0.145 ***	0.089 ***	
Net wealth: dummy class 1	-0.854 ***	-0.879 ***	**	-0.365 ***	-0.341 ***		-0.111 ***	-0.048 ***	
Net wealth: dummy class 2	-0.629 ***	-0.631 ***		-0.037 *	-0.082 ***		-0.026 **	-0.016	
Net wealth: dummy class 4	0.124 ***	0.176 ***	*	0.104 ***	0.072 ***		0.024 **	0.026 ***	
Net wealth: dummy class 5	0.146 ***	0.210 ***	**	0.178 ***	0.141 ***		0.087 ***	0.078 ***	*
Net wealth: dummy class 6	0.142 ***	0.179 ***		0.238 ***	0.203 ***		0.193 ***	0.186 ***	**
Age: dummy 20-30 years old	-0.024	0.005		0.005	-0.023		-0.049 **	-0.007	
Age: dummy 40-50 years old	-0.057 ***	0.022	***	0.022	0.005		0.003	0.002	
Age: dummy 50-65 years old	-0.073 ***	-0.002	**	0.054 **	0.034		0.033 **	0.019 *	
Age: dummy > 65 years old	-0.069 **	0.052	***	0.152 ***	0.101 ***		0.013	0.007	
Education: dummy basic 1	0.052 ***	0.051 **		-0.045 **	-0.008		-0.076 ***	-0.041 ***	
Education: dummy basic 3	-0.013	-0.054		-0.005	0.014		0.051 ***	0.026 **	
Education: dummy secondary/college	-0.078 ***	-0.050		0.029	0.038		0.054 ***	0.016	
Dummy self-employed	-0.101 ***	-0.122 ***		-0.033	0.003		0.096 ***	0.007	***
Dummy unemployed	-0.052 *	-0.001		-0.051	-0.065		0.006	-0.036 **	**
Dummy retired	-0.036	-0.022		-0.019	0.051 **	**	-0.027 **	-0.005	
Dummy other labour situation	-0.033	0.007		-0.017	-0.024		-0.014	-0.005	

Source: *IPEF*.

Note: *** Significant at 1 per cent level; ** significant at 5 per cent level; * significant at 10 per cent level.

tween consumption and wealth and empirical studies have generally supported this prediction. Recently, in the context of the financial crisis, the dramatic reversal of both stock and house price trends raised concerns that these developments could contribute to depress consumption and exacerbate the slowdown, reinforcing the interest in these issues. In Portugal, unlike in the US and many European countries, house prices changed only slightly above the consumer price index during the period 1996-2007. However, housing wealth has a significant weight in Portuguese households' portfolios which points to the relevance of developments in the housing market also in the Portuguese case.

In fact, understanding the relationship between changes in household wealth and consumption is crucial to interpret some features of the behaviour of the Portuguese economy in the recent past, namely the relatively strong consumption growth and the falling saving rate. However, empirical studies of wealth effects on consumption in the Portuguese case are scarce, mainly due to the lack of appropriate data. Castro (2008) estimated the effect of both financial and housing wealth on consumption using time-series aggregate data for the period 1980-2005 and found a significant impact,

estimating a marginal propensity to consume (mpc) out of wealth of 0.03, with similar magnitudes for both types of wealth. Following a recent branch of the literature this paper also presents evidence on the effect of financial liberalisation on the relation between wealth and consumption by concluding that a stronger impact of wealth and a lower impact of income have followed liberalisation. This evidence is interpreted as an easing of liquidity constraints faced by Portuguese consumers as a consequence of the process of financial liberalisation. This interpretation is also consistent with the results obtained before by Castro (2006). In this paper the overlapping generation's model is used to derive a specification for the consumption function that was estimated using aggregate quarterly data for the period 1980-2005. For the whole sample period, the estimation results suggest that 66 per cent of disposable income was received by liquidity constrained consumers, a result that is consistent with the estimates presented in Botas (1999) for the period 1958-1997 and in Luz (1992) for 1959-1986. These two papers also conclude that approximately 60 per cent of disposable income went to consumers who had not access to consumer credit. Castro (2006) also evaluates how liquidity constraints evolved during the period of analysis by including step dummy variables to distinguish two sub-periods (1981-1990 and 1991-2005). She also presents an additional test for the evolution of the percentage of income accrued by liquidity constrained consumers, by using a methodology analogous to the two-step instrumental variables estimation. In both cases she finds evidence of a significant reduction in the percentage of income accrued by liquidity constrained consumers between the 1980's and the 1990's. According to the results in this paper, at the end of the 1980s the share was around 70 per cent, a figure that turned out to decline to 40 per cent in the beginning of the 1990s.

It was mentioned above that wealth, including housing wealth, is not evenly distributed across the population. Moreover, the probability of being a homeowner differs according to the characteristics of households. Therefore, there are reasons to expect heterogeneity in the relevance of wealth, in particular housing wealth, across different types of households. The potentially different reaction of households with different characteristics to shocks in the housing market is then a relevant issue for studying wealth effects in the Portuguese economy.

Using survey micro data Farinha (2009) estimated an elasticity of consumption with respect to wealth around 0.04-0.05, which leads

to an mpc that is in line with European figures and, as expected, is lower than what has been estimated in empirical research for the case of the US. This paper also shows evidence that this effect is stronger for the case of homeowners and housing wealth, what is in accordance with many examples in the recent empirical literature. The estimated age pattern of the elasticity of consumption seems consistent with the hypothesis of precautionary savings. Though the estimated effect of wealth on consumption appears to be the largest for the youngest consumers (that could be saving to buy a first house), it is followed by a hump-shaped pattern, that is, it is higher for the middle aged classes when consumption needs are large and savings could be otherwise occurring (for instance to buy a larger house). In the case of the models that differentiate the effects according to income and wealth percentiles the pattern that appears seems consistent with the view that households in the lowest income and wealth classes are likely to be liquidity constrained.

Composition of households' debt

While housing wealth accounts for the most important fraction of household net wealth, loans for house purchase are the main component of households' liabilities. At the end of 2008 these loans accounted for 100 per cent of households' disposable income (Figure 7.41). On the demand side of the credit market, the main factors explaining the growth of housing debt to income ratio were higher income and lower interest rates. Other factors like demographics, tax subsidies and an absence of an efficient rental market have also added to the demand of housing loans. In fact, the increasing importance of this type of debt is closely related to house purchase. According to an ad-hoc questionnaire addressed by Banco de Portugal to the main credit institutions operating in the country, on the top of the list of motives for having a mortgage is the purchase of a first home.⁴⁰ This is followed by the wish to buy a second house.

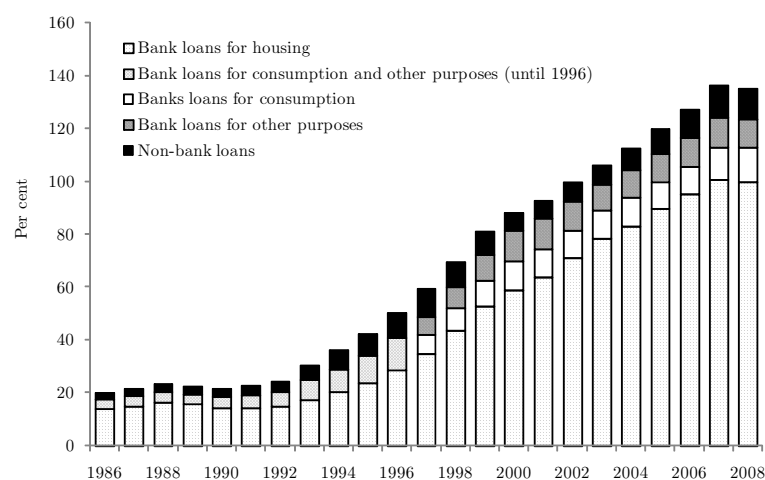
On the supply side of the credit market, the process of liberalisation enhanced competition and the development of new institutions and new products, allowing credit institutions to respond quickly to increased demand. In periods of rising interest rates, banks adapted their practices in order keep the affordability of the debt service and sustain the demand for loans for housing purposes. From the banks'

⁴⁰This questionnaire was carried out in the context of a Eurosystem's task force whose results are reported in European Central Bank (2009).

perspective these loans tend to have a lower risk, as opposed to consumer loans, as they are generally guaranteed by the value of the property used as collateral. In Portugal, this fact has been particularly reassuring since there was no evidence of a speculative bubble in the housing market.

In turn, consumer and other loans granted by banks, mainly consumer loans, starting from a much lower base, also increased rapidly. When measured as a percentage of disposable income, these loans increased from around 4 per cent in 1986 to almost 24 per cent in 2008. Households have been able to use this type of credit to satisfy increasing demand for consumption goods, mainly durables. This is consistent with survey evidence, as the results from 2006 edition of the *IPEF* indicate that around 50 per cent of these loans were intended for the purchase of motor vehicles, with a similar percentage in both number and value of the loans (Figure 7.42).

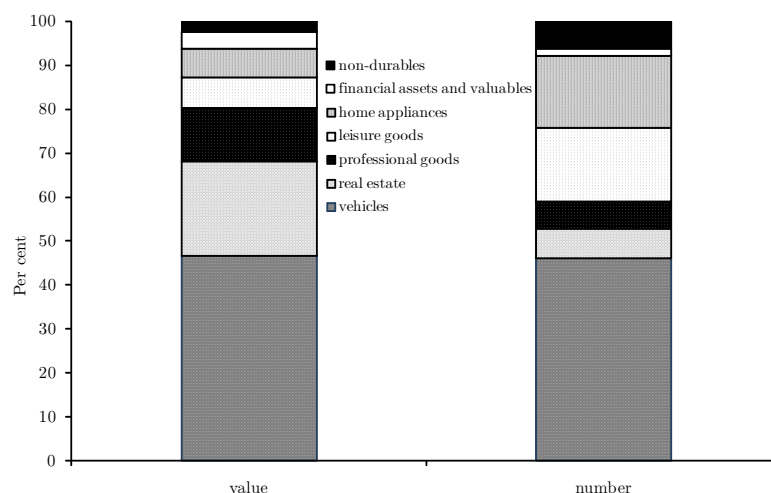
Figure 7.41: Households' financial liabilities, in percentage of disposable income



Source: Statistics Portugal and *Banco de Portugal*.

Distributional issues about household debt

Aggregate indicators on indebtedness of the household sector as a whole provide somewhat limited information, mainly because they do not distinguish between indebted and non-indebted households. Moreover, the distribution of debt across households of different characteristics remains hidden in aggregate statistics. However, un-

Figure 7.42: Non-housing loans, by purpose

Source: *IPEF*.

Understanding the cross-sectional composition of liabilities is as crucial as understanding their overall level. Knowledge about how the debt accumulation has been distributed among the population is important to assess the risks that it poses to the finances of indebted households and ultimately to the economy.

In the case of Portuguese households, survey data (from the *IPEF*) proved particularly valuable to understand that the rise of household indebtedness at the aggregate level during the second half of the 1990s had not been achieved at the expense of increased leverage at the individual level. Instead, the results suggested that more widespread opportunities for households to smooth consumption over the business cycle had been created. These findings were also important for understanding why private consumption kept growing above households' disposable income.

It was illustrated above that asset holdings are distributed very unevenly across households. This observation also holds in the case of liabilities. Therefore, information on household-specific characteristics is crucial to understand the causes and consequences of household indebtedness. Moreover, disentangling the effects of these characteristics on indebtedness can give important insights for the understanding of this phenomenon and is crucial from either a financial stability or macroeconomic perspective.

Farinha (2008) uses micro survey data from the *IPEF* to analyse

Portuguese households' willingness/ability to take on debt and also their indebtedness (measured by debt to income and debt service to income ratios) as a function of households' characteristics. A similar estimation strategy as the one described above for the participation in asset markets was carried out for the participation in the debt market. In the models of the ratio of debt to income and of debt service to income, the dependent variables are continuous for values above zero, but may take the value zero with a non-zero probability, the appropriate methodology being the estimation of a tobit model.⁴¹

Table 7.2 summarises the main results of the paper. According to these results, the probability of holding debt is strongly related to household income: households in lower income classes have a significantly lower probability of holding debt than those in the third class.⁴² The opposite relationship is observed in the higher classes. The impact of income intensifies, with different signs when approaching the tails of the distribution. A similar relation between the probability of holding debt and income is observed in 2000 and 2006. Moreover, the results suggest that it is observed in both types of debt, i.e. housing loans and other lending. However, in 2006, the probability of holding debt for purposes other than housing is similar among all households whose income is above the first quartile.⁴³ Differences between income classes regarding the participation in the market for this type of debt were likely to be more marked in 2000.

The probability of holding debt is also related to the age of the reference person. The results suggest that the probability is the highest in the 30-40 year old group, and significantly lower in the other age classes. This result is more evident in the case of housing loans. On the contrary, in the case of other loans, the results suggest that, in 2006, there were no significant differences in the probability of holding debt among the households in the first three age classes. These results differ from those obtained with data from the 2000 survey, suggesting that the access to this type of credit has been extended to younger households.

⁴¹For the presentation of the estimation methodology and more detailed results see Farinha (2008).

⁴²This is the omitted category in the estimated model.

⁴³In fact, according to the estimation results, the difference between the effect of income for households in the third and the last bracket of income is only significant at the 10 per cent level.

Table 7.2: Households indebtedness: selected regression results

Dependent variable Explanatory variables	Participation Marginal effect			Debt Marginal effect			Debt service Marginal effect		
	2006	2000	Difference	2006	2000	Difference	2006	2000	Difference
Income: dummy class 1	-0.136 ***	-0.107 ***		-0.248 ***	-0.235 ***		-0.031 **	-0.031 ***	**
Income: dummy class 2	-0.111 ***	-0.055 ***		-0.178 ***	-0.076 ***		-0.043 ***	-0.014 **	
Income: dummy class 4	0.051 ***	0.066 ***		0.018	0.132 ***	**	0.012	0.012	***
Income: dummy class 5	0.133 ***	0.134 ***		0.099 **	0.190 ***	***	0.026 ***	0.015 ***	
Income: dummy class 6	0.162 ***	0.224 ***	**	0.029	0.267 ***	***	0.017	0.023 ***	***
Age: dummy 20-30 years old	-0.063 *	-0.049 *		-0.087	0.203 ***	***	-0.015	-0.005	
Age: dummy 40-50 years old	-0.085 ***	-0.041 **		-0.320 ***	-0.107 **	**	-0.026 ***	-0.008 *	
Age: dummy 50-65 years old	-0.175 ***	-0.104 ***		-0.608 ***	-0.298 ***	***	-0.059 ***	-0.028 ***	
Age: dummy >65 years old	-0.342 ***	-0.199 ***	**	-1.170 ***	-0.557 ***	***	-0.163 ***	-0.057 ***	**
Education: dummy basic 1	-0.108 ***	-0.092 ***		-0.361 ***	-0.236 ***		-0.046 ***	-0.028 ***	
Education: dummy basic 3	0.020	0.037		0.057	0.043		0.001	0.008	
Education: dummy secondary/college	-0.017	-0.028		-0.058	-0.079		-0.011	-0.009	
Dummy self-employed	-0.042 **	-0.035 **		0.053	-0.016		0.004	-0.001	
Dummy unemployed	-0.072 **	0.045	**	-0.159 **	0.062		-0.046 ***	0.013	***
Dummy retired	-0.099 ***	-0.028	*	-0.222 ***	-0.088 *		-0.050 ***	-0.011 *	*
Dummy other labour situation	-0.083 ***	-0.004	*	-0.215 ***	0.018	**	-0.052 ***	-0.002	***

Source: *IPEF*.

Note: *** Significant at 1 per cent level; ** significant at 5 per cent level; * significant at 10 per cent level.

