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CONTENTS

CONTENTS

Economic Policy and Situation

Articles

Chronology of Major Financial Measures

ECONOMIC POLICY AND SITUATION

Outlook for the Portuguese Economy: 2008-2009

OUTLOOK FOR THE PORTUGUESE ECONOMY: 2008-2009

1. INTRODUCTION

The outlook for the Portuguese economy points to a continuing recovery of economic activity in the 2008-2009 period, accompanied by a decline in inflation to 2 per cent at the end of the horizon. This projection translates into a reduction of the Portuguese economy's net external borrowing requirements, reflecting the reversal of the downward trend of the households' saving rate, as well as the continuing reduction in general government borrowing requirements. The current projections are surrounded by greater than usual uncertainty levels and pose clear downside risks to economic activity, which are, essentially, associated with the international economic and financial environment.

Following 1.2 per cent growth in 2006, the latest estimates point to a 1.9 per cent increase in Gross Domestic Product (GDP) in 2007. The current projection foresees a GDP growth of 2.0 per cent in 2008 and 2.3 per cent in 2009, i.e. close to the values projected for the euro area (Table 1.1 and Chart 1.1). Compared with the previous projections, the growth pace has been revised slightly upwards in 2007 (+0.1 percentage points (p.p.)) and downwards in 2008 (-0.2 p.p.).

Table 1.1

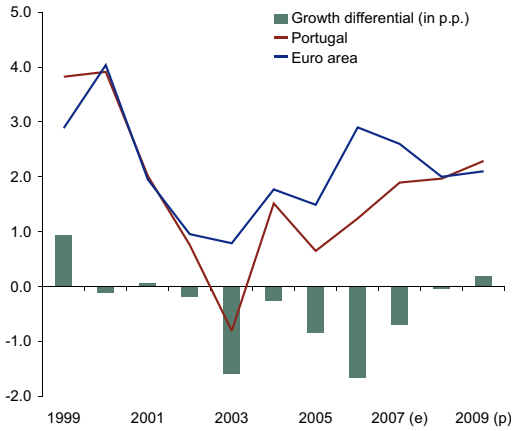
PROJECTIONS OF BANCO DE PORTUGAL 2008-2009
Rate of change, in percentage

	Weights 2006			Current projection		EB Autumn 07	EB Summer 07	
		2006	2007	2008	2009	2007	2007	2008
Gross domestic product	100.0	1.2	1.9	2.0	2.3	1.8	1.8	2.2
Private consumption	65.3	1.2	1.2	1.1	1.6	1.2	1.4	1.4
Public consumption	20.8	-0.7	0.0	0.0	0.4	-0.3	-0.1	0.3
Gross fixed capital formation	21.4	-1.8	2.6	3.3	3.1	2.1	0.6	3.1
Domestic demand	107.9	0.2	1.2	1.4	1.6	1.1	0.8	1.6
Exports	31.1	9.1	7.0	4.9	6.0	6.7	7.2	6.5
Imports	39.0	4.3	4.1	2.9	3.7	3.7	3.4	4.2
Contribution (in p.p.)								
Net exports		1.0	0.6	0.5	0.5	0.6	0.9	0.5
Domestic demand		0.2	1.3	1.5	1.8	1.2	0.9	1.7
of which: change in inventories		0.0	0.0	0.1	0.0	0.1	-0.1	0.1
Current + capital account (% of GDP)		-8.6	-8.2	-7.3	-6.4	-7.7	-7.9	-8.1
Trade balance (% of GDP)		-7.6	-6.7	-6.5	-5.3	-6.2	-5.7	-5.4
HICP		3.0	2.4	2.4	2.0	2.3	2.5	2.3

Note: The central projection for each aggregate is shown (considered to be its most likely value, depending on the set of assumptions in question). As described in Section 7, probability distributions assigned to the possible values of the aggregate may be asymmetrical. Therefore, the probability of observing a value below the central projection may be different from the probability of observing a value above the central projection.

Chart 1.1

GROSS DOMESTIC PRODUCT
Rate of change, in percentage



Note: Figures for the euro area correspond to the midpoints of the projection ranges published in the December 2007 issue of the *European Central Bank's Monthly Bulletin*.

Projections presented in this article rely on a set of assumptions related with the international environment, namely with regard to future developments in interest rates, exchange rates, in the indicator of external demand for Portuguese goods and services and in the prices of several commodities, including oil. In addition, atypically, the current projection incorporates a slight increase of the spread between bank lending interest rates and the three-month EURIBOR interest rate throughout the whole horizon. This assumption seeks to reflect the impact of the global credit risk reassessment, which underlies the turmoil in international financial markets recorded since the mid-2007. It is possible that this situation will spill over to economic activity through a number of mechanisms. However, uncertainty is high when quantifying the respective impact, both in the euro area and in Portugal.

Projections also rely on specific assumptions for the Portuguese economy, namely as regards developments in the main public finance aggregates, in particular the gradual narrowing of the budget deficit throughout the projection horizon.

Similarly to previous business cycles, the acceleration in economic activity in the current cycle requires a significant contribution from total factor productivity. Hence, following a period of weak growth, total factor productivity revealed a stronger growth in 2007, which is likely to continue over the projection horizon, reflecting not only the reorientation of the manufacturing sector to technology-intensive activities, but also a more efficient reallocation of employment within the scope of corporate restructuring processes and the rise in the capacity utilisation rate.

As far as demand components are concerned, the gradual acceleration in economic activity in the 2008-2009 period mainly reflects developments in domestic demand, particularly in business investment and private consumption, as projections point to less buoyant exports than estimated for 2006 and 2007. However, business investment is projected to slow down very slightly in 2009, due to the base effect related to the purchase of air transport equipment in the first half of 2008. When taking this effect into account, projections imply an acceleration in this type of investment (see Section 4 *Demand*). In turn, in 2008 private consumption is likely to grow at a similar pace than that estimated for 2007, notwithstanding the slight acceleration over the year; for 2009, higher growth is projected, reflecting the gradual improvement in labour market conditions and the impact thereof in households'

disposable income. In a context of accelerating real disposable income, the behaviour of private consumption in the projection horizon will bring about a rebound in the saving rate *vis-à-vis* minimum values estimated for 2006 and 2007. As regards exports, the slowdown expected over the projection horizon is mainly accounted for by the expected evolution of the indicator of external demand for Portuguese goods and services. Therefore, the market share will remain, on average, relatively stable.

With regard to the Portuguese economy's net external borrowing requirements, as measured by the combined current and capital account deficit, current projections show a decline from 8.2 per cent of GDP in 2007 to around 7.3 per cent in 2008 and 6.4 per cent in 2009. This evolution chiefly reflects the decline in the trade balance deficit, namely its non-energy component, in an environment where domestic demand is likely to grow less than in the major trading partners. The evolution expected for the trade balance will probably more than offset the deterioration in the income balance in 2008, which reflects developments assumed for interest rates. In addition, the capital account surplus is likely to rise, reflecting the profile assumed for European Union transfers within the scope of the National Strategic Reference Framework (the Portuguese acronym is QREN).

The inflation rate, as measured by the annual average rate of change in the Harmonised Index of Consumer Prices (HICP), is expected to have declined to 2.4 per cent in 2007 (3.0 per cent in 2006). Current projections point to the maintenance of the inflation rate in 2008 at a level close to that estimated for 2007, declining to approximately 2.0 per cent in 2009. The decline in the average inflation rate in 2007 seems to have been largely determined by the energy component, as a reflection of developments in oil prices in euro, in annual average terms. The maintenance of the inflation rate in 2008 at the level recorded in 2007 stems from the maintenance of the growth pace of both energy and non-energy components. The non-energy component is likely to be affected in 2008 by the impact of a significant increase in some processed food prices, already noticeable in the last quarter of 2007. This occurred in a context of contained growth in relevant import prices and accelerating unit labour costs in the private sector, albeit to relatively subdued levels compared with the recent past. In turn, the energy component is likely to reflect the rise in oil prices implicit in futures markets, which will be largely offset by the maintenance of the unit value of the tax on oil products at the 2007 level (as opposed to the increases recorded in previous years) and the more moderate growth assumed for electricity price. The slowdown in inflation to close to 2 per cent in 2009 essentially reflects the evolution of the energy component, with expectations implied by futures markets pointing to some reversal in oil price levels.

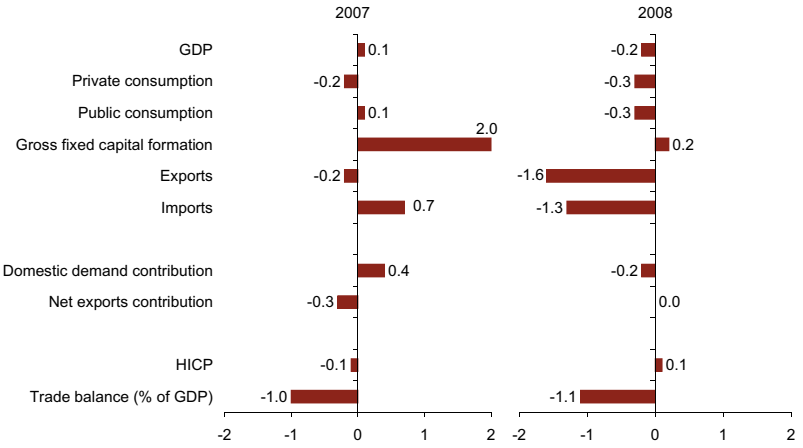
Risk factors and uncertainty underlying the current projection clearly point to the possibility of economic activity growing less than in the central projection (see Section 7 *Uncertainty and risk analysis*). The global environment has been characterised by turbulence in international financial markets, which brings about a particularly high degree of uncertainty and risk for economic activity. In addition, the possibility of the deceleration in the US economy turning out to be sharper than projected, namely in a context of persisting global macroeconomic imbalances, would tend to deteriorate the international economic environment. Furthermore, it could worsen the current turmoil situation in financial markets, thus reinforcing its impact in real terms. Finally, the deceleration of exports in the course of 2007, although still surrounded by a high degree of uncertainty, entails lower growth in the second half of the year, when compared to that of the main markets of destination of Portuguese exports.

GDP growth in 2007 has been subject to a slight upward revision (+0.1 p.p.) *vis-à-vis* the projection released in the Summer 2007 issue of the Economic Bulletin[1], incorporating a greater contribution from domestic demand, partly offset by a lower contribution from net exports (Chart 1.2). The revision of the composition of expenditure reflects the inclusion of information meanwhile released, namely the quar-

(1) GDP growth has also been revised upwards, by 0.1 p.p., from the Autumn 2007 issue of the *Economic Bulletin*, although expenditure components are closer to the current projection than those released in the Summer 2007 *Economic Bulletin* (Table 1.1.).

Chart 1.2

REVISIONS *VIS-À-VIS* THE PROJECTIONS OF THE 2007 SUMMER ISSUE OF THE ECONOMIC BULLETIN
In percentage points



terly national accounts released by Statistics Portugal (the Portuguese acronym is INE) for the second and third quarters of 2007. According to this information, private consumption and exports performed less favourably than previously forecasted, which has determined a downward revision of the projection for the growth of these expenditure components. By contrast, data on gross fixed capital formation (GFCF) point to higher-than-projected growth, stemming namely from a greater acceleration in construction investment and from the imports of air transport equipment.

For 2008 the current projection includes a downward revision of economic activity growth by 0.2 p.p., reflecting a downward revision of domestic demand and exports. Lower private consumption growth reflects, in addition to the dynamic effects associated with the revision of the 2007 intra-annual profile, a less favourable situation than previously projected for the labour market, characterised by lower net job creation. The revision of exports results from both the revision of external demand indicator for Portuguese goods and services and the dynamic effects stemming from the deceleration that is estimated to have occurred in 2007.

Current projections incorporate a downward revision of the trade balance as a percentage of GDP, of -1.0 p.p. and -1.1 p.p. in 2007 and 2008. This mainly reflects the upward revision of oil prices and the consequent deterioration in the terms of trade, as the downward revision of volume growth projected for exports in 2008 is offset by a similar revision in the imports volume.

In turn, the projection for the inflation rate represents a slight downward revision in 2007 (-0.1 p.p.) followed by a slight upward revision in 2008 (+0.1 p.p.) *vis-à-vis* the projection released in the Summer 2007 issue of the Economic Bulletin. These revisions reflect, on the one hand, lower-than-expected growth in the prices of some non-energy industrial goods in the third quarter of 2007 and, on the other, higher-than-anticipated growth in the prices of some processed food items, related to the latest developments in international markets, whose impact will particularly affect inflation in 2008. Energy goods inflation underwent a limited revision, since the upward revision of oil prices was largely offset by the appreciation of the euro, the maintenance of the unit value of the tax on oil products (compared with the previous assumption of a rise in this tax in early 2008) and by the downward revision of electricity price growth.

2. UNDERLYING ASSUMPTIONS

Current projections are based on a set of technical assumptions with regard to developments in interest rates, exchange rates and commodity prices, made on the basis of information available in financial markets and futures markets up to the beginning of December. The external environment of the Portuguese economy is included through an indicator of developments in external demand relevant for Portugal based on projections for euro area economies, produced by the respective national central banks, as well as on assumptions regarding non-euro area economies, prepared in the context of the December 2007 Eurosystem projection exercise. In addition, specific assumptions for the Portuguese economy were taken into account, namely regarding public finance developments and prices subject to regulation.

2.1. Interest rates and exchange rates

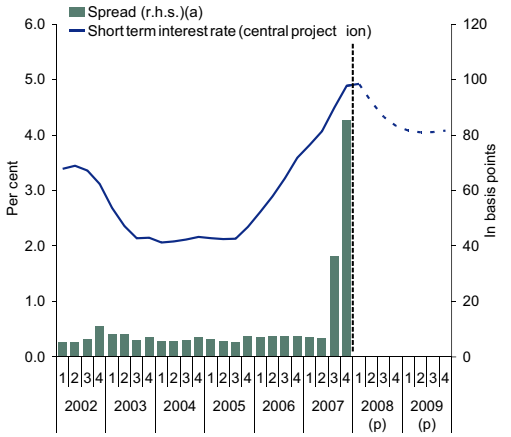
Assumptions with regard to the short-term money market interest rate (three-month EURIBOR) based on expectations implied in financial markets point to this rate's decline in the course of 2008 compared with end-2007, and a subsequent stabilisation in 2009. These expectations incorporated a rather significant risk premium in late 2007, underlined by the money market interest rate spread between collateralised and uncollateralised operations (Chart 2.1.1). In annual average terms, a 0.2 p.p. rise is anticipated for 2008, to 4.5 per cent, as well as a reduction to 4.1 per cent in 2009. Assumptions regarding the long-term interest rate based on nominal ten-year government bond yields are likely to remain close to 4.4 per cent in annual average terms throughout the projection horizon.

Previous projection exercises assumed that bank interest rates would evolve in line with money market interest rates, i.e. a constant spread over the projection horizon was assumed. As a consequence, developments in the economic agents' financing cost would only be conditioned by developments in money market rates. However, in the current context of financial market turmoil, the available information points to an increase of these spreads as from the summer of 2007, namely reflecting a reassessment of private debt risk. The current projection considers a slight increase in the spread between bank lending interest rates (relevant in agents' investment and consumption decision-making) and the money market interest rate as from the second half of 2007. Although this adjustment allows taking into account, to a certain extent, the effect of the rise in the risk premium of the non-financial private sector seen over the past few months (Chart 2.1.2), there is high uncertainty as to the quantitative impact of the ongoing turmoil in financial markets. In particular, it is possible that financing costs increase more than considered and that the availability of credit to the private sector decreases, induced by supply constraints. This would significantly affect the central projection (see Section 7 *Uncertainty and risk analysis*).

According to the technical assumption with regard to exchange rates, these are assumed to remain unchanged at the levels observed in the beginning of December 2007, implying an appreciation of the euro effective exchange rate of 3.5 per cent in 2008 (7.5 per cent against the US dollar), following the 3.9 per cent appreciation in 2007 (9.3 per cent against the US dollar).

Chart 2.1.1

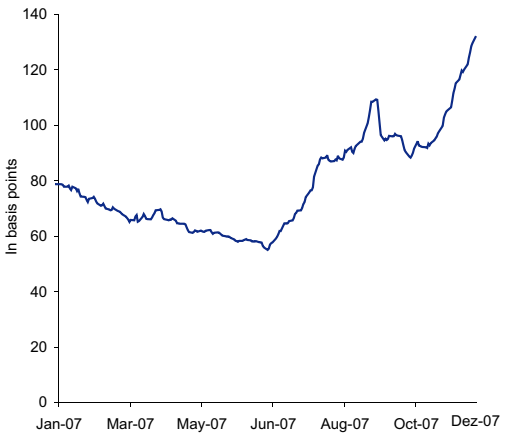
MARKET INTEREST RATES EURO AREA MONEY



Note: **(a)** Spread between 3-month interest rates of uncollateralised operations (EURIBOR) and collateralised operations (EUREPO). For the fourth quarter of 2007, it was assumed that the EUREPO rate will remain at the levels prevailing at the cut-off date of assumptions.

Chart 2.1.2

YIELD SPREADS OF BONDS ISSUED BY NON-FINANCIAL CORPORATIONS



Sources: iBoxx, Thompson Financial Datastream.
Note: Spread between yields on bonds issued in euro by non-financial corporations with BBB rating and yields on Treasury bonds issued by euro area issuers.

2.2. International prices

Developments underlying assumptions about international commodity prices, based on futures markets data, point to a significant increase in oil prices, in annual average terms, from USD 72 in 2007 to USD 89 per barrel in 2008. In 2009, the price of this commodity is projected to decline slightly to around USD 86 per barrel. With regard to non-energy commodity prices in US dollars, data available in futures markets point to a moderate increase, following significant growth in 2007, which reflected, in particular, developments in food commodity prices.

Turning to consumer prices in the euro area, the Eurosystem projections released in the December 2007 issue of the European Central Bank (ECB) *Monthly Bulletin* indicate an annual average rate of change in HICP[2] between 2.0 and 3.0 per cent in 2008 and between 1.2 and 2.4 per cent in 2009, compared to a forecast between 2.0 and 2.2 for 2007. These projections reflect an acceleration in unit labour costs, mirroring higher wage growth for the economy as a whole in comparison to recent years, together with a moderate pick-up in productivity. However, the impact of these developments on inflation shall be partly offset by a slight deceleration in profit margins. Moreover, inflationary pressures arising from developments in energy and non-energy commodity prices are expected to remain high until mid-2008. On the other hand, the unwinding of effects related to the increase in VAT in Germany in 2007 will contribute favourably to inflation developments.

2.3. Economic activity abroad and external demand

The external demand indicator for Portuguese goods and services is based on projections for GDP and import growth in several non-euro area economies. This external environment serves as a basis for projections produced by other euro area national central banks, in the context of the December

(2) The December 2007 Eurosystem projections include Cyprus and Malta as from 2008.

2007 Eurosystem staff macroeconomic projections. Subsequently, the consistency of trade flows of goods and services among all euro area countries was ensured.

Current projections indicate that GDP growth in non-euro area economies will remain robust, albeit decelerating somewhat, from 5.6 per cent in 2007 to 5.2 per cent in 2008 and 2009. These developments reflect the maintenance of a high pace of growth in emerging market economies.

According to the Eurosystem staff macroeconomic projections published in the December 2007 issue of the *ECB Monthly Bulletin*, GDP growth in the euro area is projected to lie between 1.5 and 2.5 per cent in 2008 and between 1.6 and 2.6 per cent in the following year, while GDP growth in 2007 is estimated to have been between 2.4 and 2.8 per cent. These developments are determined by export behaviour, which is affected by the recent appreciation of the euro and increased international competition, and by domestic demand dynamics, namely as regards investment. The latter is expected to be conditioned by the deceleration in world demand and the increase in financing costs. Private consumption growth is expected to remain close to that projected for real disposable income, reflecting mainly developments in real wages.

Taking into account the external environment considered, the indicator of external demand for Portuguese goods and services is expected to slow down slightly from 5.7 per cent in 2007 to 5.4 per cent in 2008, accelerating to 5.7 per cent in 2009.

2.4. Specific assumptions for Portugal

The current projection includes a set of specific assumptions for the Portuguese economy, stress being laid on those related to developments in public finances and subject to regulation prices.

With regard to assumptions on developments in public finances, according to the rule used in Eurosystem projection exercises, account was only taken of the fiscal policy measures already approved or which were specified in sufficient detail and are likely to pass the legislative process. This assumption affects, in particular, developments projected for public consumption, namely as regards the possible impact of the Restructuring Programme for the State's Central Administration (PRACE) and of the reform of public employees' pay, career and employment affiliation schemes. Against this background, real public consumption is assumed to stabilise in 2008 and to increase slightly in 2009, reflecting a reduction in the number of public sector employees, in line with the rule of hiring only one employee per each two leaving service, and a not very significant increase in the volume of intermediate consumption.

Turning to public investment, following a slight decrease in real terms in 2007, a virtual stabilisation of general government GFCF was considered. This perspective results from the expected pattern of transfers from the European Union, which entails the overlap in 2008 of projects still funded by the third Community Support Framework with other projects already covered by the National Strategic Reference Framework.

With regard to indirect taxation, the current projection points to the maintenance of the unit value of the tax on oil products until the end of the projection horizon. The current forecasts also include an increase in the tobacco tax in 2008 and 2009 as well as the impact of the reform on car taxation.

Regarding prices conditioned by administrative procedures, the current projection assumes that these will globally grow in line with the average increase in recent years. It is worth mentioning that the current projection assumes an increase in the price of electricity in early 2008 below that recorded in

2007.[3] In contrast, the increase in prices of public transportation considered in the beginning of 2008 is higher than the one recorded in 2007, in line with what was announced.

3. SUPPLY

The current estimates point to a real GDP growth of 1.9 per cent in 2007. GDP growth is projected to reach 2.0 per cent in 2008 and 2.3 per cent in 2009 (Chart 3.1). The growth in economic activity is chiefly marked by the evolution of GDP in the private sector, as activity in the public sector is expected to decrease slightly in 2008 and in 2009.[4]

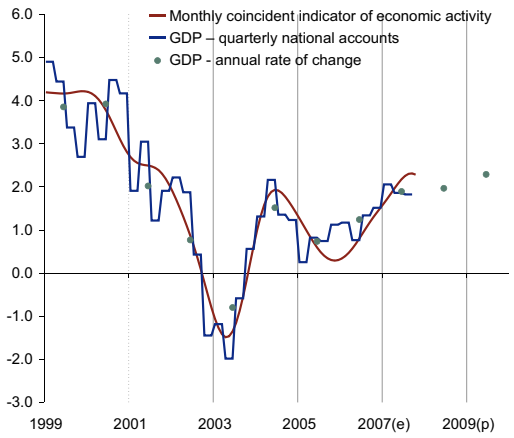
The available information by production sectors for 2007 is still very limited. However, economic activity in the manufacturing sector will probably reflect the behaviour of goods exports and domestic demand, showing a moderate trend both in 2007 and 2008 and some recovery in 2009. Activity in the construction sector is expected to accelerate slightly over the projection horizon, in line with the projected developments in housing and business investment. As regards services, the behaviour of consumption will probably be an important factor, limiting activity in this sector in 2008 and allowing for some recovery in 2009.

The current projection for GDP growth over the horizon is above the available estimates for potential output growth, implying the continued gradual narrowing of the output gap, which is projected to be virtually nil in 2009 (Chart 3.2).

Chart 3.1

DEVELOPMENTS IN ECONOMIC ACTIVITY

Year-on-year rate of change, in percentage

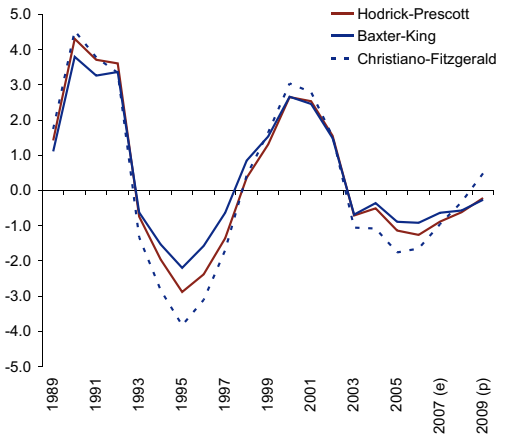


Sources: *INE* and Banco de Portugal.

Chart 3.2

OUTPUT GAP

In percentage points



Note: For further details on the output gap computation methods, see V. Almeida and R. Félix (2006): "*Computing Potential Output and the Output Gap for the Portuguese Economy*", in the autumn issue of the Economic Bulletin of Banco de Portugal.

(3) The increase assumed for the electricity price is based on data published by the Energy Services Regulatory Authority (ERSE, the Portuguese acronym for *Entidade Reguladora dos Serviços Energéticos*).

(4) Output in the public sector corresponds to expenditures in primary factors which are used with the aim of supplying public goods and services, in particular compensation of employees and consumption of fixed capital. Output in the private sector is computed as the difference between total output and output in the public sector, including therefore expenditures in intermediate consumption made by the general government in goods and services that are produced by the private sector.

3.1. Employment

Labour supply has been characterized in recent years by an upward trend in the activity rate, reflecting, among other factors, the growing participation of women in the labour market, the dynamics of demography and the promotion of active ageing through employment retention policies aimed at older age groups. The impact of some of these factors, however, will tend to decline or even unwind, leading to a stabilisation of the participation rate at values close to 74 per cent. This implies that the growth of the labour force over the projection horizon will be lower than the average growth observed in recent years.

After an employment growth in 2006 higher than the one that would be expected given the evolution of economic activity, the estimates point to an employment growth of only 0.2 per cent in 2007, reflecting some reversal of previous year behaviour. The present projection points to an increase of 0.5 per cent in 2008 and of approximately 1 per cent in 2009. This is in line with the recovery profile of economic activity, and against a background where wages are expected to increase, on average, more moderately than in the recent past.

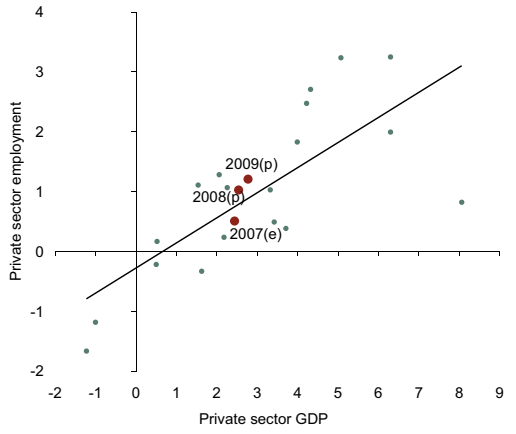
Total employment growth chiefly reflects the development of the private component (Chart 3.1.1), since employment in the public sector is expected to maintain the net downward trend in the number of employees, as already happened in 2006 and 2007, albeit at a much slower pace.

Regarding labour productivity, the estimates contain an acceleration in 2007, after a weak growth in 2006, reflecting the recovery of economic activity, in a context of low employment growth. In 2008 and 2009, productivity growth is projected to be close to the average recorded in recent years.

Chart 3.1.1

EMPLOYMENT AND ECONOMIC ACTIVITY IN THE PRIVATE SECTOR

Rate of change, in percentage



3.2. Factors of economic growth

The evolution of investment included in the present projection continues to imply a moderate increase of the capital stock, close to 1 per cent per year, which is similar to the figure estimated for 2007. This developments, in a context of a gradual acceleration of economic activity, imply a slight decline of the capital-output ratio over the projection horizon, similarly to what was seen at the same stage of the previous business cycle. In turn, the capital endowment per worker implicit in the current projection shows some slowdown over the period 2006-2009, which is also somewhat similar to developments seen during the same stage of the previous business cycle (Chart 3.2.1).

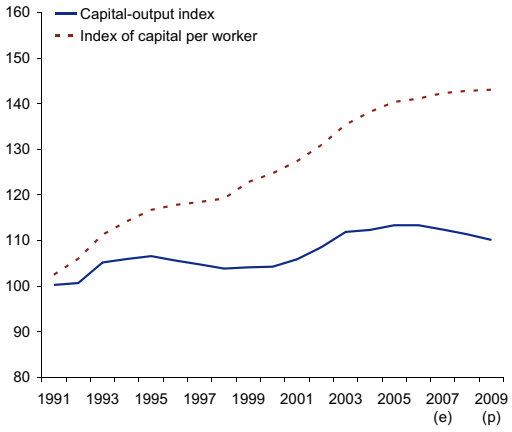
The factors of economic growth of the Portuguese economy may be quantified in the context of an accounting exercise of GDP growth. This exercise, which should not be used to establish a causal relationship among the different underlying factors, splits economic growth into the accumulation of productive factors (in this case, labour and capital) and into its more efficient utilisation, i.e., the increase in total factor productivity. Within this accounting exercise, however, the measure of total factor productivity usually refers to the component of economic growth that is not explained by the contribution of the productive factors explicitly used in the production function. Therefore, total factor productivity is computed as a residual and includes a wide number of elements that are more difficult to gauge, among which the accumulation of intangible assets, advances in production techniques and in labour organisation, changes in the institutional and regulatory framework, and all qualitative changes in actual output factors, in particular developments in human capital.[5] In addition, this measure of total factor productivity is affected by measurement errors in the factors that are actually used.

In a context where the capital stock is projected to grow moderately and where employment growth is projected to increase gradually over the horizon, the rise in total factor productivity is expected to play a key role in explaining economic activity in 2008 and 2009, similarly to what has already occurred in

Chart 3.2.1

OUTPUT, CAPITAL AND EMPLOYMENT

Index 1990=100



(5) The appropriate identification and estimation of the production function is also essential to identify factors of economic growth. For further details on the growth accounting exercise, see Almeida, V. and Félix, R. (2006) "*Computing potential output and the output gap for the Portuguese economy*" in the autumn issue of the *Economic Bulletin*, Banco de Portugal.

Chart 3.2.2

BREAKDOWN OF OUTPUT GROWTH IN THE MOST RECENT PERIOD

Contribution to the rate of change, in percentage points

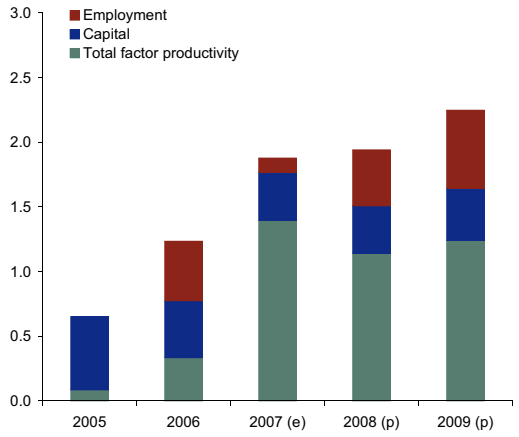
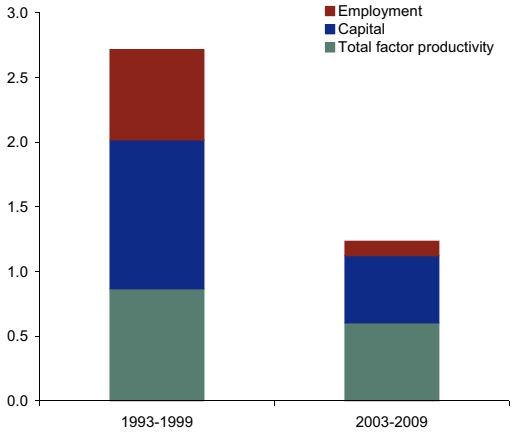


Chart 3.2.3

FACTORS OF OUTPUT GROWTH 1993-1999 VS 2003-2009

Contribution to the rate of change, in percentage points



2007 (Chart 3.2.2). The contribution of total factor productivity to output growth rose from 0.3 p.p. in 2006 to 1.4 p.p in 2007, and is expected to lie, on average, at 1.2 p.p. over the next two years. The increase in total factor productivity, in addition to reflecting the pro-cyclical developments of the capacity utilisation rate, is consistent with the perception that a reshaping of the productive structure is under way.[6] In the exporting sector, in particular, the increased competition in the international goods markets has implied a gradual reallocation of resources to technology-intensive and human capital-intensive products, in response to the participation of new players with low unit production costs and with a pattern of specialisation particularly competitive *vis-à-vis* the more traditional sectors of Portuguese exports. As already mentioned, this process is probably associated with the replacement of less productive firms by firms that are more efficient in terms of resource utilisation, and also with the creation of jobs with higher productivity levels, in the context of the internal restructuring of firms.

The comparison of the average contributions of the different factors of economic growth over the periods 1993-1999 and 2003-2009 highlights some significant differences between the stages following the two latest recessive episodes (Chart 3.2.3). Lower GDP growth in the years after the 2003 recession *vis-à-vis* GDP growth in the years following the 1993 recession is chiefly characterised by the lower contribution of the productive factors labour and capital. As regards the capital stock, this reflects a weaker growth of investment in recent years, as well as developments over the projection horizon (see Section 4 *Demand*), in contrast to the high growth rates observed in the period following the 1993 recession.

The contribution of labour over the period following the 2003 recession is also substantially lower than in the period after the 1993 recession. It should be mentioned that it is being assumed a net decline of employment in the public sector over the projection horizon. The contribution of employment in the private sector, however, has also been lower than during the same stage of the previous business cycle.