The level of education was also included as an explanatory variable in the model. Even though adjusted for the income and age effect, the households whose reference person has completed, at most, the first stage of basic education have a significantly lower probability of holding debt than those whose reference person has completed the second stage of basic education. This result, which is observed in both types of credit and in the two years under review, is consistent with the hypothesis that literacy is a relevant advantage in access to the credit market. In particular, it may be capturing, to a large extent, the effect of the job category of the reference person as in Portugal the level of education and the type of job are apparently strongly correlated.

Finally, as regards the effect of the labour market situation, which was included in the model, the results of the estimation suggest that the probability of holding debt is higher in the case of employees. The probability of holding housing loans by self-employed persons is significantly lower, although the same does not apply in the case of the probability of holding other types of debt. Moreover for households whose reference person is unemployed the probability of holding debt is significantly lower in 2006 than in 2000 that may be interpreted as evidence of a tightening in the access to credit based on the future prospects concerning the household's labour situation.⁴⁴

⁴⁴This conclusion should be drawn with some caution, given that there is no

The distribution of debt broadly corresponds to the distribution of the probability of holding debt. The results suggest that the level of indebtedness (for the case of indebted households) is also particularly sensitive to household income and to the age and education level of its reference person. Households in the lowest income and education classes have a significantly lower level of debt. Housing debt is likely to be particularly dependent on income near the tails of the distribution.

Moreover, the distribution of the debt service across households broadly corresponds to the distribution of debt. The results in Table 7.2 suggest that the debt service ratio is sensitive to household income and to the age of the household reference person. Households in the two lowest income classes have a significantly lower ratio than households in the third class. In the three highest age classes the debt service ratio is significantly lower than in the cases of 30-40 years old class. Evidence regarding the effect of education on the debt service ratio is also consistent with evidence obtained for its effect on debt to income ratio. The results for 2006 suggest that households whose reference person is unemployed or inactive have a debt service ratio that is significantly lower than the ratio for those whose reference person is employed. This result contrasts with the results obtained for 2000, in which a significant effect is only observed when the household reference person is retired, the difference being significant in the case of the effect of unemployment, which may be interpreted as a tightening of credit standards, that is access to credit has been more difficult for persons whose risk of becoming unemployed has materialised.⁴⁵

Vulnerabilities associated with the growth of households' indebtedness

Access to credit allows households to structure their borrowing to achieve a smooth and more desirable path of consumption over their lifecycle. Though it is sometimes negatively judged, indebtedness should be seen as a rational decision by households. In any case, even if indebtedness should not be considered in itself a source of a negative shock, it is a source of vulnerability for households as they become more sensitive to shocks. In fact, highly indebted

information about the (current or prospective) labour market situation of the reference person at the time when the household incurred debt.

⁴⁵The characteristics of the survey mentioned above in footnote 44 imply that this interpretation should also be made with caution.

households are more sensitive to interest rate movements (particularly if these are unexpected and variable interest rates is the dominant practice in credit contracts), changes in income (particularly if caused by unemployment) or asset price adjustments. The recent subprime crisis in the US mortgage market showed how vulnerable financial stability can be in the presence of widespread access to credit of high risk borrowers. Moreover, for households that are highly indebted and have weak income prospects, a negative shock may also lead to a sharp adjustment of consumption in order to allow households to continue servicing their debts. In sum, the current high level of households' indebtedness is not only an issue for financial stability but it can have macroeconomic implications too.

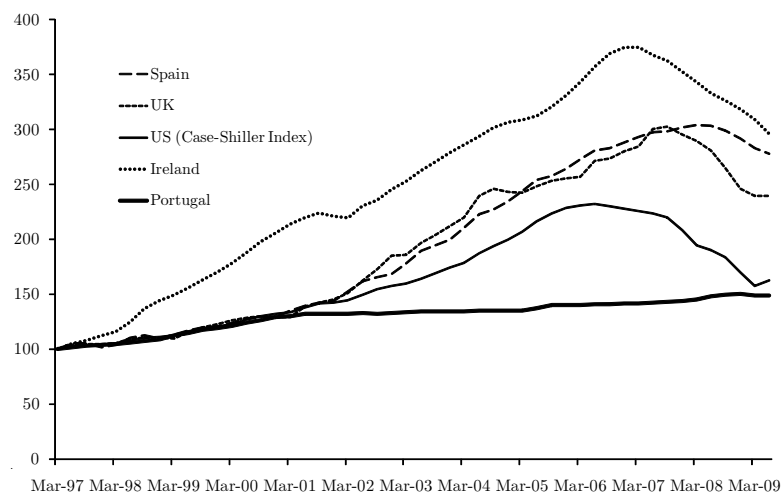
For several reasons, a subprime crisis did not develop in Europe, even in countries where the house price bubble was more inflated than in the US, such as Ireland, Spain or the UK (Figure 7.43). One of the reasons is that the above mentioned specific features of the mortgage market in the US imply that it is relatively easier for low income/low job security American households to get a mortgage, so that poor quality/high risk loans had a higher weight in the US than in Europe. Note that the extent of the crisis was highly dependent on the very specific features of the contracts in this market.⁴⁶ Most subprime contracts were basically adjustable-rate mortgages that banks could renegotiate at the end of a fixed-term period if housing prices were on the rise.⁴⁷ Another feature of these contracts was the very heavy penalty tied to early repayment of the loan, especially when compared with the terms for prime mortgages. These specific of mortgage contracts made subprime mortgagees particularly dependent on their incumbent banks. Additionally, the growth of unregulated private financial organizations, whose objective was buying and securitising mortgage credit, also facilitated the increase in the subprime segment. In the euro area, on the contrary, accounting rules in general tend to make it difficult to take securitised loans off the balance sheet of the bank that originated the credit, acting as a

⁴⁶ A detailed analysis of the subprime crisis is presented in Box 4.3 *Aspects of higher risk mortgage loans in the United States and Europe* in Banco de Portugal (2009).

⁴⁷ This adjustable rate mechanism worked very differently from the usual variable rates mechanism that prevails in Europe in which mortgage rates are indexed to market rates. In most subprime contracts the interest rate was fixed during an initial period (of two to three years). This rate was significantly lower than the rate that would apply to the mortgagee in terms of its credit risk. Following that period, the interest rate was indexed to the market, at a new rate that was usually far higher than the initial fixed rate.

disincentive to take on high-risk mortgage credit. Finally, given the specific nature of the legal framework for personal insolvency in the US, where default on servicing a mortgage implies losing the right to the property, banks grant loans based on the value of guarantees and their likely future path than to the capacity of the mortgagees to generate income.

Figure 7.43: House prices index (1997Q1=100)

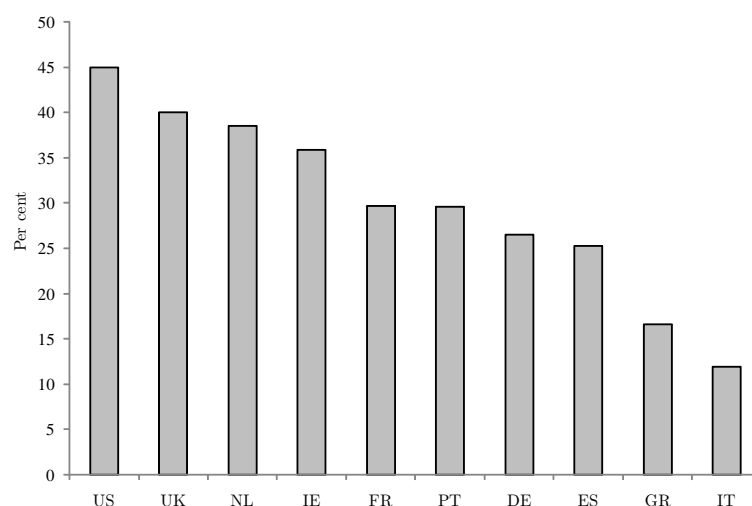


Source: Newsletter *Confidencial Imobiliário* and Thomson Reuters.

It was documented above that indebtedness as measured by the ratio between debt and GDP increased in the majority of euro area countries. This increase may entail an increase in the number of indebted households and a rise in the average indebtedness of previously indebted households. In the case of Portuguese households, contrasting the results of the 2006 and 2000 surveys, it was apparent that the increase in the aggregate level indebtedness that occurred between these two years has resulted from a rise in the number of indebted households and a rise in the average indebtedness of previously indebted households, a finding that was qualitatively different from what had previously been obtained when comparing 2000 with 1994 data. Comparisons among countries in this respect are difficult to make even at the euro area level. The assessment of indebted households' finances has to be based on data from national surveys that, in general, are not collected in a harmonised way in terms of definitions, methodologies or timings. Though a complete

and clear picture is not feasible with actual databases, some consensus on the main differences between the countries for which there is such data is possible.⁴⁸ In Portugal, on the basis of the most recent data from the *IPEF* around 41 per cent of households have debt and 30 per cent have mortgages. Within the euro area, the actual figure for Portugal, concerning mortgages, is lower than for the Netherlands and Ireland, where it stands at 38 and 36 per cent respectively, but substantially higher than for Italy and Greece, with 12 and 17 per cent (Figure 7.44). The percentage of households with mortgages in all the euro area countries for which such data is available is clearly lower than in the UK and the US (with 40 and 45 per cent, respectively).

Figure 7.44: Share of households with mortgages in selected countries



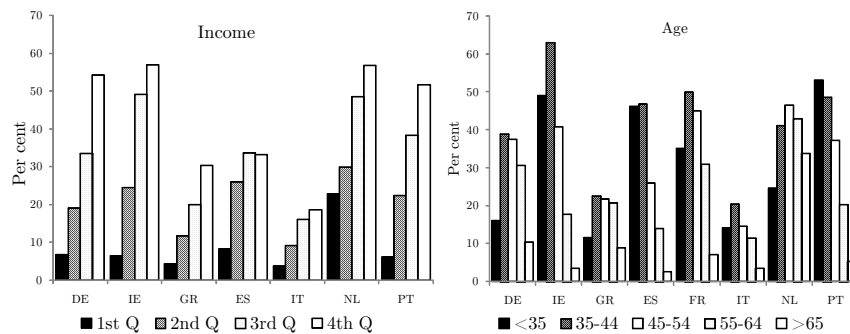
Source: *IPEF* and European Central Bank (2009).

The participation in the mortgage market increases with income in all the euro area countries where information is available (Figure 7.45). The percentage of households with a mortgage in the lowest income quartile is rather limited (fairly below 10 per cent) in all those countries, except in The Netherlands, being 6 per cent in the case of Portugal. In most countries participation in the mortgage market as a function of the age of the household head presents a hump-

⁴⁸In the euro area, fairly comparable information has been collected through national surveys in Germany, Ireland, Greece, Spain, France, Italy and the Netherlands. See European Central Bank (2009) for a more detailed comparison.

shaped pattern, that is, it increases with age up to a certain point and decreases after that point. Portugal and Spain, where participation basically decreases with age, are the exceptions to this pattern.

Figure 7.45: Share of households with mortgages by income quartile and age class

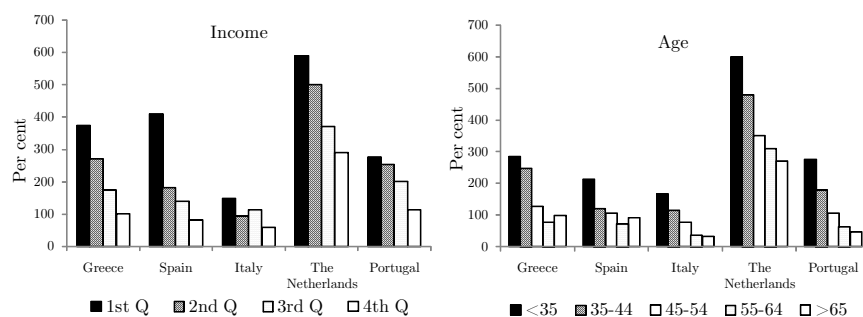


Source: IPEF and European Central Bank (2009).

Knowledge about the distribution of indebtedness among the indebted households is important to assess the vulnerabilities associated to growing indebtedness. Low income and young households are in general viewed as particularly sensitive to shocks in interest rates or asset prices. It was mentioned above that debt is rather asymmetrically distributed among households. Therefore, the conditional median, instead of the average, is usually chosen to give the picture of the typical indebted household. In the case of mortgage debt, the median ratio of debt to income exceeds 150 per cent in Portugal and Greece and it is particularly high for the Netherlands. The distribution across income and age classes is similar in all the countries, the ratio being highest for the lowest income and age classes (Figure 7.46). These findings are globally consistent with the more recent data on the distribution of mortgages across households of different age in the euro area countries coming from the responses to the ad-hoc questionnaire addressed by central banks to the main credit institutions in their countries (Figure 7.47). Consistently with the life-cycle hypothesis, maximum participation is found among people in their thirties. This information also confirms Portugal as one of the countries where the participation of the youngest in the mortgage market is the highest.

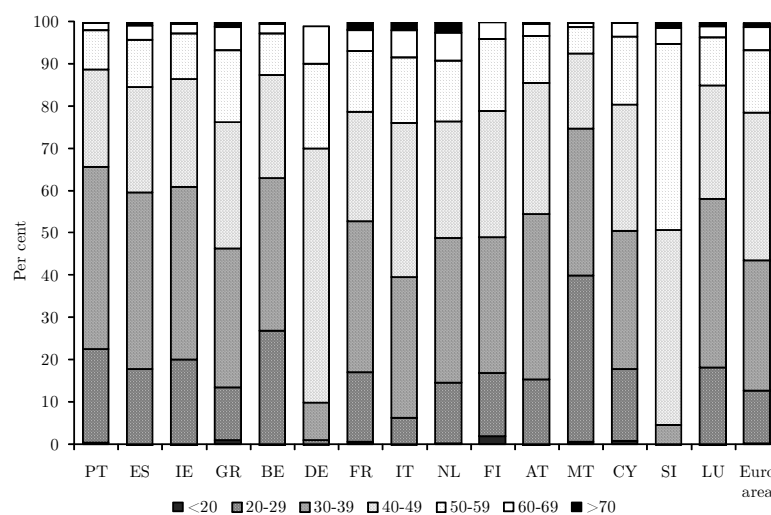
The debt to assets ratio enables the assessment of households' finances from a longer term perspective. In fact, households' ability to meet their financial responsibilities depends not only on their

Figure 7.46: Housing debt to income according to income and age



Source: IPEF and European Central Bank (2009).

Figure 7.47: Distribution of mortgages granted in 2007 by age of the borrower



Source: Ad-hoc questionnaire and European Central Bank (2009).

income but also on accumulated wealth. However, this indicator works under the assumption that houses and market traded financial assets can be sold at their actual prices. In fact, in the case of countries where the housing stock is overvalued the indicator can be misleading in evaluating households' financial fragility. Figure 7.48 shows median ratios of mortgage debt to total assets for the set of euro area countries for which survey information enables the computation of these indicators. As before, for the case of debt to income ratios, this indicator is broken down according to households' income and age. In all these countries, the value of total assets exceeds the value of debts for most of the households. Portugal presents a relatively high ratio in the context of these countries, only exceeded by the value of The Netherlands. However, in Portugal and The Netherlands, unlike in Spain or Italy, the highest values of the ratio are not found in the in the lowest quartile of income. In Portugal, among the indebted households the ratio approaches 60 per cent in the case of the youngest class.