(6) It should be noted that an increase in the capacity utilisation rate is positively reflected in total factor productivity, as the capital factor is measured by the installed capital stock and not by capital stock effectively used in production.

Finally, the contribution of total factor productivity to economic growth in the period following the 2003 recession is only slightly lower than the one after the 1993 recession. This reflects, in particular, the different evolution seen in the three years after the recession, since the evolution estimated to have occurred in 2007 and projected for 2008 and 2009 is very similar to the one recorded in the same stage of the previous business cycle.

4. DEMAND

4.1. Composition of expenditure

The gradual acceleration of economic activity from 1.9 per cent in 2007 to 2.0 per cent in 2008 and 2.3 per cent in 2009 largely reflects the evolution of the contribution of domestic demand, since the contribution of net exports is expected to decline from 0.6 p.p. in 2007 to 0.5 p.p. in 2008 and 2009. The contribution of domestic demand is projected to be 1.5 per cent in 2008 and to increase to 1.8 p.p. in 2009 (1.3 p.p. in 2007). This increase stems chiefly from the projections for the private sector, as regards both consumption and investment expenditure (Chart 4.1.1).

In the present context of turmoil in international financial markets, risk reassessment and the ensuing increase in banks' financing costs in wholesale markets might be limiting factors of private consumption and investment expenditure, either by the pass-trough of the increase in those costs to the interest rates on bank loans, or by lower availability of credit to the private sector induced by the supply side, which may imply more restrictive financing conditions than those considered in the central projection. In effect, qualitative information collected within the scope of the October Bank Lending Survey points to some tightening of conditions for granting credit to the private sector (see Section 7 Uncertainty and Risk Analysis).[7]

The comparison of the contribution of expenditure components to GDP growth in similar stages of the business cycle highlights some special characteristics of the present stage of economic activity recovery, in terms not only of its dynamics but also of the role of different economic agents as final users of the goods and services produced. The buoyancy of economic activity in the present recovery stage is clearly lower than after the 1993 recession (Chart 4.1.2). As regards expenditure composition, the differences between both business cycles focus on domestic demand, since the annual average growth of exports is much similar in both periods under analysis.[8]

Turning to households, the period following the 1993 recession was characterised by a sustained decline in financing costs and by gradually easier access to credit. This has fostered a strong increase in household indebtedness, which at the time was at substantially lower levels and which contributed decisively to growth of private consumption and housing investment expenditure in the second half of the 1990's. Against a background of increasing interest rates from the end of 2005 onwards and of a relatively high indebtedness level, consumption and housing investment expenditure tend to be constrained in this period.

The period following the 1993 recession was characterised by a significant contribution of public expenditure to GDP growth. In contrast, in recent years, the measures leading to the correction of the general government excessive deficit, although fundamental to ensure compliance with the Stability

(7) On this matter, see Box 1 "Recent turbulence in international financial markets " and the article "The Portuguese banking system in the course of 2007" published in the Autumn 2007 issue of the *Economic Bulletin*, Banco de Portugal.

(8) However, the evolution of exports in the years following the 1993 recession led to a market share loss of 0.6 per cent, in annual average terms, whereas in the period after the 2003 recession the market share loss is approximately 1.3 per cent.

Chart 4.1.1

BREAKDOWN OF GDP GROWTH IN THE MOST RECENT PERIOD

Contribution to the rate of change, in percentage points

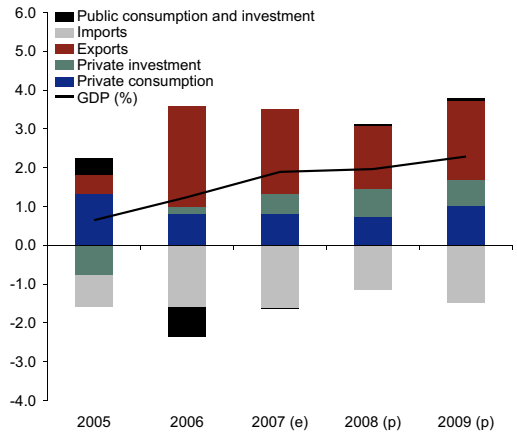
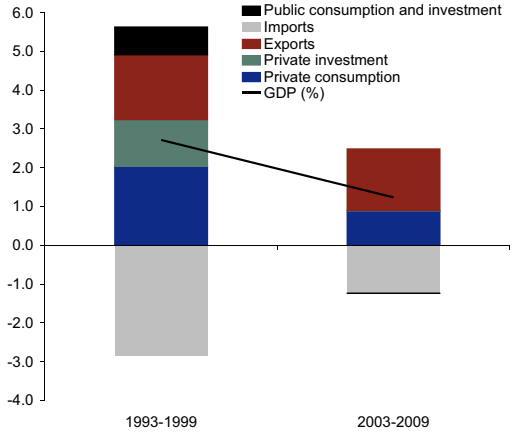


Chart 4.1.2

BREAKDOWN OF GDP GROWTH 1993-1999 VS 2003-2009

Contribution to the rate of change, in percentage points



and Growth Pact (SGP) and sustained economic growth in the long run, have affected the contribution of consumption and public investment to domestic expenditure developments in the short run.

Finally, in the current recovery period, the contribution of business investment has been clearly lower than after the 1993 recession. In the period following the 1993 recession, private investment grew significantly, fostered by an increase in the derived capital stock, namely due to the significant decline in financing costs and more favourable demand prospects. In turn, the successive falls in business investment in the recent past corresponded to an adjustment in capital stock to levels that are more consistent with the prospects for the trend growth of overall demand.

4.2. Private consumption

In 2007, the estimated growth rate of private consumption was similar to that observed in the previous year, 1.2 per cent, below GDP growth rate. The change in private consumption has also been lower than in real households' disposable income. The households' saving rate is therefore estimated to have discontinued the downward trend observed in recent years (Chart 4.2.1). The moderation of households' consumption expenditure over the last two years is associated with the effect of the gradual interest rate increase and the ensuing rise in the debt burden, in the context of relatively high household indebtedness, and with the increase of the fiscal burden, namely indirect taxation.

The present projection includes the maintenance of a moderate pace of growth of private consumption over the next two years, standing at 1.1 per cent in 2008 and at 1.6 per cent in 2009. The projection also points to a gradual recovery of the households' saving rate up to the end of the projection horizon, *vis-à-vis* the minimum values estimated for 2006 and 2007. Taking as a reference for the euro area the averages of the projection ranges published by the ECB in the December 2007 issue of the *Monthly Bulletin*, the increase in households' consumption expenditure in Portugal will be lower than in the euro area up to the end of the horizon (Chart 4.2.2). The developments in private consumption in 2007 are deemed to have resulted from the combination of a significant slowdown in consumption of non-dura-

Chart 4.2.1

CONSUMPTION, DISPOSABLE INCOME AND SAVING RATE

Rate of change, in percentage

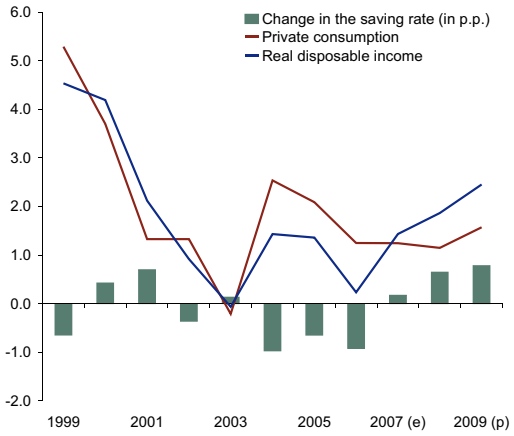
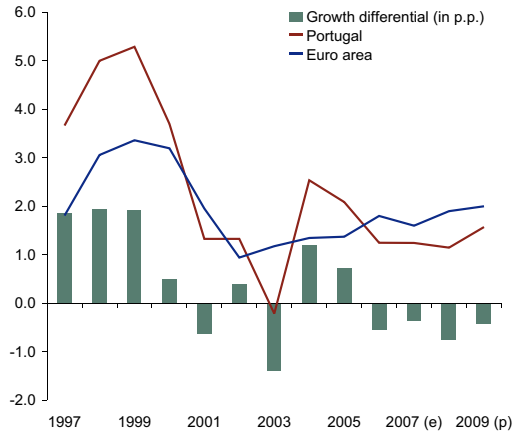


Chart 4.2.2

PRIVATE CONSUMPTION

Rate of change, in percentage



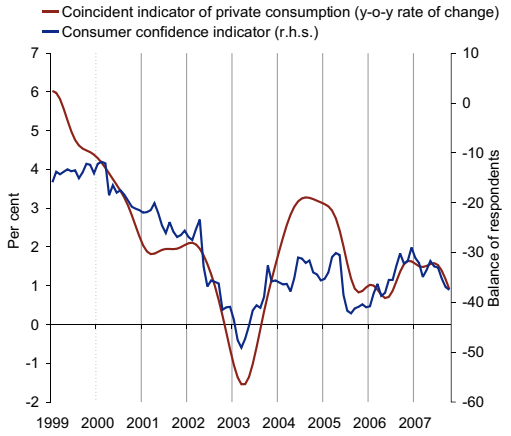
ble goods and of a strong increase in consumption of durable goods. The consumption profile of durable goods over the year was influenced by developments in acquisitions of motor vehicles, which were probably related to changes in taxation on motor vehicles that entered into force in July. The coincident indicator of the trend of private consumption calculated by Banco de Portugal and the consumer confidence indicator of the European Commission point to a downward profile of private consumption in the second half of 2007 (Chart 4.2.3).

Private consumption is expected to grow in 2008 at a similar pace as estimated for 2007, in annual average terms, in spite of the slight acceleration projected during the year. However, the trend of the European Commission indicator on the expected financial situation of households over the next 12 months points to a virtual stabilisation of consumption (Chart 4.2.4). As regards the projected evolution of the main determinants of private consumption, namely real household disposable income, a slight acceleration is expected in 2008.

For 2009, the present projection comprises an acceleration of private consumption, which is associated with increasingly favourable conditions in the labour market, in particular a slight decline in the unemployment rate and higher net job creation, and with an acceleration in real disposable income, to a large extent determined by developments in real wages. Nonetheless, the lagged effects associated with the interest rate hike, in the context of relatively high levels of indebtedness and unemployment, will continue to act as factors dampening households' consumption expenditure.

Chart 4.2.3

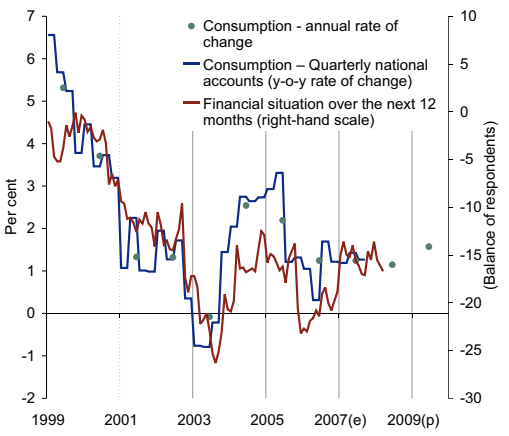
COINCIDENT INDICATOR OF PRIVATE CONSUMPTION AND CONSUMER CONFIDENCE



Sources: European Commission, *INE* and Banco de Portugal.

Chart 4.2.4

PRIVATE CONSUMPTION AND FINANCIAL SITUATION OVER THE NEXT 12 MONTHS



Sources: European Commission, *INE* and Banco de Portugal.
Note: The series on the financial situation over the next 12 months was lagged by 6 periods, i.e. the values correspond to replies submitted six months earlier.

4.3. Gross fixed capital formation

GFCF is estimated to have grown 2.6 per cent in 2007, after successive declines in recent years, which implied a sharp reduction in the share of GFCF in GDP (Charts 4.3.1 and 4.3.2). The breakdown of GFCF by institutional sector reveals a mixed behaviour. On the one hand, business GFCF made an important contribution to this evolution, showing a behaviour in line with the overall industrial confidence indicator and with the assessment of order-book level indicator published by the European Commission (Chart 4.3.3). On the other hand, growth was virtually nil in household housing investment and general government GFCF in 2007.

Chart 4.3.1

BREAKDOWN OF GFCF
Contribution to the growth rate, in percentage points

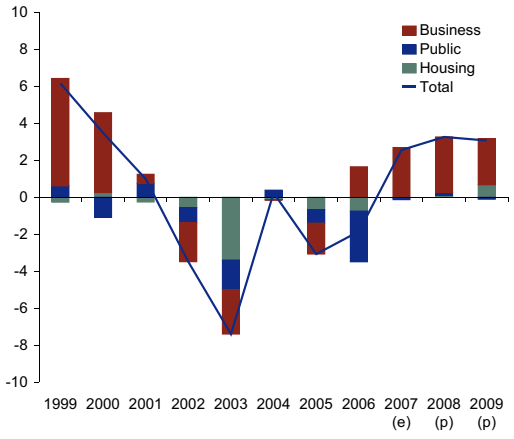


Chart 4.3.2

GFCF BY INSTITUTIONAL SECTOR
As a percentage of GDP

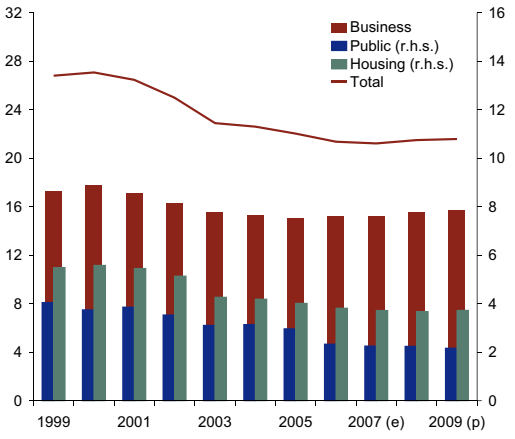


Chart 4.3.3

INDUSTRIAL CONFIDENCE INDICATOR AND INDUSTRY ORDER BOOKS

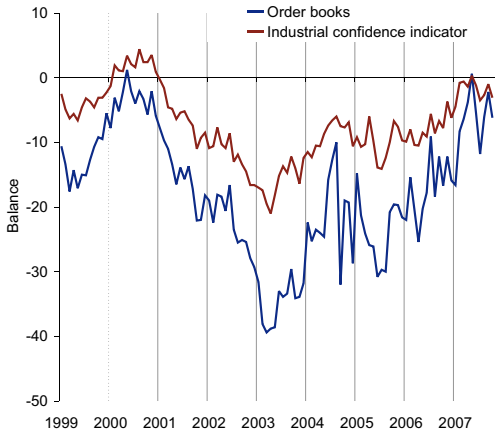
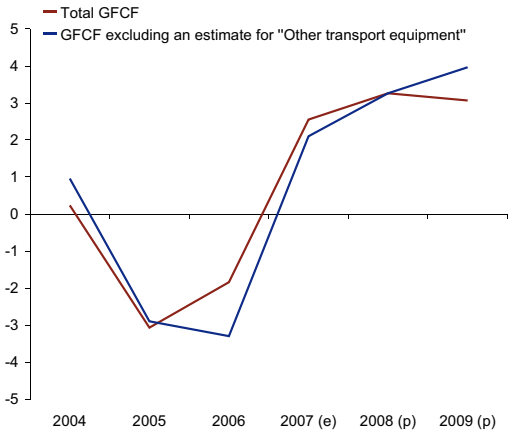


Chart 4.3.4

DEVELOPMENTS IN GFCF

Real rate of change, in percentage



Source: European Commission.

The present projection includes stronger growth of GFCF in 2008 and in 2009, compared with growth estimated for 2007, reflecting the favourable developments projected for household housing investment and for business GFCF, as well as the stabilisation in real terms of the level of the general government GFCF (see Section 2 Underlying assumptions). Therefore, growth of GFCF is projected to reach 3.3 per cent in 2008 and 3.1 per cent in 2009. The slight slowdown forecasted for the end of the horizon is fully due to the fading-out of the base effect associated with the profile of the acquisition of air transport material forecast for 2008, wherefore an acceleration is projected when considering this effect (Chart 4.3.4).

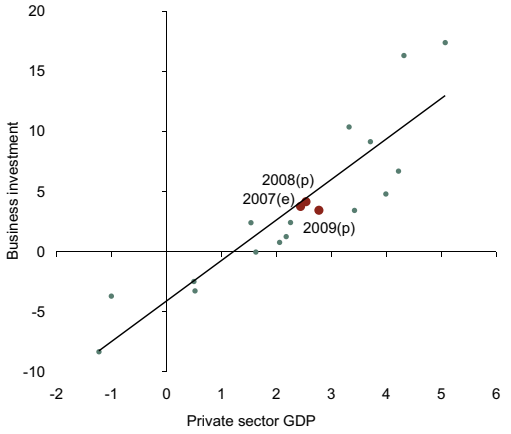
The present projection suggests that business GFCF will play a key role in the recovery of the Portuguese economy, exhibiting a growth clearly above the one of economic activity over the projection horizon and in line with the relationship between this component and private GDP growth (Chart 4.3.5). The improvement in demand conditions observed in 2007 and the favourable developments in the budget consolidation process will probably contribute to the improvement of the level of investor confidence over the projection horizon. The acceleration to 4.2 per cent projected for business GFCF in 2008 also reflects the effect of the acquisition of air transport equipment, concentrated in the first half of the year. A deceleration to 3.5 per cent is forecast for 2009, reflecting the impact of the base effect of the previous year, since available information does not point to further acquisitions in that year.

Stronger GFCF growth, in particular of its business component, is a fundamental condition to ensure a sustained recovery in the economic activity. The behaviour of GFCF in the recent past reflected some deterioration in prospects for demand growth, in the context of uncertainty about the adjustment process of main macroeconomic imbalances. According to latest available data of INE's Investment Survey published in July 2007, the deterioration of sale prospects continues to be the main factor limiting investment, but its importance declined in 2007. In turn, the difficulty in obtaining credit and the interest rate level reveal growing importance, albeit still limited. These factors assume particular relevance in the context of the present international financial markets turmoil which, according to the October Bank Lending Survey, has led reporting financial institutions to tighten credit standards for the approval of loans to enterprises for investment financing in the third quarter of 2007, being a similar tightening expected for the fourth quarter.

Chart 4.3.5

BUSINESS INVESTMENT AND PRIVATE GDP

Annual changes in 1991-2007 and projections for 2008-2009, in percentage



As regards housing investment, a gradual recovery is forecast over the projection horizon, in line with the more favourable developments in real disposable income and with some improvement in labour market conditions and in households' confidence level. However, the evolution of this investment component is probably still influenced by the intertemporal budget constraints of households, due to the significant increase in indebtedness in recent years. Its impact was strengthened by the interest rate increase in the recent past. In this context, the present projection points to growth of housing investment of approximately 0.6 per cent in 2008 and 3.9 per cent in 2009, after 7 years of consecutive declined, that reached around 30 per cent in cumulative terms.

4.4. External trade

In 2007, exports of goods and services are assessed as having contributed very significantly to the pick-up in economic activity, with present estimates pointing to a growth rate of 7.0 per cent. Exports are judged to have continued to be the most dynamic component of final demand, and gains in market share are expected to be higher than in 2006. Nonetheless, this final behaviour was the result of less buoyant exports of goods, which are forecast to decelerate to 5.0 per cent, since exports of services are likely to have continued to evidence very high growth (12.4 per cent). The present projection includes a deceleration of real exports of goods and services to 4.9 per cent in 2008. A growth rate of 6.0 per cent is projected for 2009, in line with the evolution of the external demand indicator. Exports are therefore forecast to slow down *vis-à-vis* their behaviour in the recent past, although continuing to be the most buoyant component of final demand.

The behaviour of exports in 2007 seems to confirm some trends observed in the previous year. Therefore, the structure of exports of goods, in nominal terms, continued to reflect the growing weight of some specific sectors, with stress on "Machinery and equipment". On the other hand, similarly to developments in other countries, exports of services assumed growing importance. Worthy of note in 2007 was the maintenance of strong growth of tourism exports, and also other services, such as those related to transports or to the provision of technical professional services. The growing importance of

this sector is partly explained by the expansion of the international market of services, due not only to the cut in transport and communication costs, but also to possibility that enterprises may adopt a geographical breakdown of their different activities, and may therefore benefit from the comparative advantages of the different countries.

The decelerating profile of exports over 2007, although still subject to high uncertainty, indicates that growth in the second half of the year is lower than in main markets of destination of Portuguese exports. This chiefly reflected less buoyant exports of goods, since exports of tourism and other services continued to reveal high growth. These developments are in line with the indicators made available by the European Commission regarding exports in the industrial sector, which point to a reversal of the upward trend at the end of the year for the indicators of export expectations for the months ahead and assessment of export order-book levels (Chart 4.4.1).

The deceleration projected for exports of goods and services, compared with growth in 2006 and 2007, is mainly explained by the developments in the indicator of external demand for Portuguese goods and services (see Section 2 Underlying assumptions). The market share, in average terms, is expected to remain relatively stable (Chart 4.4.2). In 2008, the evolution of Portuguese exports will continue to be influenced by two additional effects with opposite impact: on the one hand, a deceleration throughout 2007 and, on the other hand, an acceleration of exports of transport material in mid-2008, as a result of the beginning of production of a new model by an important company in the sector. Over the projection horizon, both exports of goods and exports of tourism and other services are expected to reach growth rates closer to the relevant indicator of external demand. In the case of goods, the present projection points to a deceleration in 2008, followed by an acceleration in 2009, whereas in the case of tourism and other services, the projection includes a clear deceleration up to 2009, namely when compared with the very high growth rates reached in 2006 and 2007.

According to the present projections, exports will continue to take advantage of the gradual reconversion process in manufacturing, stimulated by increased competition in international markets, as well as of the gradual redirectioning of resources to market segments with higher technology and human capital content. However, given that the degree of sustainability of Portuguese exports dynamics has not yet been confirmed, the stability of the export market share may not materialise, namely if the pattern

Chart 4.4.1

EXPORTS: ORDER BOOKS AND EXPECTATIONS

Balance

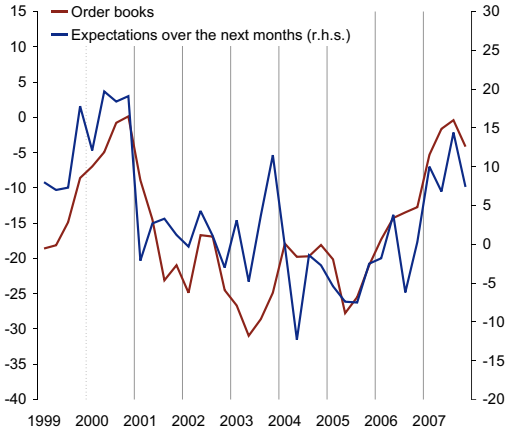
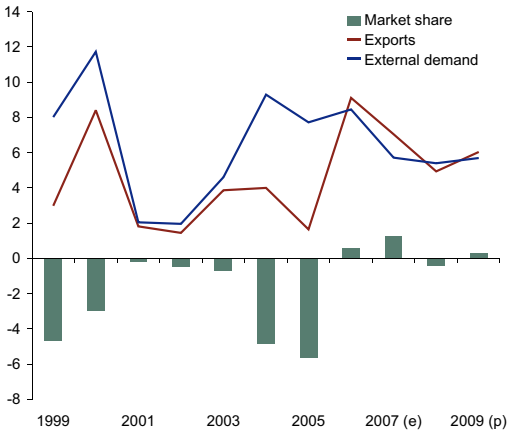


Chart 4.4.2

EXPORTS AND EXTERNAL DEMAND

Rate of change, in percentage



Source: European Commission.

of sharp deceleration of exports in the second half of 2007 assumes a less temporary nature than implied in the present projection. Also, buoyant external demand is not ensured, since the persistence of the present situation of turmoil in international financial markets may lead to the postponement of investment and consumption decisions at a global level and induce lower-than-expected world economic growth. Against this background, the present projection includes some risks and uncertainties, which shall be examined in greater detail in Section 7 *Uncertainty and Risk Analysis*.

Imports of goods and services are estimated to have decelerated to 4.1 per cent in 2007, as a result of the deceleration of imports of services, whereas growth of imports of goods is considered to have remained virtually unchanged. Projections for 2008 and 2009 point to growth rates of imports of goods and services of 2.9 and 3.7 per cent respectively, in line with the projected evolution of the weighted final demand indicator (Chart 4.4.3). The deceleration in imports in 2008 largely reflects the trend expected for exports and consumption of durable goods. Similarly to developments in recent years, real growth of exports is expected to remain above that of weighted final demand. This implies a sustained upward trend of the rate of import penetration in the national economy (Chart 4.4.4). This trend falls within the scope of growing international economic integration, which tends to imply an increase in the import content of the different components of expenditure in the Portuguese economy. It should be noted that these developments have been particularly sharp in real terms, reflecting the fall in the relative price of imports.

Chart 4.4.3

IMPORTS AND WEIGHTED FINAL DEMAND

Rate of change, in percentage

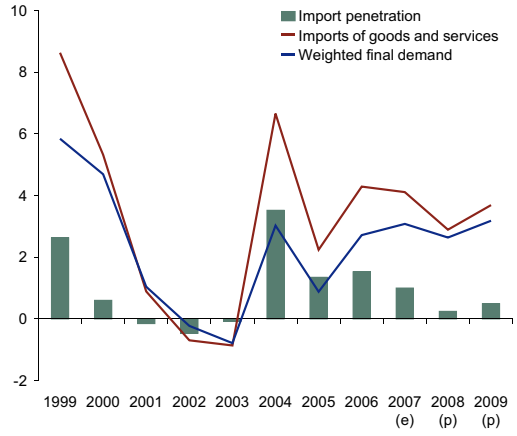
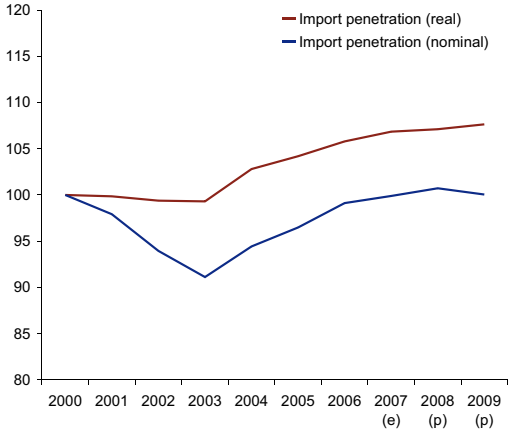


Chart 4.4.4

RATE OF IMPORT PENETRATION

Nominal and real (2000=100)



5. INFLATION

The current projections foresee that the inflation rate in 2008 will remain at the level estimated for 2007, i.e. 2.4 per cent, and that it will decline to 2.0 per cent in 2009 (Table 1.1). These developments will narrow the inflation differential *vis-à-vis* the euro area to zero or close to zero both in 2008 and in 2009, taking as a reference the midpoint of the projection ranges for inflation in the euro area published in the December 2007 issue of the *Monthly Bulletin* of the European Central Bank (Chart 5.1).

In what concerns economic agents' expectations, according to the price trend indicator for the next twelve months included in the opinion surveys of the European Commission, the fall in the inflation rate estimated for 2007 had been anticipated by consumers in the course of 2006. However, it can be seen that as from the beginning of the second half of 2007 expectations were reversed, likely reflecting the impact of both the rise in the price of oil and the increase in the prices of processed food items (Chart 5.2). The indicator made available by Consensus Economics on inflation expectations for the next twelve months is more stable over the whole period, pointing to inflation expectations at levels close to 2 per cent.

The decline in the Portuguese inflation rate to 2.4 per cent in 2007 (3.0 per cent in 2006), largely reflected a strong deceleration of energy prices, as well as a more subdued growth than in the recent past of unit labour costs in the private sector and more favourable developments in the import prices of non-energy goods. The latter are associated with high competition levels resulting from the increasing integration in international trade of economies with reduced unit production costs. The unchanged inflation rate in 2008 reflects a growth pattern of both the energy and non-energy component similar to

Chart 5.1

INFLATION IN PORTUGAL AND IN THE EURO AREA

Annual average rate of change, in percentage

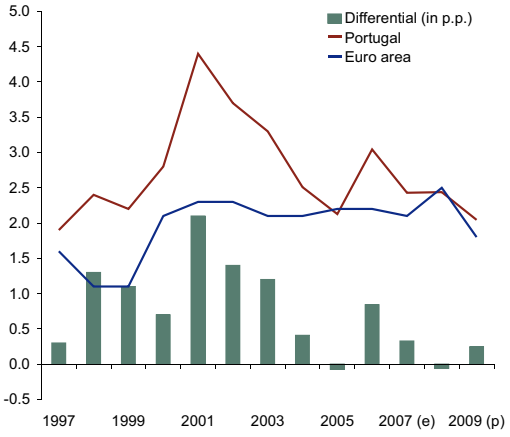
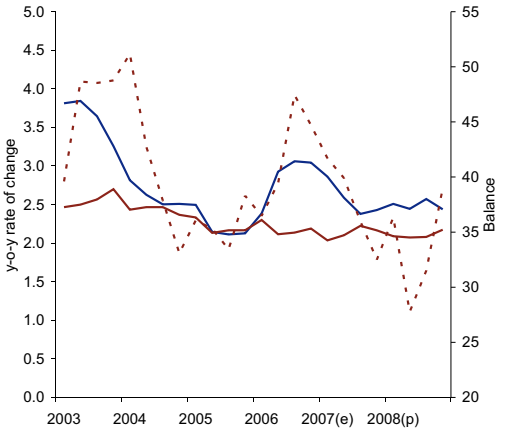


Chart 5.2

HICP AND INFLATION EXPECTATIONS

Percentage year-on-year rate of change and balance of respondents



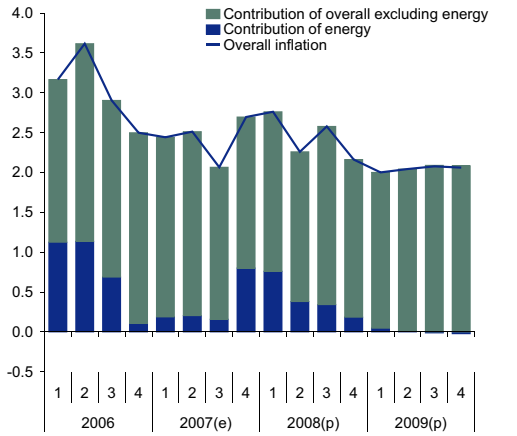
Annual average rate of change in the HICP at end of quarter, lagged by one year

Consensus (expected inflation for the next year)

Price trends over the next twelve months, quarterly average (right-hand scale)

Chart 5.3

INFLATION AND CONTRIBUTION OF ENERGY
Year-on-year rate of change, in percentage



the one recorded in 2007, while the fall of inflation to around 2 per cent in 2009 basically reflects a deceleration in energy prices (Chart 5.3).

The current projection points to an increase in the non-energy component of the HICP slightly higher than 2 per cent, over the projection horizon, reflecting the growth of import prices of non-energy goods by approximately 2 per cent, in annual average terms, in the 2007-2009 period, in parallel with an increase in unit labour costs in the private sector also close to the same figure. It should be noted that this projection incorporates the rise in food prices in the last quarter of 2007, which will have an upward impact on the inflation rate in 2008, but whose effects shall unwind as from the end of that year.

The growth rate of the energy component of the HICP is expected to remain at around 4 per cent in 2008. These developments comprise opposite effects, with the acceleration assumed for the price of oil in euros (from 0.8 per cent in 2007 to 15 per cent in 2008) being counterbalanced by the assumption that the unit value of the tax on oil products will remain unchanged at the 2007 levels, and that the increase in the price of electricity will be lower than in 2007. The close to zero growth of the price of energy in 2009 chiefly translates the assumption of decelerating oil prices, in line with expectations implied by futures markets.

6. CURRENT AND CAPITAL ACCOUNT

The net external borrowing requirements of the Portuguese economy, as measured by the ratio of the combined current and capital account to nominal GDP are projected to fall from 8.2 per cent in 2007 to 7.3 per cent in 2008 and 6.4 per cent in 2009. With the exception of the income account, developments in the 2007-2009 period result from an improvement in the balance of all major items, in particular of the goods and services account (Chart 6.1).

The reduction of the external imbalance of the Portuguese economy observed in 2007 interrupted the deterioration trend recorded since 2004. This performance resulted chiefly from an improvement in the goods and services account, which more than offsets the widening of the income deficit associated with the gradual deterioration of the international investment position of the Portuguese economy and

Chart 6.1

CURRENT AND CAPITAL ACCOUNT

As a percentage of GDP

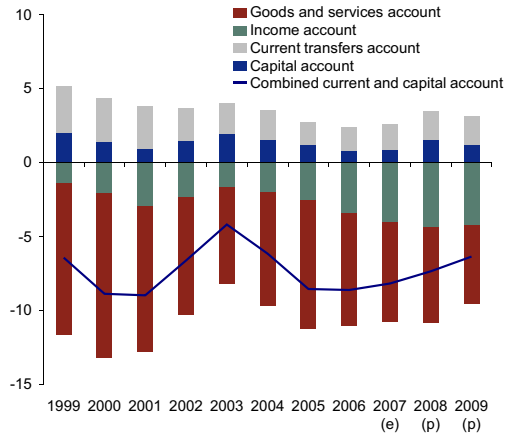
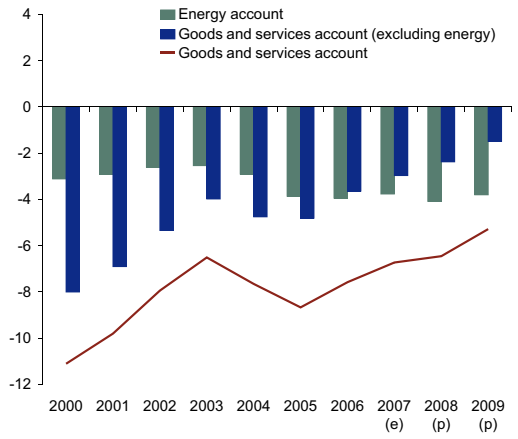


Chart 6.2

GOODS AND SERVICES ACCOUNT AND ENERGY ACCOUNT

As a percentage of GDP



the rise in interest rates. The current projections keep these trends basically unchanged with the income account deficit being projected to widen from 4.1 per cent in 2007 to 4.4 per cent in 2008 and to narrow slightly to 4.2 per cent in 2009, reflecting the assumptions for the evolution of interest rates.