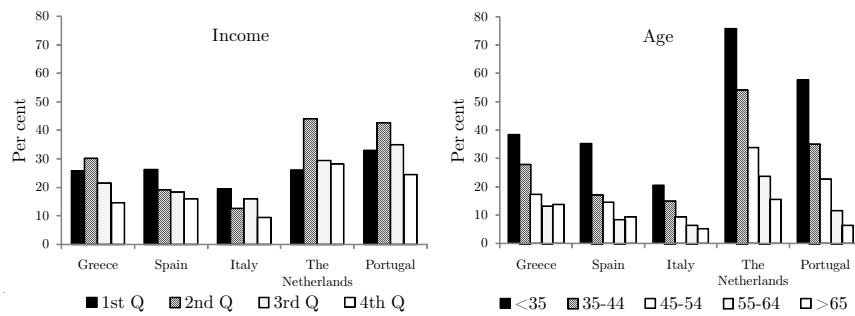
The Portuguese figures should be seen against the background of a much smoother behaviour of house prices in comparison to other countries. The relatively low values of the debt to assets ratio in Spain, for instance, largely reflect the strong growth in house prices. In Portugal, on the contrary, house prices growth was very limited (Figure 7.43). The comparison of loan-to-value ratios confirms the relatively favourable position of Portugal among euro countries in this respect (Figure 7.49). Despite some evidence that this ratio has been increasing in recent years, as a result of bank practices in an attempt to sustain demand, it remains fairly below the euro area average. Moreover, there is also evidence that the upward move in the LTV ratio was halted with the onset of the financial crisis in 2007 and reversed over 2008.⁴⁹

The debt service ratio, which measures the fraction of households' income assigned to the payment of interest and repayment of principal, is the more immediate indicator of households' financial vulnerability. Increasing households' indebtedness raised the concerns that a growing number of households might not be able to continue serving their debts. However, available data suggests that debt service ratios in Europe have been kept relatively low. The situations of higher vulnerability are likely to be limited to a relatively small percentage of households (Figure 7.50). Concerning the

⁴⁹According to the results of the Bank Lending Survey.

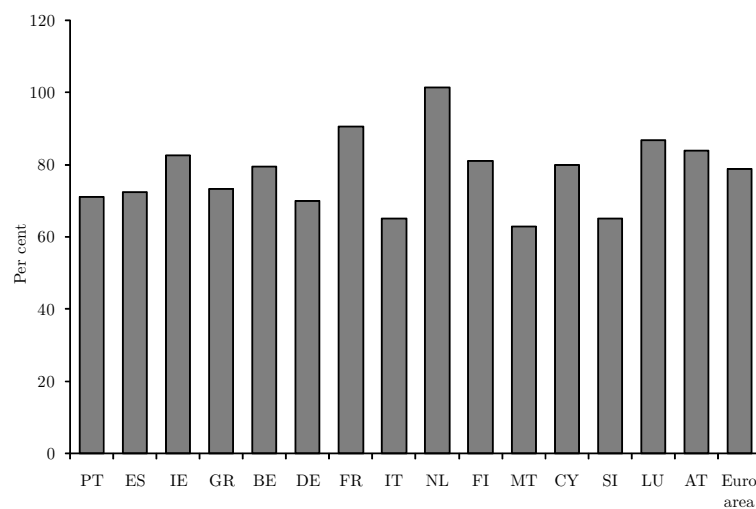
HOUSEHOLDS AND FIRMS' DECISIONS

Figure 7.48: Housing debt to assets according to income and age



Source: IPEF and European Central Bank (2009).

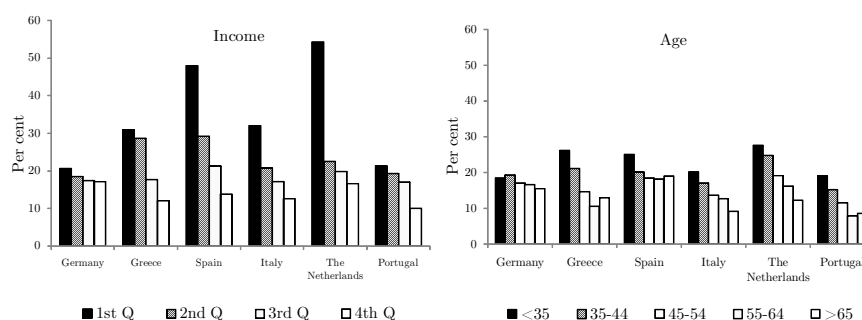
Figure 7.49: Loan to value (housing loans granted in 2007)



Source: Ad-hoc questionnaire and European Central Bank (2009).

distribution of debt service ratios according to households' characteristics, survey results suggest that they decrease with age and income in all countries. Differences across age and income classes are less marked in Germany and also in Portugal in the case of income classes. Moreover, in these two countries the debt service ratio for low income households is much lower than in the other countries. The fact that euro area households' vulnerability looks more similar across countries in the perspective of debt service ratios than in the perspective of debt to income or debt to assets ratios may be the result of a generalisation of the practice of extending repayment terms. In Portugal, evidence from survey data (*IPEF* 2006) suggests that during the last decade the weight of longer maturities in loans for house purchase showed an upward trend, what partly reflects the large incidence of renegotiation of previous credit contracts (Figure 7.51). A similar trend is likely to have occurred in other European countries. In fact, in those countries where households are more indebted, the weight of longer maturities is higher (Figure 7.52).

Figure 7.50: Debt service ratio (on mortgages) according to income and age

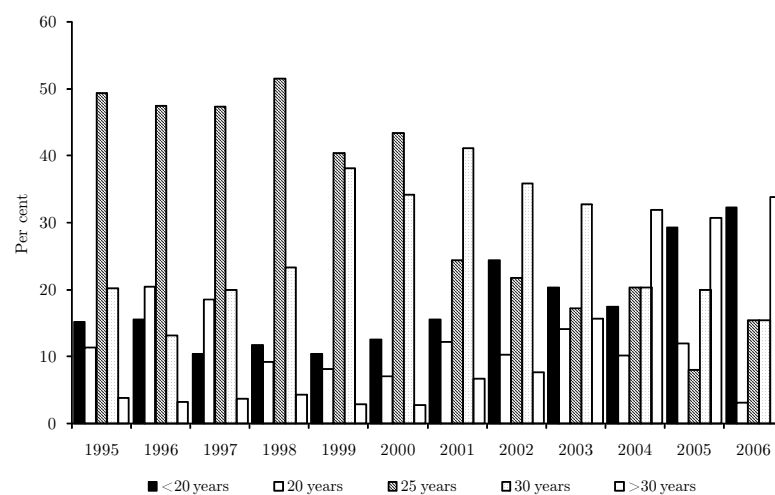


Source: *IPEF* and European Central Bank (2009).

The possibility of extending loan maturities can be particularly relevant in periods of rising interest rates, since in Portugal almost all loans, including mortgages, are granted at variable interest rate, the resetting period being between 1 and 6 months in more than 90 per cent of the cases. In the context of the euro area, Cyprus, Slovenia, Spain and Finland also have resetting periods for mortgages that are less than 12 months for the majority of loans (Figure 7.53).

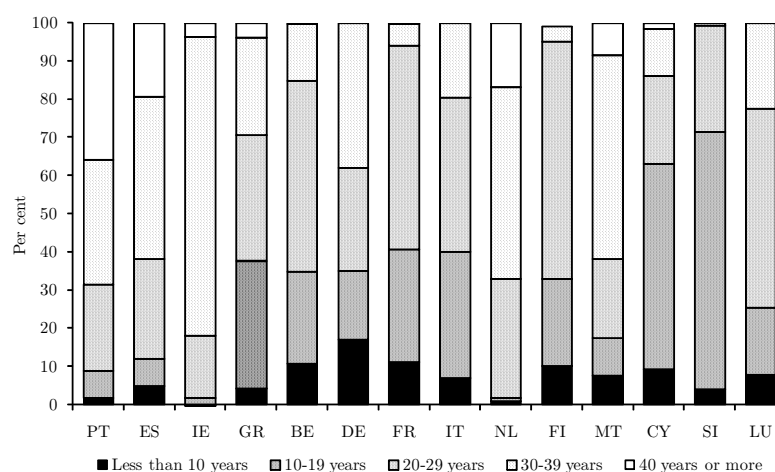
The creation of the euro area entailed a new regime characterized by lower and less volatile interest rates. In Portugal, this change has

Figure 7.51: Weight of typical initial maturities in housing loans, per year of the contract



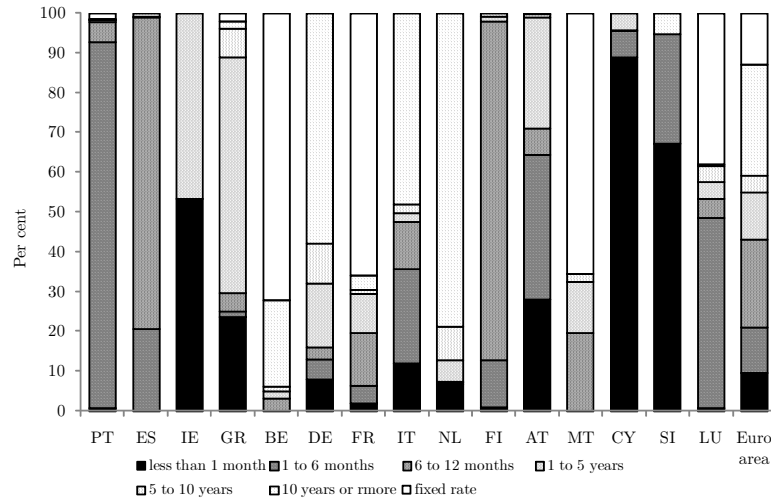
Source: IPEF.

Figure 7.52: Distribution of mortgages granted in 2007 by contract maturity



Source: Ad-hoc questionnaire and European Central Bank (2009).

Figure 7.53: Distribution of mortgages granted in 2007 by interest rate resetting period



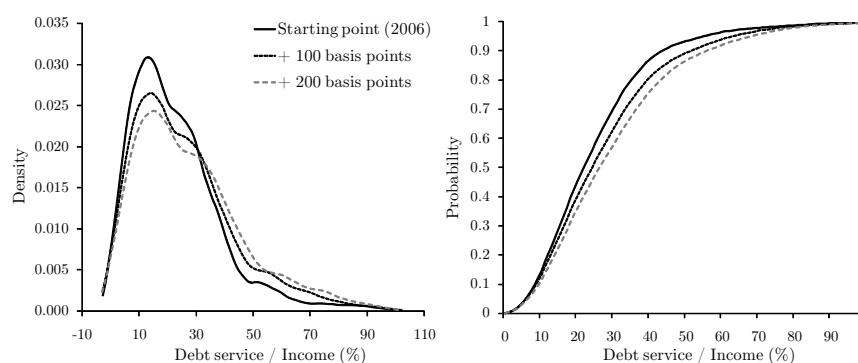
Source: Ad-hoc questionnaire and European Central Bank (2009).

significantly contributed to accommodate the sustained increase in indebtedness and keep debt service ratio in a smooth path. Nevertheless, as referred above, the current practice of variable interest rates and short resetting periods, in particular in the case of mortgages, implies that, other things remaining equal, a change in interest rates may be quickly reflected in the debt service ratio. In the case of an interest rate rise, households facing more critical situations may be particularly affected.

Figure 7.54 shows how the density and cumulative probability functions of household debt service ratio related to mortgages are affected by increases of 100 and 200 basis points in interest rates. The exercise is based on survey data from the 2006 edition of the *IPEF*. The starting density and cumulative functions are based on the distribution of the debt service ratio given by the *IPEF*. Then, the new functions are simulated computing, for each household, the new debt service ratio that would result, other things remaining equal, from the increases of 100 and 200 basis points in interest rates. The relatively high starting point of interest rates (in 2006) as well as the range of variation of market interest rates since the start of the euro area are the main reasons behind the choice of magnitude for the increases in interest rates. In the left panel of Figure

7.54 it can be seen that the density function of the debt service ratio clearly moves to the right, indicating that households with a high ratio can be put in a particularly vulnerable situation. In the right panel of the Figure, the estimated effect of the interest rate increase on the share of households with certain critical levels of debt service ratio can be directly observed. For example, in the extreme situation considered here of a 200 basis points increase in the interest rate, the median value of debt service ratio increases from 22 to 26 per cent, i.e. 50 per cent of indebted households would have a debt service ratio corresponding to more than 26 per cent of their income. In the higher percentiles, differences are slightly higher.

Figure 7.54: Sensitivity of the debt service ratio (on mortgages) to interest rate changes



Source: IPEF.

Increasing rates of default in the housing loans market may have raised the concerns that a growing number of households might not be able to continue serving their debts even if the level of default rates, which are measured by the ratio of overdue credit and other non-performing loans as a percentage of the value of loans, remain relatively low, at least in the segment of housing loans (Figure 7.55).⁵⁰ Moreover, the continuing rise in unemployment is likely to

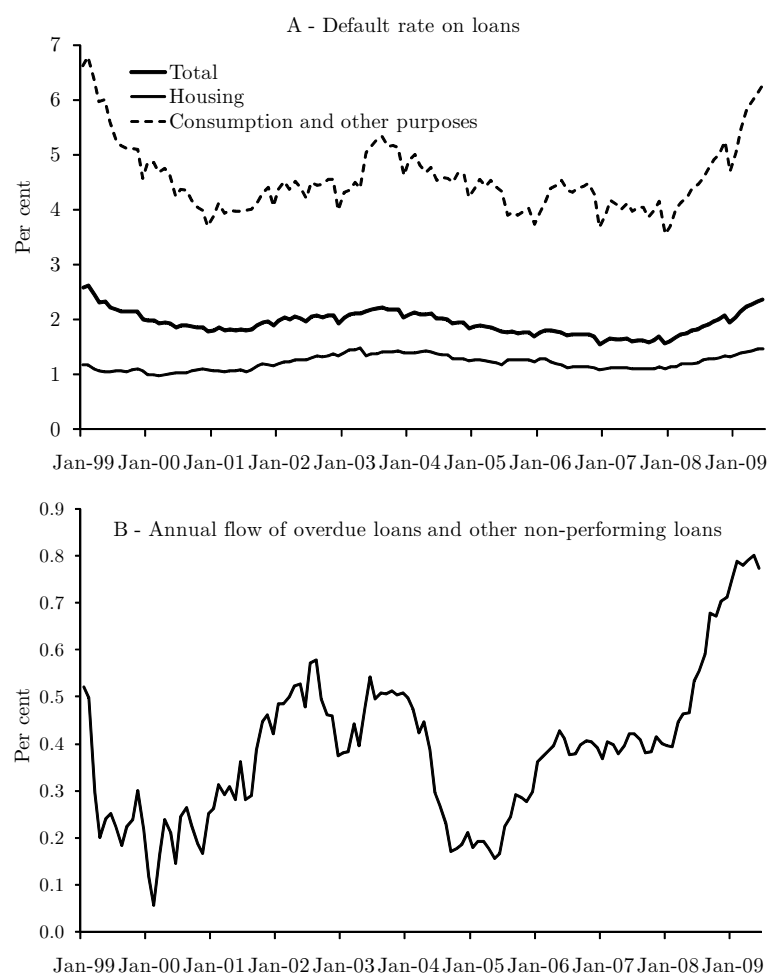
⁵⁰ The default rate on loans (upper panel of Figure 7.55) is defined as overdue payments of capital and interest and other non-performing loans in percentage of the loans to individuals, corrected for securitisation. The lower panel of Figure 7.55 presents estimates of the annual flow of new overdue credit and other non-performing loans as a percentage of loans to individuals, corrected for securitisation. The annual flow of new overdue credit and other non-performing loans was estimated by adjusting the variation in the balance of overdue loans and other non-performing loans using information on write-offs/write-downs, reclassifications and, as and from December 2005, sales of overdue credit and other non-performing

make debt service more difficult for a significant number of households and lead to historically high levels of default rates in loans granted to households. However, some mitigating factors are likely to counterbalance those concerns. On the one hand, at the macro perspective, the current low level of interest rates may be seen as a particularly important factor in keeping default rates relatively low. On the other hand, evidence on distributional aspects of indebtedness provided by survey micro data has also helped to understand that the situation is less worrying than what could be inferred by the level of aggregate households' indebtedness. In fact, considering only indebted households, the median debt service ratio in loans for house purchase stands below the figures for the euro area countries for which comparable data are available. This is partly explained by the fact that maturities in housing loans tend to be long in Portugal by European standards. Additionally, the fact that a relatively high fraction of households in the lowest quartile of income distribution exhibits a debt service ratio of more than 40 per cent is not worrying from an aggregate perspective, since only around 6 per cent of households in the lowest quartile have loans for house purchase. Additionally, younger Portuguese households, which are more indebted and have higher debt service ratios and are consequently particularly vulnerable to adverse macroeconomic conditions and to changes in interest rates, exhibit relatively low debt service ratio when compared with other countries. Moreover, in Portugal the debt of the youngest is in many cases ensured by parental guarantees. It is also worth mentioning that the relatively high debt to assets ratio in Portugal is to a large extent related to the fact that in some of the euro area countries, in particular in Spain, houses were overvalued. As for loans for purposes other house purchase, where default rates are higher and rising sharply, survey evidence shows that in most cases they are likely to be secured against the value of the goods they were used to purchase, such as vehicles. Moreover, the perception that, compared to mortgages, these loans involve a higher degree of risk is reflected in wider interest rate spreads. With the recession, the spreads associated to this type of debt have been particularly intensified along with a charge of commissions and other costs not related to interest.

It is a well known fact that recessions tend to last longer when

loans outside the banking system and not written-off from assets, reported on a quarterly basis as per Banco de Portugal Instruction no. 2/2007.

Figure 7.55: Default in households' loans



Source: *Banco de Portugal*.

Note: See footnote 50 for the definition of the indicators.

at their basis there is a banking crisis. Nevertheless, the ultimate consequences of the current crisis for both financial stability and the macroeconomy are still very uncertain. One of the distinctive features of this crisis is that unprecedented levels of authorities' intervention have been seen. There have been changes to the regulatory framework of monetary policy, cuts in monetary policy interest rates, state guarantees for issues of securitised debt and fiscal packages. These measures have been designed to support not only the financial sector but also the private non-financial sectors including households. Some of them had an immediate impact in containing systemic risks in financial markets, ensuring banks' access to funding and alleviating non-financial sectors budget constraints. However, the full assessment of their effectiveness in mitigating the impact of the financial crisis on the real economy is still unclear. The huge government budget deficits that have been created will take long to be absorbed. Additionally, some distortions may have been introduced in some product and labour markets that will also contribute to shape the recovery. Regarding the financial sector, further measures will be needed at a global scale and it is likely that the financial institutions will have to adapt to a more regulated environment but the consequences of these changes are still very uncertain. They will partly depend on how banks will react. Portuguese banks were able to adjust their financing structure in response to the increasing risk premiums in international wholesale markets. They also benefited from a remarkable rise in customer deposits that allowed them to cut back their dependence on financing through the wholesale markets.

7.3.2 Firms

Overview

The Portuguese financial sector was relatively undeveloped before the participation in the European Community in 1986, as discussed in section 7.2. The process of financial liberalization of the 80's promoted an increased competition across the financial sector and triggered financial innovation. In the early 90's, the prospects of EMU participation translated into a sharp decline of nominal and real interest rates. These factors stimulated investment expenditure by the corporate sector and contributed to the real convergence process of the Portuguese economy. This process was, however, interrupted after 2000 as negative shocks hit the Portuguese economy

against the background of several structural fragilities. Therefore, investment of non-financial firms decreased after peaking around this year, and slightly recovered in the period from 2005 to 2008. In 2009, in the background of the strong international recession, investment of non-financial firms decreased significantly. Studies conducted with data at firm level show that the financial situation of firms affects their investment decisions. However, the results of the Portuguese Investment Survey suggest that the main constraint to corporate investment is related with demand prospects and not with financial constraints.

The indebtedness level of Portuguese non-financial firms, especially through bank loans, increased significantly since 1995. In fact, an increased number of firms started having access to credit in the last ten years. However, there are still many small firms which are entirely financed with equity, which, in general, remains the main financing source of Portuguese firms. In addition, only a small number of firms is financed through the capital markets, via either equity or bonds. The smaller importance of firm's financing through financial markets when compared to bank financing is typical of most European countries, in contrast to the United States or, to a lesser extent, the United Kingdom. It is also reflected in the smaller participation of households in stock markets, as mentioned in the previous section. In bank based economies, such as Portugal, the ongoing relationship between a firm (or an entrepreneur) and a bank tend to ease the financing conditions of firms in their early stages of life, when informational problems may be more acute. However, it can result in higher financing costs as firms get bigger, in the sense that after acquiring private information about the firm the incumbent bank may have higher bargaining power than other banks. Results for Portugal support the hypothesis that a higher number of bank relationships reduces firms' borrowing costs.

Although there is some a priori that the dynamics of Portuguese firms is significantly different from the one of other countries, evidence seems not to conform to this idea. Every year there are many firms entering and exiting an industry and new firms tend to be smaller than the average size of firms in the industry. Evidence on the survival of non-financial Portuguese firms conforms to the stylized fact that most failures occur during the first years of a firm's life. Moreover, smaller firms are also more likely to exit the market than larger ones.

The significant increase in indebtedness of Portuguese firms can

raise concerns on their ability to satisfy the debt service. This issue is particularly relevant for less profitable firms. Actually, in the recessionary period which started in the second half of 2008, in the wake of the international financial and economic crisis, earnings decreased and pushed profitability down, which could raise further concerns on some firms' ability to service their debt. In addition, it may not be as easy for banks to adapt the financing conditions of firms given that banks faced tighter financing conditions in international wholesale debt markets in comparison to the situation prevailing before the crisis. However, this situation seems to have been temporary as since March 1999 there have been signs that the financial markets are coming back to a normal situation. Notwithstanding these difficulties, in 2008 the available evidence points to the non-prevalence of quantitative restrictions on bank credit to firms, mostly due to the banks' ability to substitute customer deposits for wholesale debt, as well as to use collateral to obtain liquidity from the ECB. In addition, qualitative data obtained through surveys on the factors that constrain firms' activity still suggests as a dominating factor the decrease in demand prospects, and not factors related with credit supply. Finally, notice that in 2009 the supply of bank credit to firms has still increased above the nominal GDP.

This section starts by analysing the composition of Portuguese non-financial firms' assets and how investment decisions of firms may have been related to their financial situation. It then turns to discuss the financing of Portuguese firms presenting results on the evolution of indebtedness, capital structure decisions and the relevance of maintaining banking relationships. Some results on the survival of firms are presented next. It ends with a discussion on the vulnerabilities arising from the indebtedness of the non-financial corporate sector.

Composition of firms' assets and investment

Firms' assets can be divided into two main categories: fixed assets and current assets. This accounting categorization takes into account the level of liquidity of assets. Fixed assets category includes tangible assets, intangible assets and financial investments. These are assets in which firms invest in and are used for an extended period of time in order to generate revenues. Some of these assets can also be used as collateral for credits, such as tangible assets and financial investments. Current assets include more liquid

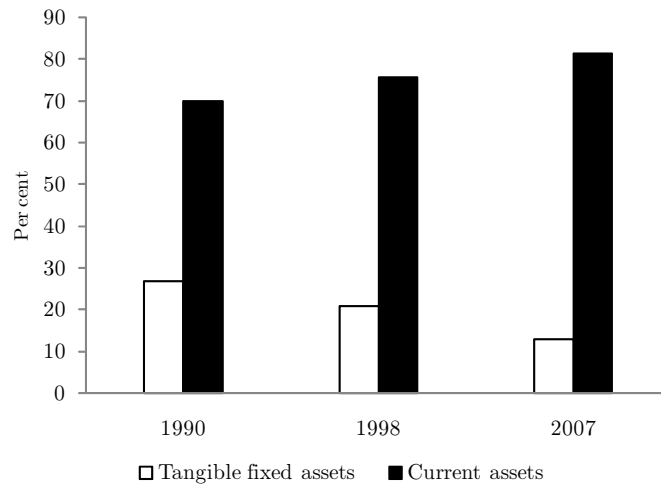
assets such as cash, banks accounts, accounts receivables and inventories. Hence, current assets are assets the firm expects to turn into cash in a short period of time, usually less than one year. The analysis of the composition of firms' assets is done using data from the Central Balance Sheet database. For most of the period under analysis the Central Balance Sheet database provides detailed accounting information on a sample of firms. Reporting was not compulsory before 2006 and data was collected through annual surveys carried out on a representative sample of firms. Despite that, the database covers around 60 per cent of total gross value added in the Portuguese economy up to 2005, with larger firms being covered more exhaustively than small and medium-sized ones.⁵¹

The asset composition of Portuguese firms changed slightly since the beginning of the 90s. The share of financial investments and intangible assets on total assets is minimal. Most relevant assets are tangible fixed assets and current assets. The share of tangible fixed assets of Portuguese firms on total assets decreased slightly since the beginning of the 90s, having increased a little around the year 2000. Contrasting with this evolution, current assets presented the opposite behaviour (Figure 7.56)

Using the information from the European Sectoral references Database, it is possible to compare some indicators of the Portuguese corporate sector with other European firms. This database provides financial ratios of the corporate sector in selected European countries, based on accounting data. For most countries, this database does not cover the total corporate sector although presenting a relatively large coverage. Hence, a comparison will be done only for the largest firms, that is, for firms with annual turnover higher than 50 million euros as this class of firms tends to present the highest coverage rates. Large Portuguese firms present a similar behaviour of European firms included in the sample of the European Sectoral references Database, namely that the share of tangible fixed assets in total assets decreased from 1999 to 2007 while the share of current assets increased (Figure 7.57).

⁵¹From 2006 onwards, this database started to be filled in with information reported within a joint project of different national entities denominated by *Inquérito às Empresas Simplificado*, which means Simplified Corporate Information. The advantage of this project is that it simplifies the reporting process of firms to different entities by concentrating all reports in just one. As a result, the information in the Central Balance Sheet database from 2005 onwards comprises all firms operating in Portugal.

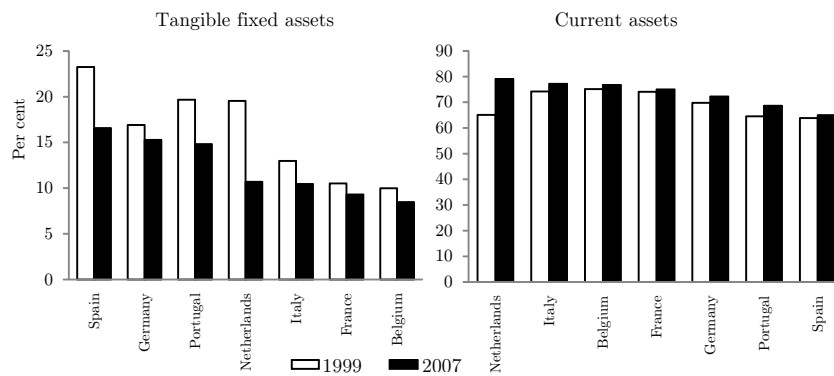
Figure 7.56: Tangible fixed assets and current assets as a percentage of total assets of Portuguese firms



Source: Central Balance Sheet of *Banco de Portugal*.

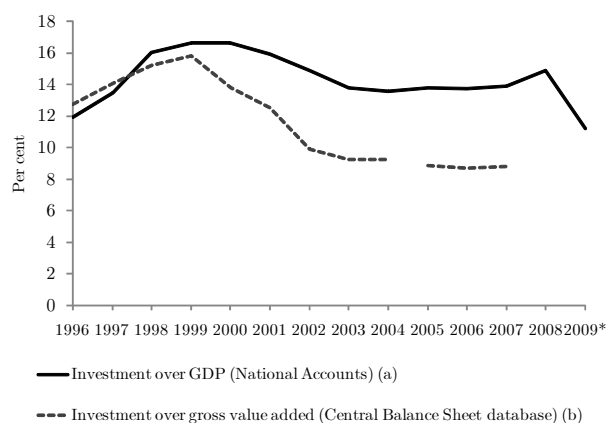
Notes: Median values per year. Firms with zero or negative values for total assets were excluded from the sample.

Figure 7.57: Tangible fixed assets and current assets as a percentage of total assets — international comparison for large European firms



Source: European Sectoral references Database.

Notes: The values presented correspond to the median firm among firms with annual turnover higher than 50 million euros.

Figure 7.58: Investment of Portuguese non-financial firms

Source: Statistics Portugal and Central Balance Sheet of *Banco de Portugal*.

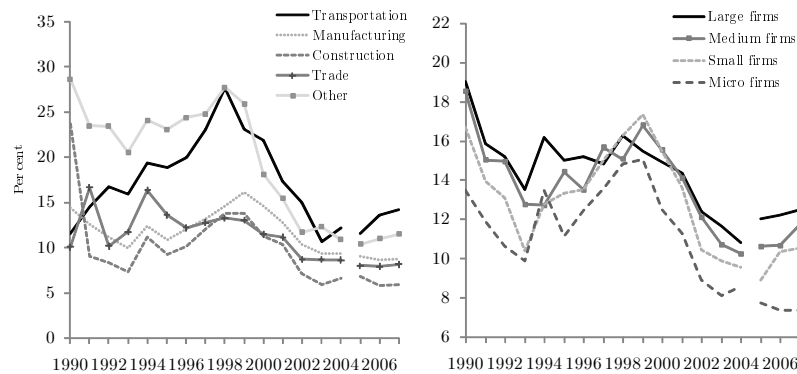
Notes: (*) Data for the first half of 2009. (a) Includes GFCF, changes in inventories, net acquisitions from disposal of valuables and net acquisitions from non-produced non-financial assets at current prices. Figures for 2007, 2008 and 2009 calculated on the basis of national quarterly accounts. (b) Median values per year. Uses data from the Central Balance Sheet database. It excludes firms with zero or negative values for total assets, null investment values and less than four years in the sample. The break in the series corresponds to a change in the set of firms under analysis as discussed in footnote 51.

The fluctuation on asset composition is related with the investment of firms. In the course of the second half of the 1990s, investment levels were relatively high in a context of buoyant economic activity. As a result, the share of fixed assets increased slightly. However, since 2000, there has been a decrease in the share of fixed assets on total assets which is consistent with the downward trend, followed by stabilization, of corporate investment as a percentage of GDP (Figure 7.58). The information on firms' investment over firm's gross value added, obtained from the Central Balance Sheet database, is in line with the evolution of the investment aggregate measure.

The evolution of corporate investment across industry and across firm size is relatively homogeneous, peaking at the end of the nineties, decreasing in the first years of the century and recovering in some cases from 2005 to 2007 (Figure 7.59). In fact, in the period from 2005 to 2007, the investment ratio increased for firms in the transportation sector, but decreased for construction firms. There are also differences in levels. Firms in the transportation sector show

the highest levels of investment while trade and construction companies show the smallest levels for the investment ratio. Regarding firm size, smaller firms tend to show lower investment ratios. For the period from 2005 to 2007, the investment ratio increased except for micro firms.

Figure 7.59: Investment as a percentage of gross value added — decomposition by industry (left panel) and by firm size (right panel)



Source: Central Balance Sheet of *Banco de Portugal*.

Notes: Median values per year. It excludes firms with zero or negative values for total assets, null investment values and less than four years in the sample. Micro firms are firms with turnover smaller than 2 million euros; small firms are firms with turnover between 2 and 10 million euros; medium firms are firms with turnover between 10 and 50 million euros and large firms are firms with turnover higher than 50 million euros. The break in the series corresponds to a change in the set of firms under analysis as discussed in footnote 51.