The goods and services deficit is projected to reach 6.5 per cent of GDP in 2008 and 5.3 in 2009, compared with 6.7 per cent in 2007. These developments are associated with the behaviour of the non-energy component of this balance, as the value of trade in energy goods as a percentage of GDP is estimated to remain relatively stable (exhibiting a deficit of approximately 4 per cent of GDP) (Chart 6.2).

According to the current projections, the growth of exports, in volume, will be higher than that of imports, despite a gradual acceleration of domestic demand (see Section 4 *Demand*), and will translate into a reduction of the external imbalance of the Portuguese economy. In the 2008-2009 period, the terms of trade of the economy are expected to remain broadly stable, in line with the pattern observed in 2007. However, these developments are conditioned by the assumptions concerning oil prices. Excluding energy goods, the current projection assumes the maintenance of some gains in terms of trade over the next two years. This behaviour will reflect not only the impact of the increasing integration in international trade of countries with low unit production costs – enabling the maintenance of moderate developments in import prices of non-energy goods – but also a significant rise in the exports deflator, in a context of gradual reallocation of resources towards market segments with higher human capital and technological content.[9]

As for the combined current transfers and capital account, it is projected a surplus of 2.6 per cent of GDP in 2007, 3.5 per cent in 2008 and 3.1 per cent in 2009. These developments are related to transfers from the European Union to Portugal, which are projected to be particularly high in 2008, due to the concentration in this year of amounts relating to the new financial programming period and to previous financial periods (see Section 2 *Underlying assumptions*).

(9) In this respect see "Box 4.3 *Recent Developments in terms of trade in Portugal*", *Annual Report* 2006, pp.120-123.

7. UNCERTAINTY AND RISK ANALYSIS

The central projection is conditional on the set of assumptions presented in Section 2. The non-materialisation of these assumptions, as well as the potential occurrence of specific factors with a direct impact on the macroeconomic scenario give rise to a number of uncertainty and risk factors. This section presents a quantitative assessment of risks for 2008 and 2009 concerning the growth of GDP and its components, as well as the inflation rate.[10]

The uncertainty and risk factors incorporated in this quantitative assessment result, on the one hand, from the international economic and financial context, which is characterised by strong turmoil in financial markets and by the persistence of global macroeconomic imbalances. On the other hand, this projection also incorporates the risk of a decrease in the market share of Portuguese exports over the projection horizon, in line with the estimated developments for the second half of 2007.

7.1. Risk factors

Against the current international economic and financial background, it is possible to identify two distinct risk factors. The first one results from the situation in international financial markets, which has been characterised by a strong turbulence since July 2007; the second one, is due to a potentially stronger than expected slowdown in the US economy, in a context of persistent global macroeconomic imbalances, in particular in this economy.

Financial market turmoil induced a considerable and abrupt reappraisal of risk by investors. The current projections assume a decline in the short-term money market interest rate in the course of 2008 and a stabilisation in 2009. However, the persistence of financial market turmoil beyond the end of 2007 and a potential reversal of the money market interest rate only in the second half of 2008 may translate not only into additional increases of financing costs, but also into the tightening of credit standards for the approval of new loans and, consequently in the evolution of credit to the private sector.[11] This might affect negatively consumption and investment decisions of economic agents at the global level and induce lower world economic growth than assumed in the central projection, with a negative impact on the external demand for Portuguese goods and services. The reappraisal of credit risk worldwide has been translated into increasing costs of borrowing by banks from wholesale markets, being a potential factor limiting investment, either through the transmission of the increase in borrowing costs to bank lending rates, or through lower supply-driven availability of credit to the private sector. This situation may be passed on to economic activity, but there is high uncertainty surrounding the quantification of this impact both in the euro area, and in Portugal. In this context, it was considered that the financial market situation may determine potentially higher financing costs and less buoyant external demand; in addition, the projections assume downside risks to consumption and investment associated with tighter financing conditions in the domestic market.

The second risk factor associated with the current international economic and financial environment results from a potentially stronger than expected deceleration in the US economy. The future evolution of the ongoing adjustment in the US housing market and the degree of tightening of financing conditions in the mortgage market are likely to be the most immediate conditioning factors of household ex-

(10) The adopted methodology was published in A. Novo and M. Pinheiro (2003) "*Uncertainty and risk analysis of macroeconomic forecasts*", Banco de Portugal, *Working Paper* No. 19.

(11) Qualitative data from the *Bank Lending Survey* for the euro area indicate some tightening of the credit standards for loans to the private sector.

penditure. This aspect is particularly relevant in the present context of strong global external imbalances, which may imply an abrupt adjustment of exchange rates. This scenario of adjustment would tend to increase international financial market turmoil, increasing its impact in real terms. Notwithstanding the high uncertainty surrounding this scenario and its impact on the global economy, if the euro appreciates *vis-à-vis* the US dollar it will probably lead to a loss of competitiveness of the European economies and to lower economic buoyancy in the euro area, which would certainly affect Portuguese exports, since approximately two thirds of these are directed to the euro area market. Moreover, the euro appreciation may also favour goods and services sales of non-euro area economies, to the detriment of exports originating from Portugal. Therefore, an appreciation of the euro in effective terms and a less buoyant external demand have been considered as risks.

Finally, an additional risk factor of this projection is the possibility of losses in the market share of Portuguese exports over the projection horizon, instead of the stabilisation assumed in the central scenario of the current projection. The profile of deceleration estimated for Portuguese exports, throughout 2007, has translated into an increase in the second half of the year lower than the one of our main destination markets. With the data available so far, it is still not possible to assess the nature of these developments and, in particular, their persistence. If this behaviour reflects a more persistent phenomenon, the current projection may not materialise implying a less dynamic export performance.

7.2. Quantification of risk factors

Table 7.2.1 presents a quantitative assessment of the risks previously identified, based on the definition of a subjective probability for the non-materialisation of the technical assumptions and for the potential occurrence of a specific impact that may affect the aggregates included in the projection. In this context, with regard to external risks, it has been considered a probability of 60 per cent of a lower growth of external demand, of an appreciation of the euro and of higher short-term interest rates, for 2008. For 2009, the probability assigned to these risks was of 55 per cent in the case of external demand, while the risks regarding the exchange rate and the interest rate are judged to be balanced. At the domestic level, it has been identified a 55 per cent probability that the outturn of the growth rates of private consumption, investment and exports will fall below the central projection in 2008 and 2009.

Table 7.2.1

SUBJECTIVE PROBABILITIES OF RISK FACTORS

In percentage

	2008	2009
Conditioning variables		
Exchange rate	60	50
Interest rate	40	50
External demand	60	55
Endogenous variables		
Private consumption	55	55
GFCF	55	55
Exports	55	55

Table 7.2.2

PROBABILITY OF AN OUTTURN BELOW THE CENTRAL PROJECTION

In percentage

	Weights 2006	2008	2009
Gross domestic product	*100.0*	66	63
Private consumption	*65.3*	65	64
GFCF	*21.4*	64	65
Exports	*31.1*	63	57
Imports	*39.0*	66	64
HICP		54	54

Chart 7.2.1

GROSS DOMESTIC PRODUCT
Rate of change, in percentage

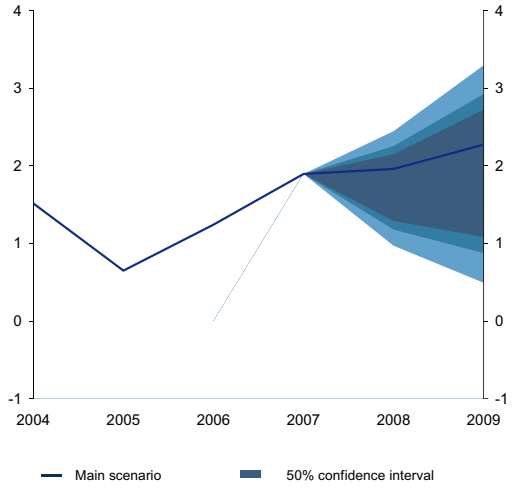


Chart 7.2.2

HARMONISED INDEX OF CONSUMER PRICES
Rate of change, in percentage

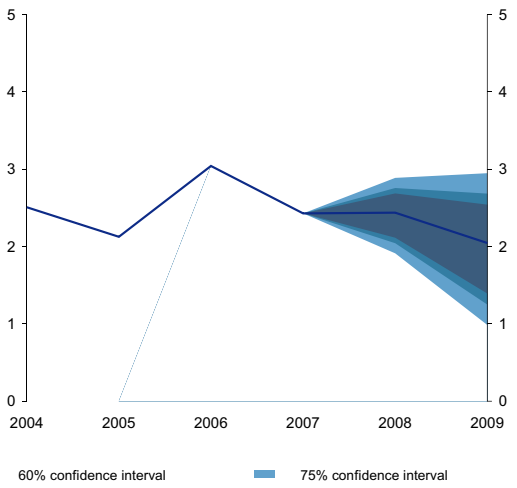


Table 7.2.2 and Charts 7.2.1 and 7.2.2 show the main impacts of the assumed risks over the aggregates included in the projection, namely GDP and its components, as well as the inflation rate. With regard to the projection for economic activity, the quantified analysis of risks enables the identification of a downside risk, i.e. the risks incorporated in the projection point to a probability of 66 per cent of economic activity falling below the central projection in 2008 and of 63 per cent in 2009. This results from the fact that most of the identified risks have direct implications on the final demand components. Turning to the inflation rate, risks are slightly on the downside, reflecting both the impact of the risk of an appreciation of the euro on imported goods prices, and the effect on domestic costs resulting from the possibility of domestic demand being weaker than what has been assumed in the central projection.

8. CONCLUSION

The Portuguese economy continued to exhibit a profile of recovery in 2007, supported by more favourable developments in business investment and robust growth of goods and services exports. On the supply side, these developments seem to have reflected a higher contribution of total factor productivity, explained not only by the increased utilisation of the available productive capacity but also by some corporate restructuring towards the net creation of more productive companies.

In parallel with this gradual recovery of economic activity there has been a correction of some imbalances. In fact, in 2007 the imbalance of external accounts was somewhat adjusted, despite unfavourable shocks related to the significant increase in oil prices and to the rise in interest rates in the past few years, and the process of fiscal consolidation continued, even going beyond the commitments assumed in the Stability and Growth Pact. It should also be noted that the deceleration in private consumption, which had started in 2006, continued into 2007, implying an interruption of the declining trend of households' savings rate observed in the past few years.

The current projections foresee the maintenance of a gradual acceleration process of economic activity and the correction of the imbalances referred above, which will enable growth rates to move closer to those of the other euro area countries, in a context in which inflation will decline to around 2 per cent.

The continuation of the fiscal consolidation process is of particular importance. Following the clearly favourable developments of the past few years, full compliance with the commitments assumed within the framework of the Stability and Growth Pact, namely the achievement of the medium-term objective of a structural deficit of 0.5 per cent by 2010, will contribute to the definition of a macroeconomic regime oriented towards stability, with positive consequences on economic growth over the medium term.

However, the current projections are surrounded by a significantly higher degree of uncertainty than usual. The year 2007 was marked by an abrupt shift in risk perception by investors at international level, whose effects on economic activity are not easy to quantify, due to the non-availability of data on the true magnitude of this phenomenon and to the complexity of the transmission mechanisms involved and of the required solutions. The effects on the Portuguese economy will basically depend on how quickly international financial markets return to normal conditions, on the final magnitude of the reappraisal of the credit risk and on the degree of tightness of credit supply. In addition, a potential higher deceleration in the US economy, in a context of persisting global macroeconomic imbalances, may significantly deteriorate the economic environment worldwide and will tend to strengthen the impact of the turbulence in international financial markets. Therefore, the possibility of a tightening of financial conditions at the global level and a deterioration of the external environment, spilling over to developments in the main markets of destination of Portuguese exports, are clear downside risks for the evolution of economic activity in Portugal over the projection horizon.

ARTICLES

THE WEALTH EFFECT ON CONSUMPTION IN THE PORTUGUESE ECONOMY*[1]

*Gabriela Lopes de Castro***

1. INTRODUCTION

Throughout the 1990s, household wealth in Portugal rose considerably, in parallel with strong growth in private consumption and a fall in the saving rate, from close to 20 per cent in the early 1990s to around 10 per cent at the end of the decade. These developments did not occur solely in Portugal, being referred to in the literature as a common phenomenon in various industrialised economies.[2]

Economic theory, in particular the Permanent Income Theory [Friedman (1957] and the Life-Cycle Hypothesis [Modigliani and Brumberg (1954)], states that household wealth is a key element for determining private consumption. According to these models, private consumption is a function of human wealth, measured as the current value of expected lifetime income, and of financial wealth, corresponding to the stock of assets held by households and the corresponding income. Consumers therefore tend to smooth consumption by taking expected income into account; they borrow while they are young, save throughout their working life and consume accumulated savings during retirement. Any unanticipated rise in (both human and financial) wealth is distributed over the remaining lifetime, raising not only current consumption but also future consumption, the aim being to maintain a relatively stable pattern over time.

Several authors have developed empirical models based on the life-cycle theory, in order to quantify the relationship between aggregate consumption, income and wealth. Some works in this area are worth mentioning, among them, Ludvigson and Steindel (1999), Boone *et al.* (2001), Davis and Palumbo (2001), Mehra (2001), Bertaut (2002), Palumbo *et al.* (2002), Bayoumi and Edison (2003) and Donihue and Avramenko (2006). Most of the literature on this subject shows evidence of a significant effect of wealth on private consumption; however, there is some disparity in the findings, not only as regards the magnitude of the marginal propensity to consume out of the various wealth components, but also as regards values estimated for the same country in different studies.

Understanding the relationship between changes in household wealth and the behaviour of private consumption is crucial to interpret the evolution of the Portuguese economy in the recent past and also to forecast the future. This article aims to estimate the wealth effect on private consumption in Portugal for the 1980-2005 period, by distinguishing two components: housing stock and financial wealth. It will also test for empirical evidence of how financial liberalisation, which took place in Portugal in the early 1990s, impacted on the elasticity of consumption to wealth and income. Finally, an attempt will be made to quantify the effect of rising wealth on private consumption through the 1990s, thereby contributing to a better understanding of the factors underlying the strong consumption growth and the fall in the saving rate over the period under analysis.

* The analyses, opinions and findings of this article represent the views of the author, they are not necessarily those of the Banco de Portugal.

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(1) The author would like to thank Nuno Alves, Mário Centeno, Paulo Esteves, Ricardo Mourinho Felix, Ana Cristina Leal and Carlos Robalo Marques for their comments and suggestions. Responsibility for any errors and omissions remains mine.

(2) See Bayoumi and Edison (2003) and Lusardi *et al.* (2001).

There is virtually no literature relating to wealth effects on consumption in the Portuguese economy. This is largely due to the fact that long and homogeneous series on household wealth have only become available recently. The paper by Cardoso and Cunha (2005) is an important contribution, providing the groundwork for further research in this field of macroeconomic analysis in Portugal.

This article is organised as follows. Section 2 gives a brief description of the role of wealth in private consumption and the various financial and housing wealth transmission mechanisms to household consumption. Section 3 summarises developments in household wealth in Portugal over the past few decades. Section 4 introduces the model used in the analysis. Section 5 discusses the empirical results obtained in the estimation of the long-term relationship and of the dynamic equation of private consumption and describes two exercises structured to quantify the impact of an increase in wealth on private consumption growth. Section 6 summarises the main conclusions.