Evidence on investment decisions

Corporate investment in fixed capital plays a major role in shaping the productive capacity of an economy and, consequently its long run growth. As such, the study of investment determinants is crucial for understanding the functioning of the economy. The classic approach to the study of investment decisions does not consider the impact of financing decisions. This approach reflects the Modigliani and Miller (1958) irrelevance theorem which implies that, in the presence of perfect capital markets, the investment and financing decisions of firms are independent and one should not have any impact on the other. However, in the presence of imperfections in capital markets, namely, asymmetrical information between those making investment decisions and those providing the

financing means, there should be a link between corporate financial standing and investment decisions. The distortion generated by this information asymmetry could have a central impact on investment decisions as it may result in a credit rationing situation as well as translate into higher external financing costs.

The impact of the corporate financial standing of firms on their respective investment decisions has been extensively studied. Faz-zari, Hubbard and Petersen (1988) initiated the so-called investment cash flow sensitivity literature by analyzing the sensitivity of corporate investment to fluctuations in internally generated funds. Their results support the existence of a positive relationship between corporate cash flow and investment. In particular, a greater sensitivity of investment to cash flow suggests the existence of external financing constraints. Later, Kaplan and Zingales (2001) questioned the interpretation of the positive relationship between investment and cash flow as an indication of a firm's external financing constraints. They showed that this positive relationship could prevail even for firms not facing financing constraints. The debate continued in Faz-zari, Hubbard and Petersen (2000) and Kaplan and Zingales (2000) and was followed by the publication of both empirical and theoretical studies questioning the financial constraints' interpretation given to the positive relationship between investment and cash flow (see, among others, Almeida and Campello (2001), Gomes (2001) and Altı (2003)). More recently, the empirical literature has focused more on the interaction among measures characterizing the financial pressure of firms and investment decisions (see Martinez-Carrascal and Ferrando (2008) among others).

Investment decisions of the Portuguese non-financial firms have been studied along the above-mentioned lines of empirical research. Using data for the period between 1986 and 1992, Farinha (1995) analyses Portuguese corporate investment decisions taking into account that firms may be subject to liquidity constraints. In particular, this work examines whether the impact of liquidity constraints depends on the size of the firm. One would expect that capital market imperfections would be found important for firms operating in Portugal in the period under analysis, that is, between 1986 and 1992, as the financial market and the banking sector could be considered as moderately developed and were going through major changes, as discussed in section 7.2. More recently, Barbosa, Lacerda and Ribeiro (2008) focused on the study of the relationship between the financial standing of firms and investment decisions. Using data on Portu-

guese firms for the period between 1995 and 2005, this study evaluates the extent to which the financial pressure of a firm affects its investment. Due mainly to data restrictions, both studies consider only firms in the manufacturing sector.

The data source for both Farinha (1995) and Barbosa et al. (2008) studies is the Central Balance Sheet Database. As already mentioned, this database collects information on financial accounts for a large sample of firms. Although the sample spans over the entire size distribution, there is an emphasis on large firms and, amongst the group of small and medium sized firms, those with a better financial standing tend to be over-represented. The panel used in Farinha (1995) comprises about 1300 manufacturing firms while the panel used in Barbosa et al. (2008) comprises about 6000 manufacturing firms.

The methodology followed in Farinha (1995) is the estimation of an Euler equation characterizing the optimal path of investment as in Bond and Meghir (1994). The estimation also considers time and industry dummies and, given that the model includes the lagged endogenous variable as an explanatory variable, an instrumental variable estimator was used. When considering the whole sample, results suggest that some firms are subject to liquidity constraints. When splitting the sample according to firm size, proxied by the number of workers, the conclusion that investment decisions are significantly affected by the impact of liquidity constraints still holds. Moreover, if the sample of firms is split into firms with more and less than 500 workers, the cash flows coefficients for the two sub samples are significantly different. For larger firms, the coefficient even presents the opposite sign, suggesting that only very large firms are qualified to overcome liquidity constraints. This result means that the possibility of carrying out investment projects, without depending on self financing, only occurred for very large firms.

The approach in Barbosa et al. (2008) is different, following the more recent line of research on this topic. The main econometric specification considers as explanatory variables the financial standing, the growth and the size of firms. The financial standing of firms is measured by the interest burden, the cost of financing, indebtedness and gross operating profitability. Time and industry dummies were also considered. As endogeneity problems could arise in the specified equation, estimations were performed using the GMM System estimator. Results are consistent with the literature. On the one hand, higher financial pressure, measured by the interest bur-

den variable, higher debt cost and a higher indebtedness level contribute negatively to corporate investment. On the other hand, firms with low profitability tend to show lower investment rates.

To better characterize the impact that corporate financial standing may have on firms' investment decisions other corporate characteristics, such as the presence of the firm in external markets, the size of the firm, the number of bank lending relationships and the existence of default were taken into account. First, the effect of the firm's presence in the external market was considered. For non-exporting firms, results suggest that investment decisions are negatively influenced by the interest burden. For exporting firms two main results emerge: these firms tend to show higher investment rates and there is a non linear relationship between the share of production placed in external markets and the sensitivity of investment to the corporate financial situation. For most firms, the increased participation in world trade implies a decrease in the sensitivity of investment to financial standing. The second corporate characteristic analysed was corporate size. The size of a firm has been extensively used as a sign of financial constraints. Small firms are expected to face higher constraints when obtaining external financing given that they tend to have less visibility in external capital markets, to be less transparent, to have less collateral and to not be able to bear the fixed costs associated with external finance (see, among others, Gertler (1988)). Therefore, the model was re-estimated considering that the coefficient of the interest burden variable changes linearly with size. Results confirm that investment decisions of larger firms are less dependent on their financial structure than are investment decisions of smaller firms. In other words, the fact that the interest burden of large firms is high during a given period is not a relevant constraint to future investment. Next, the number of banking relationships was considered. In the literature, there is no consensus regarding the impact of the number of banking relationships on financing availability and cost. Fama (1984) and Petersen and Rajan (1994) argue that the existence of a close relationship with a small number of banks is associated with easier and better financing conditions. Rajan (1992) and Bolton and Scharfstein (1996) argue that the optimal debt structure depends on efficient bargaining, which implies relationships with a sufficiently large number of banks. Evidence for Portuguese firms is consistent with the latter studies as, for most firms in the sample, the increase in the number of bank relationships contributes to weaken the investment sensitivity to the initial finan-

cial standing. Finally, firms with loans in default are shown to have lower corporate investment rates while the sensitivity of investment decisions to the interest burden is not statistically significant.

To conclude, corporate investment decisions by Portuguese firms are shown to be related with their financial situation. Although the studies above mentioned followed different empirical approaches, it is possible to conclude that, in general, investment decisions of large firms tend to be less sensitive to their financial situation than the investment decisions of smaller firms. However, in the more recent period, the difference between large and small firms may have been reduced as the access to external financing, namely bank credits, seems to have become more widespread. Notwithstanding the conclusion that at a micro-level investment decisions are related with firms' financial situation, one needs to be careful when extrapolating these results to an aggregate level, namely because the bulk of the investment in the Portuguese economy is undertaken by large firms. Further, the results of the Portuguese Investment Survey point to the conclusion that the main constraints to investment are related with the prospects concerning sales, rather than financial factors, either quantitative or associated to the interest rate level.

Capital structure and indebtedness

Portuguese firms are mainly financed with equity. According to the financial accounts,⁵² equity represents more than 50 percent of firms' financing. In terms of debt, most corporate debt is obtained through bank loans. In the 1990s, particularly in the second half, there was a significant increase in the indebtedness level of the Portuguese non-financial private sector. This increase in debt levels occurred both in the households sector, as discussed in the previous section, as well as in the corporate sector (Figure 7.60). This evolution took place against the background of a gradual development and integration of financial markets, which, jointly with the process of nominal convergence and the subsequent participation in the euro area, translated into a considerable decline in the level of interest rates and their volatility. A complementary line of reasoning for the observed increase in indebtedness is related to institutional changes such as competition in the banking sector, the implementation of new methods for the assessment of credit risk by banks or the

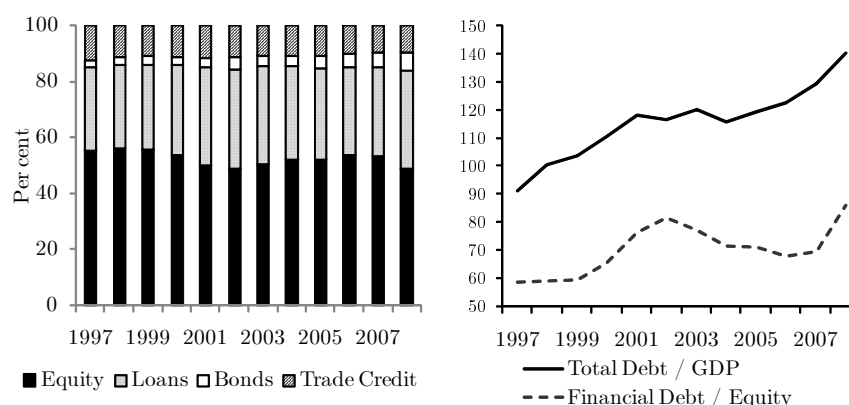
⁵²National Financial Accounts compile data for the whole corporate sector privileging market values.

sophistication of firms as regards the use of credit instruments. Using data from the Central Credit Register of *Banco de Portugal*,⁵³ it is possible to conclude that the growth in bank credit to non-financial firms since 1995 is mainly due to new exposures that emerged during this period, pointing to the conclusion that the access to credit of firms that did not use to have bank credit has increased significantly. Moreover, the improved access to credit seems to have occurred until 2001, a period of stronger decline in nominal and real interest rates.

During the last decade, financing requirements of Portuguese non financial firms have been matched by an increase in indebtedness via bank loans. Despite this increase in indebtedness, equity is still the main funding source of Portuguese non-financial firms (Figure 7.60). Regarding debt financing, bank loans are by far the main source of external funds. Hence, as in most European countries, banks play a central role in financing economic activity. However, there was some increase in the share of financing through debt securities markets, although a significant part of it corresponds to commercial paper held by banks (as discussed in section 7.2). The debt/equity ratio of the non-financial corporate sector increased significantly till 2002, as debt, especially bank loans, increased but also the market value of equity decreased in the aftermath of the burst of the dot.com stock market bubble. After 2002, the debt/equity ratio decreased for two years having then stabilised until 2007. The significant boost in the corporate sector debt resulted also in an increase in the ratio of debt to GDP in the second half of the 90's, having stabilised until 2004. Since then, corporate indebtedness showed again an increasing pattern.

In 2008, lending to non-financial firms rose considerably, with net debt securities issues also being substantially higher. These were mainly short-term and taken by resident banks. This pattern of financing needs to be seen against the background of the financial market turmoil that firms faced in 2008. In such situations, it is hard to raise funds through increases in capital via stock markets or the issue of long-term debt. Simultaneously there was a sharp decrease in Portuguese stock market prices, as it happened worldwide. Both evidence resulted in a considerable rise in the debt/equity ratio for the sector, surpassing the most recent maximum, recorded in 2002. In

⁵³This database includes monthly information on all credit exposures above 50 euros granted by all Portuguese credit institutions.

Figure 7.60: Financing of Portuguese non-financial firms

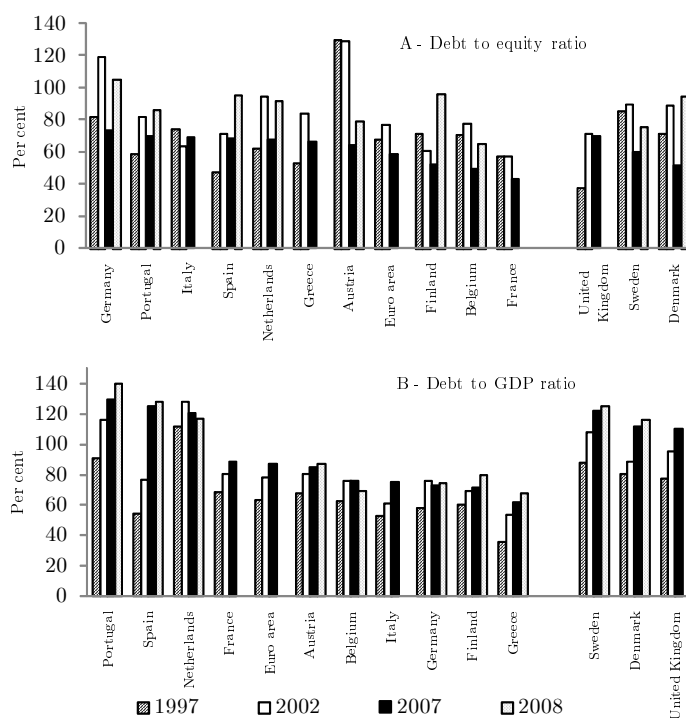
Source: Eurostat.

Notes: The left panel presents the decomposition of the financing of firms in equity, loans, bonds and trade credit considering non-consolidated values. The right panel presents the ratio Debt/Equity defined by the sum of non-consolidated values of loans and bonds over equity, and the ratio Debt/GDP defined by the sum of consolidated values of loans, bonds and trade credit over GDP.

2009, the increase of stock prices as well as the new issues of shares may have not been sufficient to change this situation.

As in Portugal, equity has been the most important financing source of non-financial firms in other euro area countries during the last decade. The debt to equity ratio for most other euro area countries also peaked around 2002, reflecting the decrease in stock market prices that followed the boom at the turn of the century (Figure 7.61). The increase in the debt to GDP ratio of the corporate sector since the second half of the 90's occurred also in most euro area countries, with Portugal reporting one of the largest increases. Even though the debt to GDP ratio of Portuguese non-financial firms is comparatively high amongst euro area countries, the debt to equity ratio is similar to most of these countries.⁵⁴ However, one should be careful when comparing the debt to equity ratio across euro area countries as the methodology underlying the valuation of non-traded shares is not the same in all countries. Hence, depending on the relevance of non-traded shares and on the methodology used to compute their value at market prices, both the level and the sensitivity of the equity value to changes in stock market prices may differ significantly across countries. In particular, Portugal is among

⁵⁴A similar result would have been obtained using consolidated values.

Figure 7.61: Financing of non-financial firms — international comparison

Source: Eurostat.

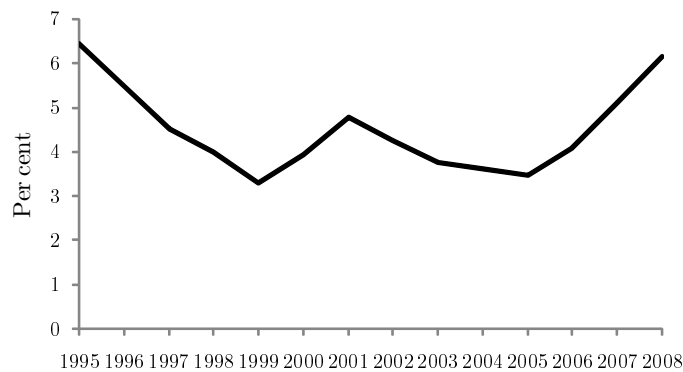
Notes: The debt equity ratio is defined by the sum of non-consolidated values of loans and bonds over equity. The debt to GDP ratio is defined by the sum of consolidated values of loans, bonds and trade credit over GDP except for the United Kingdom where non-consolidated values are used. The debt equity ratio for Greece was excluded because of its extremely high value (about 199). Euro Area: weighted average ratio for the selected euro area countries.

the euro area countries with the lowest share of equity value corresponding to shares being traded in the stock market. In 2008, the strong reduction in global stock market prices is expected to contribute to an increase in debt equity ratios in the countries for which there is not already information available.

The participation in the euro area brought a new economic environment characterized by lower interest rate levels and volatility, which helped firms to sustain a higher indebtedness level than in the past. In fact, the share of interest payments on gross domestic product decreased during the second half of the 90's despite the indebtedness level of the corporate sector had increased significantly (Figure 7.62). Since then, interest paid increased in 2000-2001 and again

after 2005, reflecting with some lag the developments in money market interest rates and, consequently, ECB policy rates. In Portugal, money market interest rates play an important role in the determination of interest rates on corporate bank loans, either because a large share of loans has an original maturity of up to 1 year, or because in longer maturities interest rates are index-linked to short-term money market interest rates, and are also periodically revised at short intervals. Hence, interest rates on outstanding amounts reflect very rapidly changes in expectations regarding the key monetary policy interest rate. In 2008, interest paid by non-financial firms as a percentage of gross domestic product increased even though the main ECB reference rates were virtually flat for most of the year. This evolution resulted largely from the increase, on average terms, of money market interest rates when compared with the previous year, and from the increased risk premia in these rates associated with the financial crisis. In 2009, the above mentioned ratio of interest paid by non-financial firms decreased significantly as a consequence of the sharp reduction of ECB reference rates.

Figure 7.62: Interest paid by the non-financial corporate sector over GDP



Source: Statistics Portugal and *Banco de Portugal*.

In this context, Gameiro and Ribeiro (2007) studied the real cost of debt of Portuguese non-financial firms. This study concludes that throughout the 1990s the real cost of bank lending to Portuguese firms also declined significantly. Comparing with the euro area, between early 1999 and the end of 2005, the real cost of bank loans in Portugal was systematically lower, largely reflecting relatively higher short-term inflation expectations in Portugal. From that date

onwards, the real cost of bank financing in Portugal converged to the euro area's.

The analysis of this indicator in aggregate terms makes it possible to characterize the financial pressure of the non-financial corporate sector as a whole. However given that firms are heterogeneous, a characterization of the distribution of firms according to this indicator may provide a better understanding of the non-financial corporate sector. This analysis is possible to perform using data from the Central Balance sheet database. The upper left panel of Figure 7.63 presents the evolution of the interest burden defined by the ratio of interest paid over operating earnings (measured by Ebitda) for the median firm, and for the median firm in both the first and fourth quartile of this indicator. Similar to the aggregate indicator, the interest burden decreased till 1999. The decline of this indicator was particularly relevant for firms in the fourth quartile, that is, for firms with heavier interest burden. This indicator synthesises a few variables that characterize the financial situation of firms, namely the financing costs, the financial leverage and operating profitability. Hence, this indicator can be broken down as follows:

$$\frac{Interest}{Ebitda} = \frac{Interest}{Debt} \times \frac{Debt}{Assets} \times \frac{Assets}{Ebitda}$$

where *Ebitda* corresponds to earnings before interest, taxes, depreciation and amortization, *Debt* corresponds to financial debt, that is, the sum of loans and bonds, and *Assets* corresponds to a measure of capital invested in the firm, that is, the sum of equity plus financial debt. The first element of this decomposition measures the cost of debt, the second one measures financial leverage and the last one measures the inverse of an operating profitability measure. Figure 7.63 presents the evolution of the median values of these indicators for firms in the first quartile, the central quartiles and the fourth quartile of the distribution of the interest burden indicator. The major driver of the decrease in the interest burden was the decline in the cost of debt, as can be observed in the upper right panel of Figure 7.63. Firms with higher interest burden faced a higher financing cost which, in the 1990s, was considerably higher than the one faced by firms with less interest burden. These firms are the ones that benefited more from the decrease in interest rates during this period as financial leverage and operating profitability, the two other relevant variables, contributed positively to the interest burden. In general, firms with higher interest burden present higher leverage

ratios and are less profitable. After 2000, the cost of debt remained relatively stable for all firms while operating profitability decreased, especially until 2005. Hence, as operating profitability decreases, and with everything else almost stable, the interest burden of firms should increase. Actually, this is the evolution observed for firms in the central and fourth quartiles. Concerning firms in the first quartile, and despite the reduction in operating profitability, a decrease in financial leverage helps to explain the lower values for the interest burden.

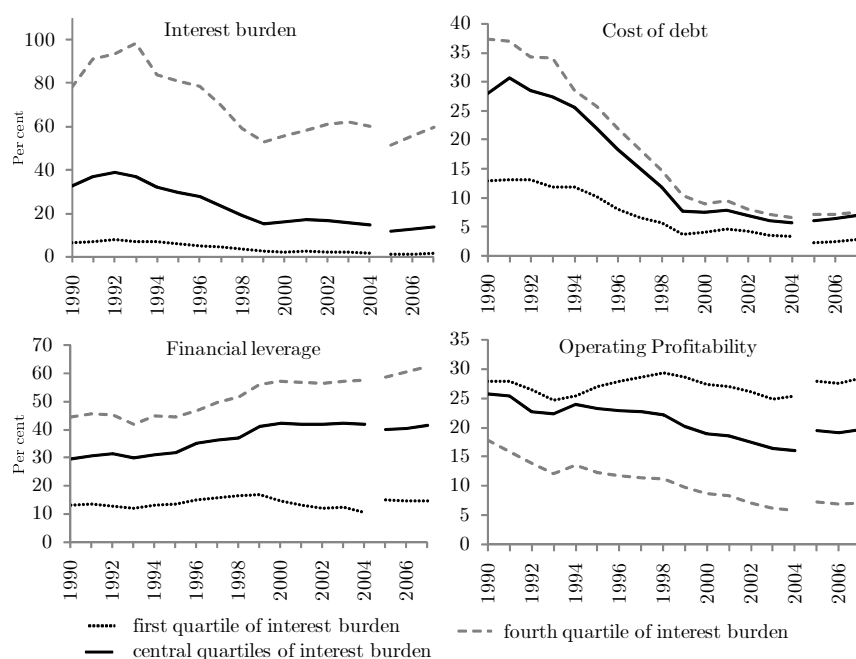
Using the information from the European Sectoral references Database, it is possible to compare the interest burden (interest paid over Ebitda) of Portuguese firms to firms operating in other European countries. As before, the comparison will be done only for the largest firms. As observed in Figure 7.64, the interest burden of the largest Portuguese firms evolved in a similar way to comparable European firms, but presents one of the highest levels.

Evidence on capital structure decisions and banking relationship

As mentioned, equity is the most important source of financing of Portuguese firms. Regarding debt, Portugal has historically been a bank-based economy. Most external funding of firms is provided by banks and only a very small percentage of firms issue debt through capital markets. Against this background, both capital structure decisions, that is, the choice between debt and equity as a source of financing, and the relationship between firms and banks, are worth studying to a better understanding of the financing of the non-financial corporate sector.

Antão and Bonfim (2009) study the capital structure decisions of Portuguese firms considering the two most important theories of capital structure in the corporate finance literature: the trade-off theory and the pecking order theory. The trade-off theory argues that firms choose the optimal level of debt by trading off the benefits of debt against its costs resulting in an optimal level of debt. The main predictions of the trade-off theory on leverage ratios are related with the profitability of firms, where profitability has a positive impact on leverage as, for instance, it helps bankruptcy costs to decrease and the existence of debt payments helps to reduce agency costs of equity which is more relevant for firms with higher profits. The pecking order theory is an alternative theory of capital structure. The theory argues that the insiders of the firm are assumed to know more about the firm's prospects than outside investors. Being

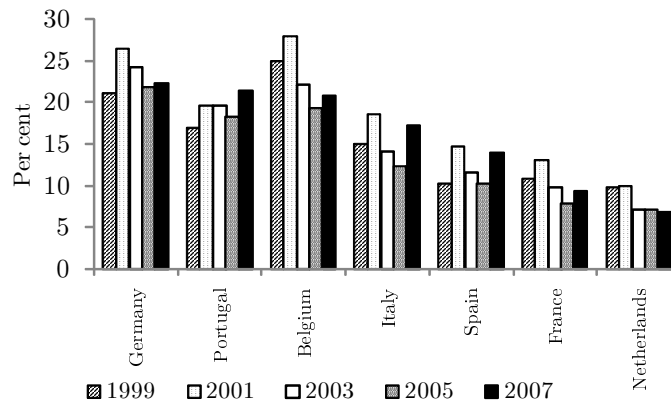
Figure 7.63: Distribution and decomposition of the interest burden of Portuguese firms



Source: Central Balance Sheet of *Banco de Portugal*.

Notes: Median values per year. The interest burden is given by the ratio of interest paid over earnings before interests, taxes, depreciation and amortization (ebitda). The cost of debt is given by the ratio of interest paid over financial debt, defined by the sum of loans and bonds. Financial leverage is given by financial debt over invested capital, defined by the sum of financial debt and equity. Operating profitability is given by the ratio of ebitda over invested capital. This analysis excludes firms with zero or negative values for total assets and/ or negative values for ebitda. Moreover, only firms with positive values of financial debt and interest paid are considered. Each panel presents the median value of the variable under analysis for firms in the first, the central and the fourth quartiles of the distribution of the interest burden. The break in the series corresponds to a change in the set of firms under analysis as discussed in footnote 51.

Figure 7.64: Interest burden — international comparison for large European firms



Source: European Sectoral references Database.

Note: The interest burden is defined by interest paid over ebitda. The values presented correspond to the median firm among firms with annual turnover higher than 50 million euros.

privity to confidential information, managers will issue risky securities only when they are overpriced. However, as investors anticipate this type of behaviour from the managers of the firm, they will discount both new and the existing securities when new issues of risky securities are announced. As a result, the pecking order theory argues in favour of a hierarchy of financing. Hence, firms prefer to use retained earnings as their first financing source, followed by debt and, lastly, by equity. Some predictions of the pecking order are at odds with those of the trade-off theory. In the first place, there is no target leverage, as each firm chooses its leverage ratio based on financing needs. Secondly, profitable firms use less debt than less profitable ones as more profitable firms can finance a larger portion of their activity with internally generated funds.

Against this setting, Antão and Bonfim (2009) study the decisions affecting the capital structure of non-financial Portuguese firms by testing empirically whether the leverage of firms follows more closely the predictions of the trade-off model and/or the pecking order model. In particular, it is studied (i) how the level of leverage changes with firms' profitability and other firms' characteristics and (ii) if firms have an optimal target leverage to which they converge.

The data used comes from the Banco de Portugal Central Balance

Sheet database and covers the period from 1990 to 2007, covering more than 390,000 firms over 18 years. The analysis starts by studying the determinants of the leverage ratio, as this analysis provides a direct test of the pecking order. The empirical research strategy consists in estimating a fixed effects panel data model where the leverage ratio, defined as the sum of bonds and loans as a percentage of total assets is regressed on a measure of cash-flows, sales growth, tangible assets, total assets, a liquidity measure and other firm-specific variables. All these variables are firm-specific and time-varying. Moreover, in all regressions time and firm fixed effects are considered.

Results are in favour of the pecking order theory: firms with more available funds will use less debt than other companies. As the specifications can be affected by simultaneity issues, the authors consider alternative specifications that deal with this issue. The estimated coefficient for cash-flow remains consistent with that previously observed. Regarding firm size, results suggest that large firms use less debt than smaller firms, after controlling for other firms' characteristics. A similar behaviour is observed for older firms.

As this analysis does not make it possible to establish clear conclusions regarding the trade-off theory, it is then tested if firms adjust their leverage ratios in order to converge to a target ratio. In order to test whether this conclusion is valid a two-step regression is estimated. The first step corresponds to the regression of the leverage ratio already mentioned. In the second-step regression, the fitted values of the first-step are used as a proxy for the target leverage in a partial adjustment model. The results are clearly in favour of an adjustment toward the target, thus providing evidence in favour of the trade-off theory. Regarding firm size, it is observed that there are indeed different adjustment speeds. In fact, smaller firms are able to adjust much faster to their target leverage ratio. Moreover, it is also considered the possibility of differences between two adjustment paths. It is observed that firms which have a negative adjustment (i.e., their target is below their current leverage) are able to reach their target faster than firms that have to increase leverage. This result seems to suggest the existence of financial constraints in issuing new financial liabilities, as well as relatively high flexibility in decreasing leverage if firms are affected by a negative shock on their equilibrium leverage ratio.

In short, the authors observe a significant negative relation between profitability and leverage, which supports the pecking order

theory. However, it is also observed that firms converge rapidly to their target leverage ratios, thus providing evidence in favour of the trade-off theory. The authors argue that these results may not be conflicting as they could refer to decisions made with different time-horizons in mind.

As mentioned, most external funding of firms is provided by banks and only a very small percentage of firms is financed through bonds. In addition, most Portuguese firms can be classified as small or medium-sized firms. In such environment, the banking relationship of Portuguese firms has been studied in two different perspectives. First, using data on firms created in the 1980-1996 period, Farinha and Santos (2002) study a firms' decision to switch from a single to multiple lending relationship. In turn, Bonfim, Dai and Franco (2009) use data for the 1996-2004 period to study the relation between the number of bank relationships and the cost of borrowing. Both studies use data from the Central Credit Register of Banco de Portugal. The other dataset used is the Central Balance Sheet Database.

Empirical research on the number of bank lending relationships found that the average number of bank-lending relationships increases with firm age and size (see Petersen and Rajan (1994) and Detragiache, Garella and Guiso (2000) among others). It was also found that single bank relationship dominate in some countries, as in the US (Petersen and Rajan (1994)) while in others the opposite is observed, as is the case of Italian firms (Detragiache et al. (2000)). In what concerns Portugal, a large part of Portuguese firms has one exclusive lending relationship. According to the Central Credit Register, it is observed in the last decade around three quarters of Portuguese firms had one or two bank relationships. Farinha and Santos (2002) observe that single relationships dominate amongst firms recently created in the 1986-1996 period. Bonfim et al. (2009) conclude that, for their sample of firms, approximately one quarter of the firms holds exclusive lending relationships.

A large number of studies has investigated the benefits to small firms of close relationships with banks. Most research on this topic indicates that there are advantages for small firms to establish long-term relationships and to borrow from a small number of banks. Early in their life, firms have little ability to show their worth and hence find it difficult to access capital markets. Banks fill in this gap by gathering information which is not as easily gathered by the market. Upon granting the first loan, the bank continues monitoring the

firm and learns about it. This will make the decision to lend again to the firm easier. From this perspective, the longer the relationship between the firm and the bank the more valuable it is and therefore the lower the firm's incentive to initiate a new relationship. This is consistent with Diamond (1984) delegated monitoring theory which suggests that exclusive lending relationships minimize loan rates by avoiding duplication of monitoring costs. Results show that there are benefits for firms both in what regards credit availability and cost of funds (see Petersen and Rajan (1994) among others). These results then raise the question of why firms should borrow from more than one bank at earlier stages of their life. The fact is that relying on just one relationship can be costly. Sharpe (1998) and Rajan (1992), among others, predict that firms can reduce interest rates by borrowing from several banks. When the information gathered by the bank cannot easily be transmitted by the firm to other parties, then the firm would pay a lemon's price when approaching other banks as these would question why the firm is not getting funding from its original creditor. Initiating a relationship with a second bank can be the optimal solution to this potential hold-up problem. Another reason for firms to start a multiple relationship is that banks may choose to limit their exposures to poor credit quality firms. These firms, unable to borrow from the incumbent bank will then approach other banks for additional credit. From this perspective, the longer the firm is in financial difficulties, the more likely is that the firm would approach another bank.