2. THE ROLE OF WEALTH IN PRIVATE CONSUMPTION

The wealth effect on private consumption is traditionally analysed through life-cycle models based on the seminal work of Modigliani and Brumberg (1954). According to these models, consumption depends on the current and expected income (human wealth) and on the stock of assets held by households and the corresponding income (financial wealth). Accumulation essentially reflects two factors: savings out of current income and asset valuation changes. The main transmission channels usually considered to account for a wealth shock on private consumption are the sale of assets to finance consumer spending and the use of wealth as collateral in borrowing operations.[3] Occasionally, reference is made to an additional transmission channel linked to changes in future income and wealth expectations.

An important factor in this analysis is the nature of wealth: it is not homogeneous, since it consists of various components with different characteristics as regards risk, collateral and liquidity. An important part of the literature distinguishes financial assets from the housing stock and within the former equity wealth is occasionally analysed separately. A number of arguments support such a distinction.[4] First, there are differences in asset liquidity. For example, potential gains in securities, such as bonds and shares, are traditionally easier to realize directly than those from real estate valuation, in particular from an increase in house prices. However, this has been changing in some countries, since it has become increasingly easy to obtain mortgage-backed loans for purposes other than acquisition of a residence, based on potential gains in the housing market.[5] Second, the extent to which consumers view their currently-measured wealth as temporary or uncertain may be different in their consideration of housing wealth and financial asset wealth. For example, the price of some financial assets, for example shares and other equities, tends to be more volatile than house prices, which makes it more difficult to assess whether a change in asset prices are permanent or temporary. Credit institutions/households will therefore be more cautious when lending/borrowing operations are backed by increases in financial asset wealth than when they are backed by increases in housing wealth. Third, house

(3) Where wealth is used as collateral, the effect on consumption largely depends on the development and depth of the financial market.

(4) For more details, see Bayoumi and Edison (2003) and Case *et al.* (2001).

(5) In the case of Portugal and resorting to the ad-hoc question from the Bank Lending Survey of July 2006, the share of loans to households secured by real estate for purposes other than the acquisition of a principal residence is negligible although it increased throughout 2006. According to responses to the question "On the basis of the information available to you, what share of the volume of the outstanding amount of loans to households secured by real estate currently on the books of your bank do you estimate was used for purposes other than the acquisition of a principal residence?", four of the five banking groups included in the sample reported that in relation to loans used for purposes other than the acquisition of a principal residence this share was lower than 10%; only one bank indicated that the figure was between 10% to 20%. As regards the question "How does the share of loans to households secured by real estate contracted over the last 12 months for purposes other than the acquisition of a principal residence compare with the share of such loans in the previous 12-month period?", two banking groups considered that this share was "somewhat higher" and one that it was "considerably higher". The remaining banking groups reported that it was "basically unchanged".

purchase is largely financed with borrowed money, while securities purchases are not. Consequently, an increase in house prices has a potentially higher net return as a percentage of household investment than a corresponding rise in the price of financial assets. Finally, wealth components have different characteristics if one of the reasons for accumulation is to bequest to future generations.

There are empirical results to be found in the literature regarding the estimation of the marginal propensity to consume out of the different types of wealth but they do not provide the basis for a general conclusion on which effect has a larger impact on consumption. For example, Case *et al.* (2001) used a panel data on 14 developed countries for the 1975-1999 period and a series of panel data on the United States for the 1982-1999 period. They concluded that there was a stronger impact on consumption from the housing market for both the United States and the panel of other developed countries than from the stock market. Bayoumi and Edison (2003) also concluded that increases in housing wealth have a stronger impact on consumption than rises in financial wealth. Campbell and Cocco (2005) used microeconomic data for the United Kingdom and found that house prices had an important effect on consumption. In turn, Ludwing and Slok (2002) studied the impact of stock and house prices on consumption based on data from 16 OECD countries. One of the main conclusions was that the long-term impact of stock market wealth on private consumption was approximately twice as much as the impact of changes in housing wealth. These results are far from homogeneous, and general conclusions drawn from them have been contested in recent studies. For example, according to Attanasio *et al.* (2005), Aron and Muellbauer (2006) and Benito *et al.* (2006) there is a correlation between private consumption and the housing market because they both react to common factors, which are not usually considered in this type of analysis.

Some studies conclude that the different findings obtained in estimating the marginal propensity to consume out of wealth relate to specific features of any given country, namely the nature of the financial system. These studies consider two types of economies: bank-based and market-based.[6] In market-based systems, a larger proportion of household wealth is usually made up of financial assets, especially shares, and therefore the distribution and ownership of shares tends to be wider. In countries that are characterised by this type of financial system, it is generally easier for households to borrow against their assets (equity withdrawal), since the financial system is more developed and more financial instruments are available. As a result, it is often stated that the wealth effect on consumption will be stonger in market-based systems than in bank-based systems. In this sense, the marginal propensity to consume out of wealth is likely to increase over time, as financial markets become more developed.

For example, according to Ludwing and Slok (2002) results suggested that stock price changes have a greater impact on consumption in economies with market-based financial systems, than in economies with bank-based systems. Results also suggested an increased impact of the stock market on consumption over time, both in market-based and bank-based economies. Boone *et al.* (1998) presented a study on the impact of stock market fluctuations on consumption for the main OECD countries. They concluded that the effect of the stock market on consumption is stronger in the United States than in the other G7 countries, especially in continental countries in Europe, where there is smaller stock ownership, less equal distribution and later financial liberalisation. Slacalek (2006) also concluded that there was a higher wealth effect on consumption in countries with higher stock market capitalisation.

Finally, it is also important to mention a number of empirical works that study the effect of financial market liberalisation on private consumption, in particular the impact on wealth and income elasticities.

(6) Bank-based economies such as Germany and Japan are characterised by relatively less developed capital markets, in which only a small portion of corporate financing needs are met through the issuance of securities. Companies borrow from banks, which cover their refinancing needs through the central bank. On the other hand, in market-based economies such as the United States and the United Kingdom companies cover most of their financing needs by issuing financial securities (shares, bonds, commercial paper, etc.) directly to investors.

Barrell and Davis (2004) presented an estimation of a consumption function for 7 industrialised countries and concluded that in the wake of financial liberalisation, consumption became less dependent on income and more dependent on wealth. According to Boone *et al.* (2001), financial liberalisation caused the wealth effect to impact significantly on private consumption in the United States, the United Kingdom and Canada, while results for France and Italy are inconclusive.

3. THE EVOLUTION OF HOUSEHOLD WEALTH IN PORTUGAL

This section gives a brief description of the changes in household wealth in Portugal over the past few decades. For a more detailed description and international comparison, see Cardoso and Cunha (2005).

In the course of the 1990s, household wealth rose significantly in a number of countries, largely driven by big asset valuation, often associated with a fall in the personal saving rate.[7] These developments, widely mentioned in the literature, are also suggested by the data on Portugal (Chart 1).

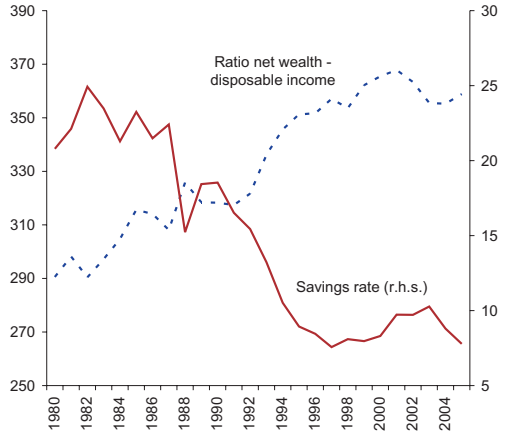
Gross household wealth as a percentage of disposable income has increased over the last 25 years, from around 320 per cent in the early 1980s to around 480 per cent in the most recent period (Table 1). This increase was considerably more marked for financial assets, in particular shares and other equities, implying a significant change in the composition of household wealth. In the early 1980s housing accounted for around 63 per cent of total household wealth, but during the 1990s this trend changed, and now financial assets account for the highest share, i.e. around 56 per cent. Net wealth recorded a considerable increase over that period, despite the big rise in household liabilities, remaining on an upward trend until the late 1990s, followed by relative stabilisation in the most recent years.

This evolution is common to other industrialised economies. In fact, countries such as Italy, the United Kingdom, the United States, Spain and France also saw considerable increases in household wealth

Chart 1

RATIO OF NET HOUSEHOLD WEALTH TO DISPOSABLE INCOME AND SAVING RATE

As a percentage



Source: Banco de Portugal.

(7) For example, according to Lusardi *et al.* (2001), macroeconomic estimates suggested that the rise in wealth through capital gains in the stock market in the United States from 1988 to 2001 implied that personal savings fell by around 3.4 to 4.6 percentage points, i.e. 40% to 50% of the fall decline since 1988.

Table 1

HOUSEHOLD WEALTH AND INDEBTEDNESS
As a percentage of disposable income

	Gross wealth	Financial assets	Of which: Shares and other equity	Non-financial assets	Financial liabilities	Net wealth
1980-1985	321	117	16	204	22	299
1986-1990	346	146	25	200	29	317
1991-1995	374	177	40	197	40	334
1996-2000	437	236	71	201	79	358
2001-2005	477	266	76	211	117	360

Source: Cardoso e Cunha (2005), "Household wealth in Portugal: 1980-2004", *Working Paper* nº 4, Banco de Portugal.

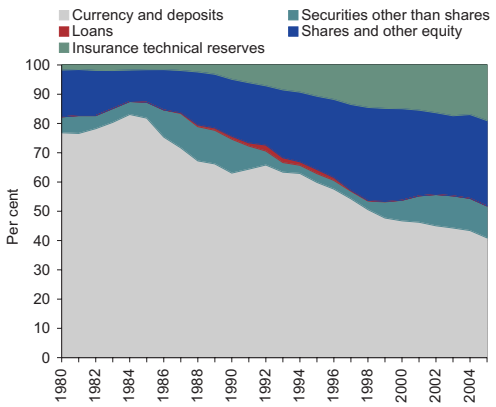
as a percentage of disposable income, particularly in the second half of the 1990s, in both the housing and financial components. In most of these countries, however, as in Portugal, this increase was greater in financial wealth, with a consequent decline in the proportion of the housing component to total assets.

In terms of developments in Portuguese household financial wealth, it is worth mentioning that the shares and other equities component grew markedly, from around 20% of disposable income in the early 1980s to 80% in 2000. [8] The growing importance of shares in the portfolio of Portuguese households was boosted by two factors: firstly, the privatisation process, which started in the late 1980s and gathered momentum in the second half of the 1990s; and secondly, the rise in stock market prices. As for the composition of household financial assets, there has been an increase in insurance technical reserves, above all life insurance and pension funds, since the mid-1990s (Chart 2).

Housing wealth as a percentage of disposable income did not grow as markedly as financial assets, rising from around 200 per cent in the 1980s to 212 per cent in 2005. Housing demand was particularly strong in the second half of the 1990s, a fact which seems to have been associated with a steady decline in nominal and real interest rates and expectations of favourable economic growth. In more re-

Chart 2

COMPOSITION OF THE HOUSEHOLD ASSET PORTFOLIO



Source: Banco de Portugal.

(8) The shares and other equities component includes holdings in investment funds, where fixed income funds are an important component.

cent years, housing investment has fallen steeply, partly induced by intertemporal household budget constraints stemming from high indebtedness levels as a percentage of disposable income.

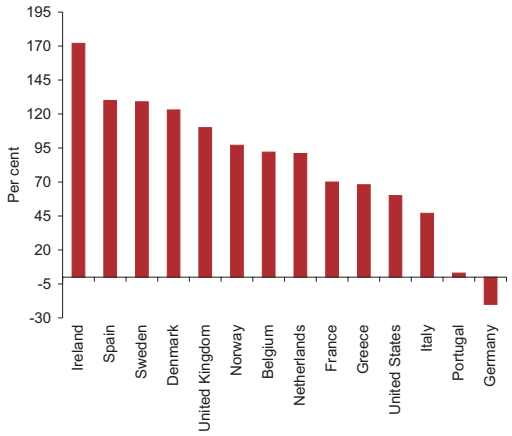
According to the data presented in Cardoso and Cunha (2005) Portuguese households hold the smallest share of housing in their investment portfolio and the lowest ratio of housing wealth to disposable income compared with France, Germany, Italy, Spain, and the United Kingdom. For example, in Spain, France and the United Kingdom, housing wealth as a percentage of disposable income increased between 1995 and 2003 by around 260, 80 and 163 percentage points (p.p.) respectively, whereas the rate in Portugal was 17 p.p.. One of the factors accounting for this result is the big rise in house prices in these countries over the past few years, in contrast to the subdued growth visible in the data available for Portugal (Chart 3).[9]

Additionally, in terms of the financial liabilities of households, the ratio of loans for housing purchase to housing wealth in Portugal (Chart 4) shows that there is a significant increase in the proportion of the housing value that is obtained by recourse to bank loans from the second half of the 90s. This ratio was approximately 5 per cent in the 1980s and increased to around 40 per cent in 2005, which accounts for the sharp downward trend in non-mortgage housing wealth as a percentage of disposable income.

The increase in households financial assets and housing wealth was clearly accompanied by a big rise in indebtedness, i.e. from around 25 per cent of disposable income in the 1980s to around 130 per cent in 2005, at which point it was amongst the highest in the European Union.

Chart 3

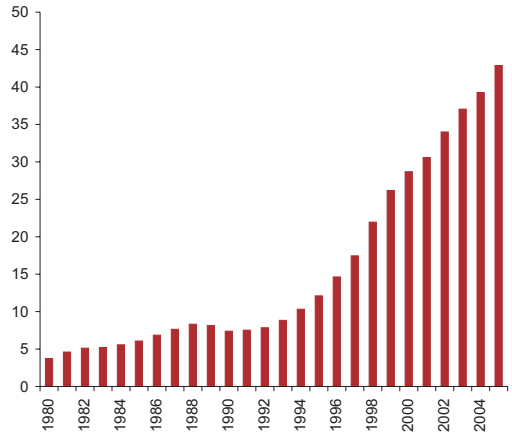
CHANGE IN THE REAL HOUSE PRICE OVER THE LAST 10 YEARS (1996-2006)



Source: Morgan Stanley "Financial innovation and European Housing and Mortgage Markets" July 2007.

Chart 4

LOANS FOR HOUSE PURCHASE
As a percentage of housing wealth



Source: Banco de Portugal.

(9) The series on housing wealth in Portugal detailed in Cardoso and Cunha (2005) was valued using the deflator of gross fixed capital formation in housing, while the series shown in Chart 3 corresponds to the index released by Confidencial Imobiliário. The two series, however, do not in fact differ significantly.

4. THE MODEL

After the article of Hall (1978), most of the literature on consumption considers that decisions relating to it are determined through an intertemporal optimisation process of a representative consumer, with forward-looking behaviour, whose future income is subject to uncertainty. This type of model, which includes the Permanent Income Theory and the Life Cycle Hypothesis, postulates a simple model composed of a consumption function, with labour income and household wealth as determinants. These theories state that consumption is determined according to permanent income, defined as the present value of wealth, including human wealth (labour income) and non-human wealth, usually termed financial wealth (financial assets and housing stock). Hence, consumption varies according to unexpected fluctuations in permanent income, but remains virtually unchanged as a result of transitory fluctuations in current income.

The traditional methodology for an estimation of the wealth effect on private consumption is based on the assumption that there is a cointegration relationship among aggregate consumption (c_t), financial wealth (a_t) and aggregate labour income (y_t), using the following relationship:[10]

$$c_t = \alpha + \beta a_t + \delta y_t + u_t$$

where lowercase letters represent logarithms and parameters β and δ stand for the elasticities of consumption to wealth and income, respectively.[11]

If a cointegration relationship exists between the previous variables, then consistent estimates for β and δ can be obtained using, e.g. the Ordinary Least Squares (OLS) method. The existence of a cointegration relationship is an important property, given that the estimation of the cointegration parameters with OLS is robust to the presence of endogeneity in regressors [see Phillips and Durlauf (1986)]. The section below tests for the existence of a cointegration relationship based on the previous equation and estimates elasticities and marginal propensities to consume out of disposable income and wealth.

5. EMPIRICAL RESULTS

The series used in this study will be found in the quarterly series for the Portuguese economy detailed in the June 2006 issue of the Banco de Portugal Economic Bulletin for the 1980Q1-2005Q4 period and the household wealth series detailed in Cardoso and Cunha (2005).

An important issue widely discussed in the literature is the choice of the consumption series to be used. It is often argued that the definition of consumption implied in life-cycle models is not observable[12], because it includes not only the consumption of non-durable goods and services, but also the services associated with durable goods consumption. In this context, the series on consumption of non-durable goods and services is often used as a proxy, given that in most cases there is no series available for the services associated with durable goods consumption. This study has followed such an

(10) Lettau and Ludvigson (2001, 2004) provide a theoretical justification for the cointegration approach based on the log-linear approximation of consumer's intertemporal budget constraint.