The question that Farinha and Santos (2002) raise in their study is why firms start to borrow from more than one bank at some stage of their life. When Portuguese firms borrow for the very first time from the banking sector, nearly almost all of them start by borrowing from just one bank. Yet, in the following years, many firms continue to have a single lender, but others start to borrow from additional banks. This question is particularly relevant for younger firms because their lack of history makes it more costly to establish new relationships. The main methodology used is duration analysis. The median duration of single relationships is shown to be five years. Moreover, the likelihood of a firm substituting a single relationship with multiple relationships is, *ceteris paribus*, larger for firms with more growth opportunities. However, this is not true for firms with more intangible assets, which is used as a proxy for asset opacity. Consequently, data only partially support the hold-up hypothesis, that is, that firms engage in a multiple relationship to protect them-

selves from being locked-in to one bank. Results support, however, the other hypothesis that banks refuse to increase their exposure to lower-credit-quality clients and force them to approach alternative banks as multiple relationships are more likely to be initiated by less profitable firms and firms with past-due loans.

The duration analysis is complemented with a regression analysis to identify some ex post firm effects of going from a single to multiple bank lending relationships. The firm specific variables included in the regressions are a measure of the investment rate, total leverage, the share of bank debt on total assets, a measure of cash flows and past-due loans. At first sight, results seem to be more aligned with the hypothesis that it is the incumbent bank decision to stop granting credit to the firm that leads the firm to start borrowing from another bank. Consistent with this hypothesis, it is observed that firms start to perform less well and are more likely to have past-due loans after initiating multiple relationships. Still, it is conceivable that some of the firms that initiated multiple relationships did so to protect themselves from future hold-up costs. To study the plausibility of this scenario firms were split into two groups according to their investment opportunities. Results show that those firms that had higher levels of investment in the period before they initiate multiple relationships do increase their investment afterwards, while the other firms decrease it. This evidence supports the hold-up hypothesis. The authors end up concluding that the two hypotheses could hold simultaneously as they apply to different subsets of the firms that initiate multiple relationships.

Using more recent data, Bonfim et al. (2009) study the relationship between the number of bank relationships and the cost of borrowing. Empirical studies on the impact of the number of bank relationships to the cost of borrowing have mixed results (see Degryse and Ongena (2008) for a recent survey on international empirical findings). In this study, a fixed-effects model is estimated where the cost of debt is the dependent variable. The explanatory variables include the number of bank relationships and a measure of profitability, collateral, leverage, credit risk, debt coverage, size and age. It also includes a vector of time varying variables motivated by the characteristics of the sample period. The sample period corresponds to a time of structural change in the Portuguese banking sector as there were several entries, exits, mergers and acquisitions in the banking sector, as discussed in section 7.2. It is also a time of convergence that led to the participation of Portugal in

the euro area. These developments contributed to the steady downward trend in money market rates during this period. To capture all these time effects the estimation includes a set of time dummies and, in a different specification the 3-month Euribor, the total number of banks granting credit in each year and the GDP growth. Results give support to the hypothesis that the number of bank relationships influences negatively a firm's borrowing costs, that is, one additional bank relationship would decrease the firm's borrowing cost. This effect is larger for larger firms which is consistent with the argument that larger firms have more outside options to finance themselves and, as such, more bargaining power. It is also consistent with the asymmetric information implications in relationship banking literature which states that concentrated lending relationships are crucial to informational opaque firms while of less importance for large firms. Older firms, which have on average a larger number of bank relationships than younger ones benefit more from the diversification in lending sources. Firms with access to non-bank funding sources such as trade credit or bond issuance tend to have lower loan rates. This could be due to the fact that these firms have more bargaining power or that banks find them less risky.

Finally, the impact of bank competition on borrowing costs is also studied. There is a debate in the literature regarding this variable. Boot and Thakor (2000), for instance, argue that bank competition should lead to lower interest rates while Petersen and Rajan (1995) argue in the opposite direction, that is, competition leads to higher interest rates. The rationale behind this is that when banks can break even intertemporally, they are able to charge lower rates up-front, anticipating higher returns in the future when information asymmetry dissolves. Market competition forces banks to break even in every period, and as a result, relationship banking becomes less feasible, leading to high interest rates and limited access to credit for young or financially distressed firms. Hence, Petersen and Rajan (1995) suggest that, for young or financially distressed firms, it is cheaper and easier to borrow from banks in a less competitive credit market. In the baseline regressions, overall bank competition is found to be statistically insignificant in explaining borrowing costs. However, local bank competition may be more relevant than aggregate measures of bank competition. Using a measure of bank competition computed at the district level, the negative impact of bank relationships on bank interest rates is definitively stronger in areas with more intense local bank competition. This effect is valid

for all sizes of firms except for micro firms. It is also more significant for older than younger firms.

The findings of this work are at odds with the predictions that small and opaque firms would benefit more from having less bank relationships. This might be related to the fact that the Central Credit Register allows Portuguese banks to share information about their customers which helps to reduce information asymmetries between borrowers and lenders. In such a setting, both the benefit of the borrower of maintaining an exclusive banking relationship and the rent the lender can obtain from that relationship are reduced.

Evidence on the survival of firms

One of the most robust stylized facts of firm dynamics is that the population of firms undergoes significant changes over time. In general, each period there are many firms entering and exiting an industry; a new firm is smaller than the industry average and grows faster than the industry average; and entrants are more likely to exit than older firms. Although there is some a priori that the dynamics of Portuguese firms is significantly different from the one of other countries, evidence seems not to conform to this idea. In fact, there is evidence that these general stylized facts also hold for Portuguese firms (see Cable and Schwalbach (1991), Bartelsman, Scarpetta and Schivardi (2005) and Mata and Portugal (1994)). In addition, Portugal does not seem to be an outlier in terms of firm size and firm size distribution (see Cabral and Mata (2003) and Bartelsman et al. (2005)). Survival rates of Portuguese firms tend to be increasing in firm size and firm age (see Mata and Portugal (1994), Farinha (2006), Bartelsman et al. (2005) and Geroski, Mata and Portugal (2009)), and the probability of survival is increasing in current size (see Mata, Portugal and Guimarães (1994)). Hence, although the largest firms in Portugal are certainly smaller than the largest firms in Germany, when looking at small and medium-sized enterprises, it is hard to find a significant difference between Portugal and other OECD countries.

There is a large literature aiming at explaining why some firms survive and grow healthy while others stagnate and die. Several types of reasons help explaining the survival of firms. One can consider not only the conditions in which the firm is born but also the current conditions of the firms to study the probability of survival, as both may have a substantial effect on its performance. In both cases,

these conditions may relate to environmental factors, such as macro-economic conditions or industry characteristics, and firms' strategic decisions concerning, for instance, firm size and investment in R&D. This issue of survivorship is particularly relevant to the assessment of financial stability as when firms default, their creditors, namely banks, also suffer losses. However, this does not mean that firms should be protected from failing and exiting. In this regard, two considerations are at stake: first, a firm may be temporarily liquidity constrained and fail, with the distress cost associated to its liquidation process; and secondly, although it is true that the immediate effect of saving a firm from exiting is to save a number of jobs, such policy is detrimental to the entry of new and innovative firms. This turns out to be a significant welfare cost in term of misallocation of resources. In fact, a high turnover rate may be part of a learning process crucial for the development of a healthy competitive industry. In addition, industry turnover also contribute to increase average productivity as more productive firms tend to be the ones that survive longer.

Farinha (2006) empirically tests some of the hypotheses concerning the factors that explain differences in the probability of survival of newly established firms. In particular, it aims at understanding the relative importance of environmental versus firm's specifics characteristics, and if initial conditions and decisions have a relevant impact at birth and during the life of the firm.

The data refers to the period between 1985 and 1998 and comes from three main databases: the Balance Sheet database, the *Quadros de Pessoal*,⁵⁵ and the Central Credit Register. The Balance Sheet database covers mainly accounting data, the *Quadros de Pessoal* database provides information on firms' exit, and the Central Credit Register provides information on bank credits and number of banking relationships. A first result is obtained considering the distribution of firm failures according to the age of the firms at the time of failure. On the unsuccessful firms in this sample, 78 per cent of failures occur during their first five years. This result is in line with a stylised fact of firm survival that most failures occur during the first years of a firm's life.

The methodology used in this work is the duration analysis. In the duration analysis, the variable to explain is the time evolved be-

⁵⁵This is an administrative source that has been constructed by the Portuguese Ministry of Employment since 1982. This dataset considers all firms employing paid labor regardless of industry, size, or legal form.

fore a certain event occurs which is, in this case, the firm failure. In this analysis, the probability that the firm exits at time t is a function of the initial conditions when the firm enters the market and of the changes in these conditions from birth to the current period. Results suggest that smaller firms, those that are less able to pledge collateral, that are more leveraged or that have a large number of relationships have lower chances of survival. The evidence on the effect of GDP suggests that firm's probability of survival is higher when GDP growth is lower. This result could be due to the effect of stronger competitive pressure during booms which could intensify exit. It is also in line with the conjecture that firms do not effectively leave the market when they get into financial distress, but only a few years later. Regarding the question of the relative importance of the impact of initial and current conditions on firms' probability of survival, the results indicate that size, leverage ratio, and number of bank relationships at start-up have a persistent and significant impact on a firms' chance of survival. In addition, the empirical evidence suggests that firms created during periods of expansion are more likely to fail. This result is consistent with the conjecture that in booms a huge number of firms are created but most of these firms have a low probability of success.

In the same context that the conditions in which a firm is born may have a substantial effect on its performance, Geroski et al. (2009) develop a model that enables to test the importance of both founding and subsequent conditions upon the survival of firms. The objective of this work is to estimate the probability that firms exit when they reach a certain age considering explicitly the speed of erosion of the effect of initial conditions. This analysis allows the assessment of the effect of initial conditions, if it is temporary or persists along several periods. The data used is the Quadros de Pessoal database covering the period 1982 to 1995. Using just one database has the advantage of being possible to follow more firms during a longer period of time (when comparing with Farinha (2006)). On the other hand, it has the disadvantage of excluding from the analysis a characterization of the bank credit history of firms and their leverage ratio, among other firm characteristics.

Results suggest that firm strategies, market conditions, and macroeconomic conditions are all important determinants of survival. Large firms, with more human capital, located in concentrated industries with low entry rates, operating during a period of macroeconomic growth are more likely to survive. In general, there is a

clear indication that founding conditions contribute significantly to explain the variation in survival rates, although it is rejected that these effects are persistent.

Finally, Mata, Antunes and Portugal (2007) study the exit of firms from the market distinguishing between bankruptcies and voluntary exits, analysing the effect that credit decisions exert upon these two modes of exit. The data refers to the period from 1995 to 2000 and comes from two sources: *Quadros de Pessoal* and the Central Credit Register. As mentioned, *Quadros de Pessoal* covers all firms employing paid labour in Portugal and allows firms to be followed over time. The Central Credit Register includes the complete credit history of all firms. The identification of voluntary exits from bankruptcies are done taking into account if firms defaulted on their debt obligations.

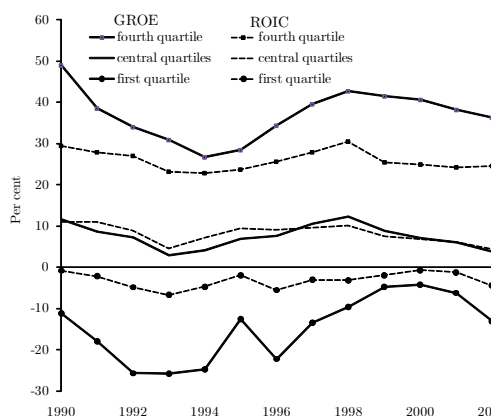
The methodology consisted in estimating a multinomial logit model for the risks of bankruptcy and voluntary exit. Results suggest that larger firms, growing firms and more productive firms have lower probabilities of exiting voluntarily or going bankrupt. In what concerns the number of banking relationships, results suggest that borrowing from more banks lowers the likelihood of voluntary exit if the number of banks is small. However, as firms borrow from more banks, the probability of exiting the market, either voluntarily or by going bankrupt, increases.

Vulnerabilities associated with the indebtedness of non-financial firms

As mentioned, over the past decade a higher level of indebtedness has become a structural feature of non-financial Portuguese firms. On the supply side, the participation of Portugal in the euro area facilitated the access of banks to financing in international wholesale debt markets with lower costs, which allowed banks to accommodate smoothly the increase in the demand for financing of firms stemming from the higher demand prospects for goods and services. Still on the supply side, increased competition among banks contributed to lower the cost of financing of the corporate sector, further contributing to the increase in the indebtedness level of non-financial firms.

However, this evolution could raise some concerns about the ability of some firms to satisfy their debt service. A major driver of firms' ability to pay debt commitments is profitability. In general, more profitable firms should be able to more easily satisfy their debt

Figure 7.65: Distribution of Portuguese firms' profitability — average values for the gross return on equity (GROE) and return on invested capital (ROIC) by quartile of the GROE



Source: Central Balance Sheet of *Banco de Portugal*.

Notes: Average values per year. The gross return on equity (GROE) is equal to the ratio of operating plus financial earnings over equity and reported as continuous lines; the return on invested capital (ROIC) is given by the ratio of operating earnings plus financial revenues over invested capital and reported as dotted lines. The first (fourth) quartile lines corresponds to the average value for firms on the first (fourth) quartile of the distribution of the GROE and the central lines correspond to the average value for firms in both central quartiles of the distribution of the GROE. The analysis excludes firms with zero or negative values for total assets and/or book value of equity. The break in the series corresponds to a change in the set of firms under analysis as discussed in footnote 51.

service then less profitable firms, motivating the analysis of the profitability of the Portuguese corporate sector. Figure 7.65 presents the average profitability of three groups of firms through time. The three groups correspond to the first, the central and the fourth quartiles of firms according to the distribution of the gross return on equity (GROE), which is defined by the ratio of profits before extraordinary items and taxes over equity.

The profitability of Portuguese non-financial firms fluctuated with the business cycle. After peaking at the end of the nineties, it decreased until 2003, having slightly recovered in period from 2003 to 2007. However, for 2008 and 2009, the available data suggest a significant decrease in firms' profitability. The lower profitability of firms for 2009 is mainly due to the rigidities in a considerable part of their operational costs, only partly offset by the fall in banks' lending rates.

The GROE indicator measures a firm's efficiency at generating profits from the capital invested by shareholders, and can be decomposed into two components: operating profitability and financial leverage impact, that is,

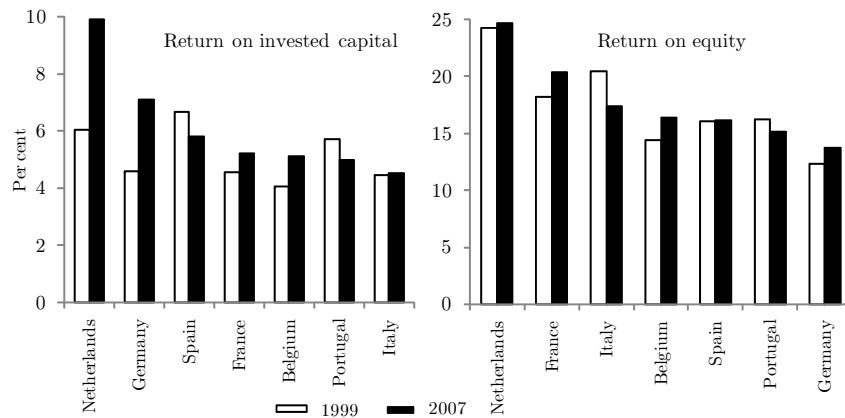
$$GROE = ROIC + \left(ROIC - \frac{Interest}{Debt} \right) \frac{Debt}{Equity},$$

where ROIC (return on invested capital) is a measure of the operating profitability of the invested capital in the firm, Interest / Debt measures the cost of debt and Debt considers the financial debt, that is, the sum of loans and bonds. Whenever the difference between ROIC and the cost of debt is positive, firms benefit from financing their activities with debt, although their risk also increases. The opposite occurs when operating profitability is lower than the cost of debt. For Portuguese firms, it is observed that firms with higher operating profitability benefited from financing their activities with debt, while the opposite was true for firms with lower values for the return on equity indicator. The average cost of debt for these three classes of firms was not significantly different, implying that operating profitability is the main driver of this result. In addition, the average debt to equity ratio for firms with lower profitability is significantly higher. To sum up, firms with less operating profits tend to have more debt, which amplifies the negative effect of using debt. This makes this group of firms more sensitive to fluctuations in the cost of debt and the sales level. In addition, there are restrictions to the indebtedness level of firms, as it is not possible to sustain large disparities between investment and savings levels for a long period of time, in particular in those cases in which operating profitability does not remunerate adequately the invested capital.

The gross return on equity for large Portuguese firms has been higher than for smaller sized firms. This result is robust to different definitions of firms. The comparison between large Portuguese firms with large firms operating in other European countries can be done using information from the European Sectoral references Database. The profitability of the median large Portuguese firm is among the lowest ones for the countries under analysis (Figure 7.66). It is also clear that large European firms benefited from financing their activities with debt.

The interaction between the turmoil in financial markets and the deterioration in the real economy is expected to continue to put downward pressure on the financial situation of non-financial firms,

Figure 7.66: Profitability indicators - international comparison for large European firms



Source: European Sectoral references Database.

Notes: Return on invested capital defined by the ratio of net operating profits over total assets; return on equity defined by the ratio of the profit or loss for the year before taxes over capital and reserves. The values presented correspond to the median firm among firms with annual turnover higher than 50 million euros.

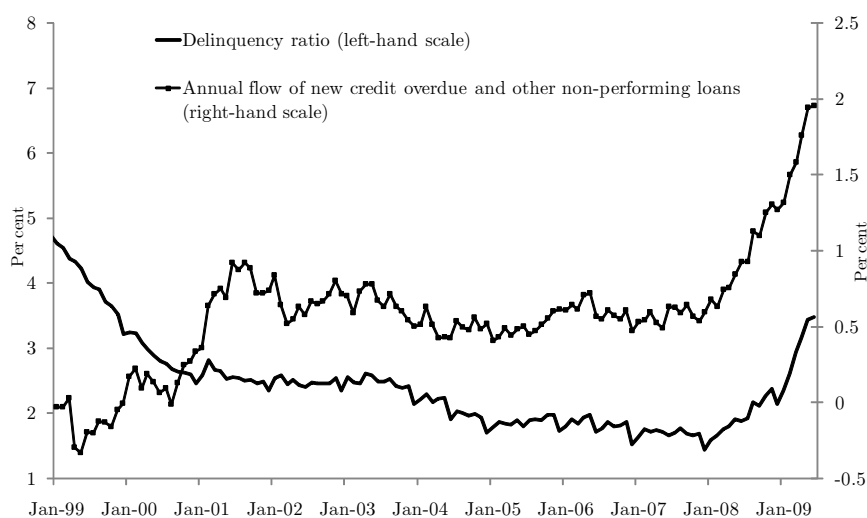
as they try to adjust to the sudden decrease in demand. The recession which started at the end of 2008 had an impact on firm's profitability, which can result in higher credit losses for banks. In fact, overdue credit and other non-performing loans of non-financial firms increased significantly, surpassing the figures recorded in 2003. The annual flow of new credit overdue and other non performing loans also increased significantly (Figure 7.67).⁵⁶ The available evidence suggests that the effects of the current recession will tend to impact not only on small firms but also on larger ones. Hence, although large firms tend to have lower probabilities of default, the effect of the current recession may result in a materialization of de-

⁵⁶The delinquency ratio is defined as overdue payments of capital and interest plus other non-performing loans, as a percentage of the loans to resident non-financial firms corrected for securitisation. The annual flow of new credit overdue and other non-performing loans is presented as a percentage of the loans resident non-financial firms corrected for securitisation. The estimate of the annual flow of new credit overdue and other non-performing loans was calculated by adjusting the variation in the balance of overdue loans and other non-performing loans to write-offs/write-downs, reclassifications and, as from December 2005, sales of overdue credit and other non-performing loans outside the banking system and not written-off from assets, reported on a quarterly basis as per Banco de Portugal Instruction no. 2/2007.

fault of some large firms on bank credits.

As Portugal is a bank based economy, the financing of the financial sector is crucial to the financing of firms and, hence, to economic growth. As such, Portuguese firms are vulnerable to the financing conditions of Portuguese banks in international wholesale debt markets when comparing to the situation that prevailed before the crisis. Notice that this situation seem to have been temporary as, since March 1999, there have been signs that the financial markets are coming back to a normal situation. However, in 2008, the financial turmoil per se seems to have had a limited impact on the availability of financing as the evidence is to the maintenance of a high growth of bank credit to firms. In addition, qualitative information conveys the idea that the main constraint to firms' activity has been a sharp decline in demand prospects, with financial factors still playing a minor role. Finally, in 2009 the supply of bank credit to firms has still increased above the nominal GDP.

Figure 7.67: Default in non-financial firms



Source: *Banco de Portugal*.

Note: See footnote 56 for the definition of the indicators.

7.4 Concluding remarks and main vulnerabilities of the Portuguese financial system

Historically, as in most continental Europe countries, the Portuguese financial system is a bank-based one, in the sense that banks are overwhelmingly involved in the intermediation of savings and gross borrowing requirements of the non-financial private sector. The liberalisation process has not changed significantly this feature, as most of the disintermediation that has been observed (i.e., on the one hand, the rise in mutual funds and pension funds and, on the other, a decline in the importance of bank loans in the financing of firms) remains, to a large extent under the umbrella of universal banking groups. In fact, banks have shareholding control over most of the companies operating in the asset management industry, while they are major holders of securities issued by non-financial corporations.

The banking system that came out of the liberalisation process is a relatively concentrated one, which progressed rapidly into the adoption of productivity enhancing technologies. On average, the banking system operates without wasting a large amount of unnecessary resources, in the sense that, concerning banks with retail operations, there are no signs of large deviations relatively to the industry's best practices in the post liberalisation period. In tandem, the implicit tax borne by the banking system and in most part passed on to the non-financial sector was phased out gradually until the late 1990's. Competition also increased, as reflected in lower margins, after a period of adjustment to privatisation, consolidation and shifts in the control of the major institutions.

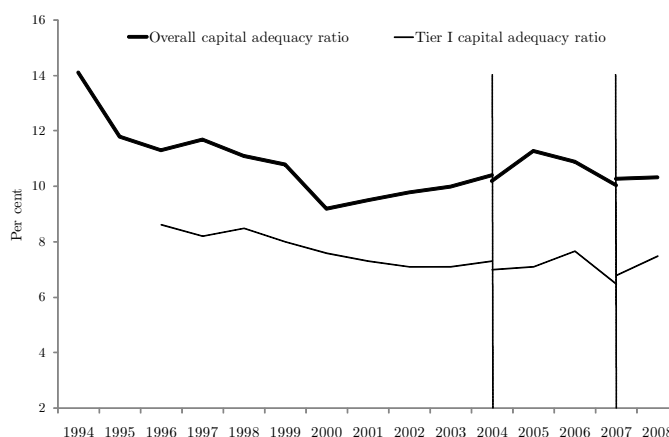
In the run up to EMU, tight monetary policy remained in place, inducing high real interest rates until very late in the nominal convergence process. However, the decline in nominal interest rates represented a reduction in households' and, to a lesser extent, non-financial corporations liquidity constraints. The access to credit improved, allowing for these two sectors to increase steadily their gross borrowing levels. In that period, banks accommodated swiftly the stronger demand for credit by shedding from their balance sheets the large pool of government debt inherited from the period of credit ceilings that prevailed in the 1980's. The liquidity placed with debt certificates issued by Banco de Portugal (created to absorb the excess liquidity associated to the significantly reduction in reserve requirements in 1994) gradually matured from 1996 onwards and also contributed to finance credit growth. Loosely speaking, since the mid

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1990's, there was a significant shift in the asset composition of banks, away from very liquid and low credit risk assets, to loans to the private sector which carry higher credit risk, on average. In 1991/1992, by the time of the lift of the remaining administrative controls to capital flows, to retail interest rates setting and to credit growth, an upgrade of the supervisory infrastructures and instruments was enforced, in line with the international re-regulation process, reflected in EU Directives. The timing of the changes in supervision necessary to tackle the new environment in which banks could take higher levels of risk was crucial to avoid the emergence of a banking crisis, a stylised fact characterising earlier liberalisation episodes in many OECD countries.

The participation in the euro area, represented a move to a regime with low and less volatile nominal and real interest rates, implying a higher equilibrium level of gross borrowing among private economic agents, alongside a perception that lower liquidity constraints would prevail inter-temporally. The higher demand for credit was accommodated by Portuguese banks by being active in all segments of international funding markets, ranging from the interbank market (although to a limited extent), to commercial paper, medium term notes and securitisation. Special care has been dedicated by financial institutions and by the Banco de Portugal in reducing exposure to refinancing risk and in contingent planning for protracted periods of illiquidity in primary debt markets, in particular after the turbulent period those markets faced in the second half of 2002 and early 2003, following the accounting scandals of major US corporations. Securitisation has also been under special monitoring from a supervisory perspective, aiming at ensuring that the adequate level of capital would be required after a securitisation if the originator bank would retain economic risk. This ended up also providing the incentives for the proper assessment of risks when banks granted loans and for the adequate monitoring after securitisation. It should be mentioned, however, that, in a first stage, credit expansion translated into some deterioration in banks capital adequacy ratio. In fact, the capital adequacy ratio declined continuously until 2000 and recovered afterwards (Figure 7.68).

The large share of banks in the financing of households and non-financial corporations and the related importance of loans in the balance sheets of banks accentuates the importance of credit risk in the currently evolving financial crisis, which has already interacted with the economic situation, leading to a pronounced recession. The ex-

Figure 7.68: Capital adequacy ratios of the Portuguese banking system

Source: *Banco de Portugal*.

Note: The series break in 2004 reflects the adoption of the International Accounting Standards, whereas the one in 2007 reflects a change in the sample of institutions covered.

pected more intense materialisation of credit risk adds to the losses banks had already suffered due to the materialisation of market risk. These occurred directly in banks' own portfolios or stemming from the shortfalls in the defined-benefit pension plans of their employees and also through negative impacts on income for market-related services.

The available evidence at the micro level for the household sector allows for the conclusion that the increase in aggregate indebtedness from 1994 to 2000 was mostly achieved by increased access to the credit market of households that previously were not indebted and not by higher indebtedness of previously indebted households (see section 7.3.1). Comparing the situation in 2006 with 2000, higher aggregate indebtedness resulted from both situations, potentially meaning that more risky situations may have arose in the most recent period. In order to assess this one needs to focus on the most vulnerable cohorts of the indebted population, such as the youngest households and those with the lowest income. To the extent that those individuals are more prone to fall into unemployment, or to earn more volatile income, since virtually all mortgage debt is indexed to money market interest rates, they are more vulnerable to cyclical developments and to rises in interest rates. In fact, these cohorts have the highest debt-to-assets ratio and debt-service ratio

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(instalments as a percentage of disposable income), even though the first of these ratios has a hump shape pattern across the distribution of households' income. However, according to 2006 data the number of indebted households in this class of low income is low, for instance, only 6 percent of the households in the first income quartile have a mortgage debt obligation.

Against the background of a severe recession that started at the end of 2008, aggregate default rates have been rising both in the mortgage market and especially in the loans to households for other purposes, reaching levels close to the ones observed in the beginning of the euro area. It should be mentioned, however, that house prices have shown mild nominal rates of growth over the ten years up to 2009. This contrasts with other European countries and the United States where house prices, after having posted very high rates of growth, have been showing sharp downward corrections in these prices. This amplifies banks' losses via either perverse incentives for voluntary default (in the cases the allowed by the legal regimes) or difficulties for banks to recover the full debt value in case of repossession. Further, the use of personal guarantees (usually from parents or other relatives) on top of the real estate collateral is a common practice in Portugal when banks grant a loan to young households with more uncertain income. This fact, while facilitating home-ownership of this segment of the population with recourse to debt (alongside a dysfunctional rental market), provides banks further security to the timely payment of instalments. Survey data allows also to conclude that most credit granted for other purposes other than houses is secured against the good purchased, the most common being cars. Moreover, the high average spreads charged by banks in the consumer loans segment serve as the first buffer to absorb already rising losses in this segment.

Similarly to the household sector, the participation in the euro area, with the associated decline in interest rates and elimination of currency risk, implied a higher equilibrium level of debt of non-financial corporations. A more stable economic environment with increased market opportunities for their goods and services, together with enhanced availability of credit intermediated by banks in international debt markets, are amongst the factors underlying the strong aggregate growth in credit granted to non-financial corporations.

One of the most prominent features of the ongoing recession is the protracted interaction between the financial crisis and the deteri-

oration in the economic activity, leading to the most severe recession in the post second World War period. In fact, the sharp reduction in firms' sales observed since the last quarter of 2008 impacted directly their operating profitability and is expected to continue (see section 7.3.2). Aggregate default rates have already increased to new highs since the beginning of the euro area and are expected to increase further. In addition, micro data shows that in Portugal the more heavily indebted companies in terms of debt-to-equity ratio tend to be those showing the lowest operating profitability. This amplifies the effect of changes in interest rates and sales on the economic performance of these firms. The portfolio of the Portuguese banks is concentrated in a relatively low number of large firms which, as it is the case in the remaining European Union countries, have higher gross return on equity than the smaller sized firms. However, the concentration of the portfolio carries risk in itself since it implies that the default of a small number of large companies may lead to significant losses.

The authorities' response at the international level to the deep ongoing crisis, including changes in the monetary policy framework, sharp declines in interest rates and fiscal packages, in particular those directed to support the economic agents facing more difficult financial situations, have immediate positive impacts on their ability to continue serving their debts. Those initiatives have also included measures to support the banking sector aiming at ensuring that the intermediation of credit would continue to flow to the non-financial private sector. The prompt action by public authorities which was coordinated at the global level is a distinctive feature of the current financial crisis, abating the initial more pessimistic concerns regarding its consequences. However, given the great disparity of the extension of the problems to be solved amongst the banking systems of some of the largest economies, much uncertainty remains about how the business cycle will evolve in the short to medium term.

The evidence available so far allows for the conclusion that Portuguese banks adjusted fairly well to the adverse financial environment both due to the ability to continue financing the economy and to attract equity from investors. On the one hand, Portuguese banks were able to collect substantial amounts of deposits from customers by bidding up their remuneration. Some of these new deposits reflected portfolio shifts of the resident households and were made out of redemptions of mutual funds. On the other hand, the difficulties initially felt by banks internationally in refinancing their debt were

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less pronounced in the Portuguese banks because they were less reliant on short term debt and/or had no commitments to provide funding to securitisation vehicles, as some large European banks did. In addition, in the periods of complete drying up of primary markets for any kind of debt at affordable price, banks were able to mobilise collateral to get direct financing from the ECB. Further, even though a state guarantee is in place and has been partly used, Portuguese banks have continued to obtain funding in wholesale markets, including longer maturities, without such a guarantee. In addition, as opposed to many European banks, the exposure of the Portuguese banks to the complex securities created out of sub-prime loans to borrowers in the United States was negligible. Finally, as referred to above, the idiosyncratic situation in the Portuguese housing market, which in other countries is the focus of amplifying effects between the financial crisis and the economic recession, is not comparable to the one observed in other European countries, which experienced strong growth in prices for a few years, followed by a sharp reduction.

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