(11) The relationship between consumption, income and wealth is usually estimated with the variables in logs. On the one hand, the variables in question are typically integrated of order 1 and their first difference is integrated of order 0 only in logarithms and not in levels. On the other hand, estimation in levels often gives rise to heteroscedasticity problems.

(12) One of the hypotheses underlying these models is the separability of utility over time, which means that the marginal rate of substitution between two periods is independent from the level of consumption in any other period. This hypothesis excludes at least two important things: the formation of consumption habits and durable goods.

approach, and thus the consumption series used accounts for around 90% of the total consumption of Portuguese households.

The literature on the estimation of consumption functions also discusses which income series should be used. According to economic theory, the figures used should be labour income net of taxes, as in Lettau and Ludvigson (2003). However, disposable income is frequently used as a proxy, given that there is no available series of labour income net of taxes (see for example Bayoumi and Edison (2003)). This study followed this approach.[13]

The household wealth series detailed in Cardoso and Cunha (2005) is available on an annual basis from 1980 to 2004, so it had to be extended until 2005 and disaggregated into quarterly figures.[14] Household wealth series includes financial assets and liabilities and housing. The housing stock results from the application of the permanent inventory method, which consists in the accumulation of gross fixed capital formation (GFCF) in housing at constant prices in a given year and in the application of a linear depreciation. The housing stock is subsequently valued at market prices using the deflator of GFCF in housing. According to Cardoso and Cunha (2005), the lack of information on house purchases in Portugal, especially for more distant years, gives rise to some problems in the use of this deflator in housing stock valuation.[15]

The analysis presented in this study takes into account three measures of wealth: (i) total net wealth, i.e. financial assets and housing net of financial liabilities; (ii) net financial wealth, financial assets net of financial liabilities except loans for house purchase; and (iii) non-mortgage housing wealth, i.e. the housing stock net of loans for house purchase.

Before estimating the long-term relationship, it is important to test for the existence of a cointegration relationship between the consumption of non-durable goods, disposable income and wealth, and to check the order of integration of the series. In order to test for the stationarity of these variables around a linear trend or a stochastic trend, unit root tests were performed to variables in logarithms. The results obtained were consistent with the existence of a unit root in all series (see Annex A).

Since the series used are integrated of order 1, I(1), it is possible to test for the existence of a common trend in these variables.[16] In this context, two types of test were performed, the Shin test, in which the null hypothesis is the existence of cointegration, and the augmented Dickey-Fuller (ADF) test, in which the null hypothesis is the absence of cointegration.

As regards the ADF test, it can be concluded that the null hypothesis of no cointegration can be rejected at a 5 percent significance level in the specification with aggregate net wealth, while in the specification with disaggregated wealth it is no longer possible to reject the null hypothesis at 5%, although a rejection at 10% is quite close (see Annex B). In the Shin test, the null hypothesis of cointegration is not rejected in any of the cases, regardless of the number of leads and lags considered. In this sense, a long-term relationship can be deemed to exist between consumption and its economic determinants, i.e. income and wealth.

(13) The household disposable income account does not enable labour income to be directly extracted, since the share of self-employed is not registered on an individual basis, and is instead included in the item business and property income.

(14) Quarterly figures are obtained by a smoothing process which minimizes the sum of square of their first differences, see Boot *et al.* (1967).

(15) House prices index from *Confidencial Imobiliário* could also be used to value the housing stock. However the evolution is similar to the GFCF housing deflator, so the use of *Confidencial Imobiliário* index is likely to give rise to similar results. It should also be highlight that the way house prices have moved in Portugal over the last decade is quite different from most European countries.

(16) Tests were performed to check for the existence of a cointegrating vector between consumption of non-durable goods and services, disposable income and net household wealth and between consumption of non-durable goods and services, disposable income, net financial wealth and non-mortgage housing wealth.

5.1. Long-term equation for private consumption: marginal propensities to consume out of income and wealth

Table 2 displays the results of the consumption function estimation based on the dynamic OLS procedure proposed by Stock and Watson (1993), in order to obtain efficient estimators.[17] The equations to be estimated may be written as:

$$LP1\,model: pcr_t^{nd} = \alpha + \beta pyr_t + \delta fwr_t + \sum_{i=-k}^{i=k} \beta_i \Delta pyr_{t+i} + \sum_{i=-k}^{i=K} \delta_i \Delta fwr_{t+i} + \varepsilon_t$$

$$LP2\,model: pcr_t^{nd} = \alpha + \beta pyr_t + \eta fwr_t^{hab} + \gamma fwr_t^{af} + \sum_{i=-k}^{i=k} \beta_i \Delta pyr_{t+i} + \sum_{i=-k}^{i=k} \eta_i \Delta fwr_{t+1}^{hab} + \sum_{i=-k}^{i=k} \gamma_i \Delta fwr_{t+i}^{af} + \mu_t$$

where lowercase letters represent the logarithms of the corresponding variables: pcr^{nd} stands for consumption of non-durable goods and services, *pyr* for disposable income, *fwr* for aggregate net wealth, fwr^{af} for net financial wealth and fwr^{hab} for non-mortgage housing wealth. Δ represents the first difference operator. The parameters of the equations above reflect consumption elasticities with respect to income (β), net wealth (δ), non-mortgage housing wealth (η) and net financial wealth (γ). Marginal propensities to consume (MPC), presented in Table 2, were calculated using sample averages of the consumption to disposable income ratio and the consumption to wealth ratio.[18]

Results show that changes in disposable income and net wealth have a positive and significant impact on private consumption of non-durable goods and services. Long-term elasticity of consumption to net wealth is 0.43, according to the aggregate household wealth model, and the marginal propensity to

Table 2

ESTIMATION OF THE LONG-TERM EQUATION FOR CONSUMPTION OF NON-DURABLE GOODS AND SERVICES

	LP1 model		LP2 model		LP3 model
	Elasticity	MPC	Elasticity	MPC	Elasticity
pyr_t	0.64	0.48	0.81	0.61	0.77
	(3.17)		(5.27)		(6.07)
fwr_t	0.43	0.03	-	-	0.32
	(3.08)				(3.01)
fwr_t^{hab}	-	-	0.17	0.02	-
			(3.27)		
fwr_t^{af}	-	-	0.14	0.02	-
			(2.26)		
$pyr_t lib_t$	-	-	-	-	-0.21
					(-3.16)
$fwr_t lib_t$	-	-	-	-	0.05
					(3.58)

Note: A constant was included in the estimation. Estimation period: 1981Q1 to 2005Q4. Equations were estimated using the logs of variables and the "leads and lags" procedure proposed in Stock and Watson (1993). The t-ratios were adjusted according to the Stock and Watson method (1993). The LP1 model is the aggregate net wealth model and the LP2 model is the net wealth model broken down into non-mortgage housing wealth and net financial wealth, which corresponds to financial assets net of financial liabilities excluding housing loans.

(17) This procedure consists in adding leads and lags of the first difference of the righ-hand-side variables to eliminate the effects of regressor endogeneity. T-statistics presented in Table 2 were adjusted according to the Stock and Watson methodology (1993), and can therefore be compared to the standard tables of t-distribution.

(18) The marginal propensity to consume out of wealth can be proxied by the following formula: $\varepsilon = (\Delta PCR/PCR)/(\Delta FWR/FWR) = (\Delta PCR/\Delta FWR) \times (FWR/PCR) = mpc \times (FWR/PCR)$, where ε is the elasticity of consumption in relation to wealth and *mpc* is the marginal propensity to consume out of wealth. This implicitly assumes that the ratio of consumption to wealth is stable throughout the sample period.

consume implied in this estimate is 0.03, which suggests that the effect on consumption of a €1 increase in net wealth is around €0.03.[19]

A separate analysis of the elasticity of consumption in relation to housing wealth and to net financial wealth shows that elasticity is very similar, at 0.17 and 0.14 respectively, and implied responses to a €1 increase in wealth stand at approximately €0.02. The long-term elasticity of consumption to disposable income stands at 0.64 according to the aggregate household wealth model, and the marginal propensity to consume implied in this estimate is €0.48 per euro. In the disaggregated wealth model, elasticity of disposable income is higher, at 0.81, and the marginal propensity to consume is €0.61 per euro.

Although the results in the literature are relatively dissimilar not only as regards the magnitude of the marginal propensity to consume in different countries but also in the same country in different studies, most results point to a significant effect of wealth on private consumption. According to Altissimo *et al.* (2005) the disparity in results cannot be explained only in the light of economic theory; they propose that incomparable measures of wealth may be an important source of differences in the estimates on the marginal propensity to consume out of wealth. In fact, one of the main limitations in these studies is related to the absence of relatively long household wealth series. For this reason, proxies are often used, e.g. the stock market index for financial wealth and the house price index for non-financial wealth.

Notwithstanding these limitations, findings in the literature may act as a reference for figures on the marginal propensity to consume out of wealth in Portugal. First, figures presented in Botas (1999) for Portugal also indicate a value of 0.03. With regard to international comparisons, Slacalek (2006) presented some results for the marginal propensity to consume out of wealth in G8 countries and in some European countries, using the cointegration methodology. Figures obtained ranged between 0.004 (Netherlands) and 0.05 (United States). According to Bertaut (2002), results stand at 0.05 for the United States, 0.04 for the United Kingdom, 0.08 for Canada and 0.05 for Australia. Estimates of Boone *et al.* (2001) were slightly lower, i.e. 0.02 for the United Kingdom and Japan, 0.03 for France and Italy, 0.04 for the United States and 0.06 for Canada. For the United States, additional results regarding the marginal propensity to consume out of wealth may be mentioned: in Mehra (2001) the figure is 0.03, in Davis and Palumbo (2001) it is 0.04, in Ludvigson and Steindel (1999) it is 0.02, and in Palumbo *et al.* (2002) and Donihue and Avramenko (2006) it is 0.04.[20]

In order to analyse the stability of parameters over the sample period, the LP1 model was estimated using the recursive least squares method. [21] Charts 5 and 6 point to a decline in the value of the coefficient associated with disposable income and an increase in the coefficient associated with net wealth in the early 1990s, indicating that the sensitivity of consumption to disposable income and wealth changed over the sample period.

The Portuguese financial system had been subject to tight regulations in the early 1980s and was the subject of far-reaching reforms in the 1990s. Financial deregulation and liberalisation led to important changes in the banking sector stimulating competition, above all through the creation of new financial instruments and a squeeze on the financial intermediation margin. These measures made it easier for economic agents to make use of the credit market.

(19) As previously mentioned, the marginal propensity to consume was calculated on the basis of the average ratio of consumption to wealth. However, considering the average for the past year, a value of approximately €0.03 would be also obtained.

(20) A detailed description of results and the main differences between the above-mentioned papers is beyond the scope of this study. For a detailed discussion of some of this issues see Altissimo *et al.* (2005).

(21) According to the results presented in Table 2 there is no evidence of a significant difference in the elasticity of consumption to the two measures of wealth, and the LP1 model was therefore chosen for the following analysis.

Chart 5

RECURSIVE ESTIMATION OF THE NET WEALTH COEFFICIENT

LP1 Model

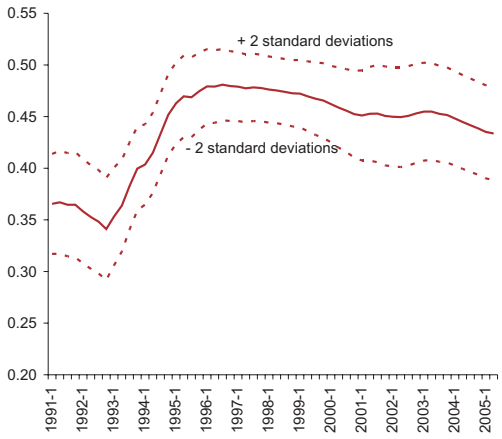
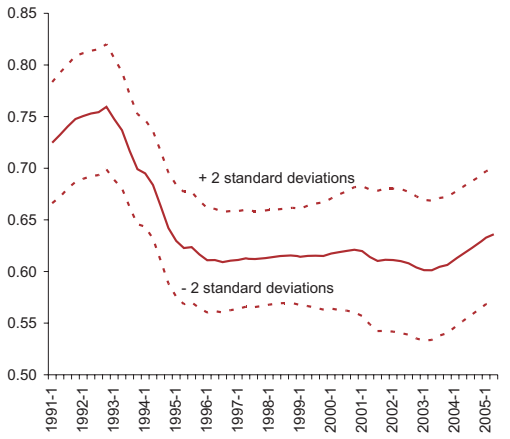


Chart 6

RECURSIVE ESTIMATION OF THE DISPOSABLE INCOME COEFFICIENT

LP1 model



As previously mentioned, some literature on the effect of wealth on private consumption analyses the impact of financial liberalisation on the consumption and wealth relationship. For example, Barrell and Davis (2004) presented a study for the main industrialised economies and concluded that the coefficients of the consumption function should be estimated separately for the periods before and after financial liberalisation. This could be done by reducing the sample period or by introducing additional variables which allow for time-varying coefficients. The LP1 model was re-estimated and a dummy variable was introduced in the coefficients as in Barrell and Davis (2004), allowing the effect of wealth and income on private consumption to vary throughout the sample period. The choice of the dummy variable (lib_t) was based on the implementation date of the main measures in the financial liberalisation process in Portugal (Annex C). The lib_t variable stood at zero before the second quarter of 1990, when credit ceilings became indicative, and at 1, five years later. The transition path is given by a logarithmic trend. The new model to be estimated is given by,

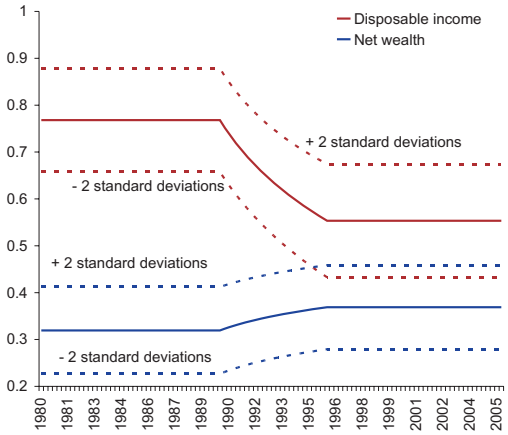
$$LP3\ model: pcr_t^{nd} = \alpha + (\beta + \beta' lib_t) pyr_t + (\delta + \delta' lib_t) fwr_t + \sum_{i=-k}^{i=k} \beta_i \Delta pyr_{t+i} \sum_{i=-k}^{i=k} \delta_i \Delta fwr_{t+i} + \upsilon_t$$

As the financial sector liberalisation occurred in parallel with other major structural changes in the Portuguese economy, the lib_t variable may capture other effects on consumption function parameters such as favourable expectations regarding future developments in the Portuguese economy, associated with Portugal's participation in the euro area and lower interest rate volatility.

Results presented in Table 2 and Chart 7 point to a significant effect (with the expected signal) of financial market liberalisation on the elasticities of consumption to income and wealth. In the case of disposable income, an analysis of the periods before and after financial liberalisation shows that the value of the coefficient fell markedly, by around 0.2. In the case of elasticity with respect to wealth, differences are not so marked, although the lib_t variable is also significant. The results are in line with the notion that financial market liberalisation and the decline in interest rates led to a reduction of liquidity constraints of households, due to easier access to the credit market, thus allowing for a greater smoothing

Chart 7

DEVELOPMENTS IN LONG-TERM ELASTICITY OF PRIVATE CONSUMPTION TO INCOME AND WEALTH



of household consumption throughout the life cycle and a lower dependency of consumption on current income [see Castro (2006)].

Barrell and Davis (2004) also concluded that the behaviour of consumers changed significantly following financial market liberalisation, which led to a greater influence of wealth on long-term consumption and lower dependency on disposable income. In this respect, Ludwing and Slok (2002) and Boone *et al.* (1998) point to greater marginal propensity to consume out of wealth in market-based systems as opposed to bank-based systems, and concluded that the marginal propensity to consume out of wealth increases as financial markets become more developed.

5.3. The dynamic equation of private consumption

This subsection presents the findings for the estimation of the dynamic equation in which changes in consumption are related to changes in disposable income, in wealth, in the long-run deviation calculated on the basis of the parameters estimated in the LP3 model, and in other variables not included in the long run, which may help to explain consumption (Z_t).

$$\Delta pcr_t = \theta(L)\Delta pyr_t + \lambda(L)\Delta fwr_t + \rho(L)\Delta Z_t + \tau\left[pcr - \alpha - (\beta + \beta' lib)pyr - (\delta + \delta' lib)fwr\right]_{t-1} + \nu_t$$

Δ represents the first difference operator, τ measures the speed at which the consumption of non-durable goods and services responds to deviations from long-term equilibrium, and the Z_t vector is a nominal interest rate, which can be seen as an indicator of consumer accessibility to the credit market and may also be an indicator of liquidity constraints.[22]

Table 3 presents the results obtained in the estimation of the previous equation.[23] Coefficients obtained are statistically significant and have the theoretically expected signal. In particular, the coefficient estimated for the error correction mechanism is negative, indicating that consumption gradually

(22) The unemployment rate was also taken into account, but was not significant.

(23) As in Barrell and Davis (2004), the introduction of the lib_t variable was tested in short-term coefficients and in the error correction term. However, it was not significant in any of the cases.

Table 3

ESTIMATION OF THE DYNAMIC EQUATION FOR CONSUMPTION OF NON-DURABLE GOODS AND SERVICES

$Dpcr\_nd_{t-2}$	0.24 (3.51)
$Dpcr\_nd_{t-3}$	0.26 (3.66)
$Dpyr_t$	0.23 (3.75)
$Dfwr_{t-2}$	0.24 (3.12)
$Dstn_{t-3}$	-0.01 (-2.18)
MCE_1	-0.09 (-2.30)
Estimation period	1985Q1-2005:Q4
Standard deviation	0.0048
Number of observations	84
AR 1-5 test	F(5,69) = 0.875 [0.503]
ARCH 1-4 test	F(4,66) = 0.389 [0.816]
Normality test	Chi^2(2) = 2.754 [0.252]
Heteroscedasticity test	F(16,57) = 0.529 [0.920]
RESET test	F(1,73) = 2.998 [0.088]

Note: D represents the first difference of the logs of variables and ECM corresponds to the error correction mechanism.

adjusts to its long-term equilibrium level. Short-term coefficients estimated for disposable income and wealth suggest that consumption responds contemporaneously to changes in income and with some lag to changes in wealth. Finally, changes in nominal interest rates are also important to explain consumption variations.

5.3. Quantification of the wealth effect on private consumption

This section presents two exercises aiming to quantify the effect throughout the 1990s of the increase in wealth on household expenditure in the consumption of non-durable goods and services. The analysis is in part in line with the literature[24] and allows for some interesting conclusions. However, it should be noted that a partial equilibrium model is subject to a number of caveats; the results should therefore be taken cautiously. One of the main limitations of this type of analysis is the impossibility of correctly assessing the importance of a structural shock, given that variables are endogenous and potential feedback effects are ignored.

First, the long-term equation previously estimated with aggregate wealth (the LP3 model) was used to forecast the consumption level in the first quarter of 2000. This calculation was based on actual disposable income and on two alternatives for the evolution of wealth, i.e. its historical value and the level of wealth compatible with the maintenance of the ratio of wealth to disposable income at the level observed in the first quarter of 1990.[25] The hypothesis regarding the evolution in wealth indicates that between 1990 and 1999 it grew in real terms at an annual average rate of 3.2 per cent, which compares with the observed 4.7 per cent. By comparing the simulation results with the historical and the alternative measure of change in wealth, it is possible to quantify, albeit in a simplified and merely illustrative form, the "wealth effect" on consumption throughout the 1990s. The exercise implies an impact of the "wealth effect" of around 1 p.p. on the annual average growth of consumption of non-durable goods

(24) See Mehra (2001), Davis and Palumbo (2001) and Bertaut (2002).

(25) This hypothesis is mostly equivalent to considering the average value of the ratio of net wealth to disposable income between 1981Q1 and 1989Q4.

and services in the 1990s. According to this exercise, the exceptional increase in net wealth with respect to disposable income growth partly explains the strong private consumption growth and the decline in the household saving rate.

In order to analyse the contribution of wealth in each year to the growth in private consumption of non-durable goods and services, the annual rate of change of consumption was decomposed into the contributions associated with the explanatory variables. The model used was the dynamic equation estimated in the previous sub-section.

The contribution of variable X to consumption growth C_t^X in period t,can be computed as:

$$C_t^X = \sum_{j=0}^{J} \Phi_j^X X_{t-j}$$

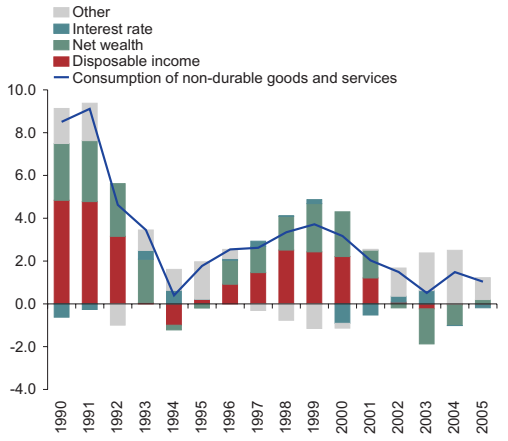
where X_{t-j} is the change of the explanatory variable in period t-j and Φ_j^X is the impact on consumption growth j periods after a 1% shock in variable X in period t.[26]

Some interesting conclusions may be drawn from this exercise (Chart 8). First, wealth seems to have played an important role in private consumption growth in Portugal throughout the 1990s, with a contribution virtually similar to the one from disposable income from the second half of the 1990s up to 2001. From 2001 onwards the contribution of net wealth to consumption growth became negative, particularly during the period 2003-2004, associated with high growth of household indebtedness for housing purchase well above that of the housing stock, which implied a decline in net household wealth.[27] There is also a virtual nil contribution of disposable income to consumption growth after 2001. The gradual decline in interest rates had a slightly positive contribution to growth in consumption of non-durable goods and services throughout the 1990s, a trend that was interrupted in 2000 and 2001 with the increase in interest rates. In 2002 and 2003 consumption benefited further from the decline in interest rates. Finally, special mention should be made of the big contribution of the non-explained component

Chart 8

CONTRIBUTIONS TO GROWTH IN PRIVATE CONSUMPTION OF NON-DURABLE GOODS

Percentage points



(26) In order to calculate contributions, data since the early 1980s were used, given that effects on consumption of shocks in explanatory variables only unwind after approximately 10 years.

(27) It is important to note that the deflator implicit in the household wealth series grew moderately during the period under review.

to consumption growth from 2002 onwards. The behaviour of private consumption over the past few years, which apparently is not explained by the usual macroeconomic fundamentals, may be associated with the maintenance of very favourable conditions in the credit market. These conditions are associated with the supply of new financial products and types of contracts, which made it possible to contain the household debt service burden.

This exercise highlights the contribution of wealth to growth in private consumption of non-durable goods and services in the 1990s. This result, always bearing in mind the above-mentioned limitations, helps to understand the behaviour of private consumption in Portugal throughout this period and the downward trend of the household saving rate, which moved from levels close to 20 per cent in the early 1990s to levels around 10 per cent in the most recent period.

6. CONCLUSION

Throughout the 1990s, the increase in net household wealth in Portugal was accompanied by strong consumption growth and a significant fall in the saving rate. These developments did not occur solely in Portugal, and were common in a number of other industrialised economies.

This paper estimates the wealth effect on private consumption in Portugal, broken down into financial wealth and housing wealth, and presents empirical evidence regarding the importance of the wealth variable in explaining the consumption growth and the decline in the saving rate throughout the 1990s. The results of the estimation of the long-term relationship for the period 1981-2005 suggest that the marginal propensity to consume out of wealth in Portugal is 0.03, i.e. each additional euro of net wealth leads to an increase of €0.03 in expenditure of non-durable goods and services. This figure for Portugal is similar to that presented in Botas (1999) and is in line with the results reported in previous papers for other countries.

Although economic literature stresses that the impact on private consumption of the various wealth components may be different according to the risk, collateral and liquidity of each asset, results in this paper for the estimate of the marginal propensity to consume out of financial and housing wealth suggest very similar figures.

Results also point to a slight increase in elasticity of consumption with respect to wealth and to a decrease in elasticity of consumption with respect to disposable income throughout the 1990s. This is in line with the notion that access to the credit market became easier with financial liberalisation, enabling consumers with previous liquidity constraints to smooth consumption over their life cycle through loans from the credit market. Moreover, according to the findings, the fact that throughout the 1990s net household wealth, on average, grew at a higher rate than disposable income may help to explain the strong growth in consumption of non-durable goods and services (around 1 p.p. of the average annual growth rate) and the decrease in the saving rate.

A more detailed analysis of the annual contribution of wealth to growth in private consumption of non-durable goods and services shows that this variable may explain part of consumption growth throughout the 1990s. In the second half of the 1990s that contribution was relatively similar to that of disposable income. Moreover, there is a virtual nil contribution of disposable income to consumption growth after 2001 and a negative contribution of net wealth to consumption growth in 2003 and 2004. During this period a negative growth of real net wealth was observed, which was due to the strong growth in household indebtedness for house purchase well above growth in the value of the housing stock. However, the negative effect on consumption was dampened by the maintenance of very fa-

vourable financing conditions in the credit market, linked to the supply of new financial products and types of contract that made it possible to contain the household debt service burden.

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ANNEXES

Annex A: Unit root tests

Table 1A shows the results for the augmented Dickey-Fuller tests for a unit root in consumption of non-durable goods (pcr^{nd}), disposable income (pyr), net wealth (fwr), net financial wealth (fwr^{af}) and non-mortgage housing wealth (fwr^{hab}).

Table 1A

AUGMENTED DICKEY-FULLER (ADF) UNIT ROOT TEST

	ADF t-statistic	Critical value
Private consumption of non-durable goods and services	-1.34	-3.45
Household disposable income	-1.63	-3.45
Net wealth	-0.37	-3.45
Net financial wealth	-1.52	-3.45
Non-mortgage housing wealth	0.86	-3.45

Note: Unit root tests were performed for variables in real and per capita terms and in logarithms. The model includes a constant and a linear trend. According to the ADF test, the p-order of the autoregressive process for each regression was chosen in order to ensure that residuals are not correlated.

Annex B: Cointegration tests

In order to study the existence of a cointegration relationship between consumption, disposable income and net household wealth, two types of test were implemented: the Shin test, in which the null hypothesis is the existence of cointegration, and the augmented Dickey-Fuller test, in which the null hypothesis is the absence of cointegration. Ogaki and Park (1997) argue that the tests taking as null hypothesis the absence of cointegration are known to have low power in identifying a false null hypothesis, and therefore the probability of non-rejection of a false null hypothesis is high, even though variables are cointegrated. Ogaki and Park claim that when the economic model postulates the existence of a long-term relationship between variables, such as the case under review, it is more appropriate to test as null hypothesis the existence of cointegration rather than testing its absence. Results obtained are show in Tables 1C and 2C.

Table 1B

COINTEGRATION TESTS (ADF AND SHIN) WITH AGGREGATE WEALTH

Augmented Dickey-Fuller test			Shin test (C_μ statistic)				
	Critical values						Critical value
t-value	5%	10%	Lag=1	Lag=2	Lag=3	Lag=4	5%
-3.91	-3.83	-3.51	0.137	0.131	0.125	0.120	0.221

Table 2B

COINTEGRATION TESTS (ADF AND SHIN) WITH DISAGGREGATE WEALTH

Augmented Dickey-Fuller test			Shin test (C_μ statistic)				
	Critical values						Critical value
t-value	5%	10%	Lag=1	Lag=2	Lag=3	Lag=4	5%
-3.80	-4.21	-3.89	0.063	0.063	0.061	0.062	0.159

Note: The Shin test statistic was applied to cointegration regression residuals of consumption in disposable income and in net wealth or, alternately, in housing wealth net of housing loans and net financial assets wealth excluding loans for house purchase.

Annex C: Main measures of financial liberalisation and deregulation in Portugal

Table 1C

MAIN MEASURES OF FINANCIAL LIBERALISATION AND DEREGULATION

February 1984	Start of the removal of barriers to the entry of new banking institutions and of restrictions on the expansion of the network of bank branches
June 1984	Liberalisation of deposit rates, excluding the rate on deposits with a maturity of 180 days up to 1 year
August 1985	Liberalisation of lending rates, excluding those on operations with a maturity of 90 up to 180 days, 2 up to 5 years and of over 5 years, for which a ceiling was set
September 1988	Liberalisation of lending rates, excluding those related to loans for house purchase
March 1989	Start of the reprivatisation process and elimination of ceilings on all lending rates
March 1990	Suspension of the compulsory credit ceiling system
January 1991	Elimination of compulsory or indicative quantitative credit limits
May 1992	Liberalisation of all deposit rates
December 1992	Conclusion of the process for liberalisation of international capital movements

INVESTMENT DECISIONS AND FINANCIAL STANDING OF PORTUGUESE FIRMS*

*Luciana Barbosa***

*Ana Lacerda***

*Nuno Ribeiro***

1. INTRODUCTION

Classic macroeconomic models do not consider the impact of corporate financial decisions on the economy's real variables. These approaches reflect the Modigliani-Miller theorem (1958), which establishes the capital structure irrelevance principle, i.e. capital structure does not affect the decisions to accept and carry out investment projects, against a background of perfect financial markets. However, imperfections in capital markets, namely asymmetrical information between agents making investment decisions (corporate management) and those providing the respective financing (savers or financial intermediaries), establish a link between the corporate financial standing and investment decisions. The resulting distortions are a source of inefficiency in the allocation of resources and may involve the rationing of credit to firms at the prevailing market price (as shown by Stiglitz and Weiss (1981)), as well as translate into higher economic costs for external financing sources.

The cyclical volatility of corporate investment, strongly concentrated in specific periods which are followed by other periods of sharp decline, is a stylised fact in most economies, and is documented as the so-called financial accelerator literature (Bernanke and Gertler (1989); Bernanke, Gertler and Gilchrist (1996 and 1999)). In this type of models, the existence of imperfections in the credit market results in factor accumulation decisions which are dependent on corporate financial conditions, thus accounting for the widening and greater persistence of business cycles, in particular as far as corporate investment is concerned. Kiyotaki and Moore (1997) also summarise explanations for this phenomenon, by establishing possible relationships between the value of assets in the economies, including the market value of residual claims of corporate shareholders, and the aggregate expenditure and production of firms. In these models, the corporate financial conditions at a given point in time are liable to restrain access to external financing, spilling over into corporate business. These constraints will tend to be stronger in downturns than in upturns of economic activity.

In line with the theoretical literature, several empirical studies aim at assessing the impact of the corporate financial standing on the respective real decisions at microeconomic level. Fazzari, Hubbard and Petersen (1988) published a pioneering study analysing the sensitivity of corporate investment to fluctuations in internally-generated funds (giving rise to the cash flow sensitivity-related literature). The outcomes support the existence of a positive relationship between corporate cash flow and investment. In particular, and according to the authors, greater sensitivity of investment to the cash flow points to the existence of external financing constraints. Farinha (1995) gathers similar evidence for the Portuguese case, observing that, for most Portuguese firms, investment is positively influenced by the cash flow, and concludes that the results are consistent with the existence of liquidity constraints.

* The opinions of this paper represent the views of the authors, they are not necessarily those of the Banco de Portugal.

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The positive relationship between investment and cash flow seems to be relatively consensual among researchers, against the background of frictions in the functioning of capital markets. However, some controversy remains in what concerns the interpretation of this relationship as an indication of firm's external financing constraints. Kaplan and Zingales (1997) initiated the discussion emphasising that there may be a positive relationship between corporate cash flow and investment even in those cases where firms are not facing financing restrictions. Hubbard (1998) presents several other studies that examine this relationship. When analysing the relationship between financial variables and job creation by firms, Nickell and Nicolitsas (1999), Sharpe (1994), Carpenter *et al*. (1994) also obtain a significant effect of financial variables.

More recently, the empirical literature has focused on interactions among measures characterising the financial pressure of firms and factor accumulation in the economy. Worthy of mention in this context are the works of Nickell and Nicolitsas (1999), Benito and Hernando (2002), Benito and Young (2002) and Hernando and Martínez-Carrascal (2003), which identify the ratio of interest paid to the operational cash flow as a relevant variable for firm's investment. This ratio is interpreted rather intuitively, making it possible to assess the extent to which corporate gross income (before interest) ensures that interest payments to creditors are met. This measure has also the advantage of reflecting the financial and operational performance of firms.

The importance of capital accumulation in the Portuguese economic growth, jointly with the indebtedness level reached by Portuguese non-financial corporations, warrants the identification of potential financial vulnerabilities, possibly spilling over into aggregate investment. In fact, as shown in Amador and Coimbra (2007) and Almeida and Félix (2006), capital stock developments made an important contribution to Portuguese economic growth in the past few decades. In parallel, indebtedness of Portuguese non-financial corporations grew significantly in recent years, particularly in the second half of the 1990s. This largely reflected the sharp decline in the level and volatility of nominal interest rates resulting from the convergence process and subsequent Portuguese participation in the euro area.

Hence, this study evaluates the extent to which the financial pressure of a firm, as assessed by the level of interest payments (as a percentage of operating income), affects its investment. In order to better identify the sources of constraints to corporate investment, the financial pressure indicator was broken down into three components that reflect the leverage, the operating profitability and the implicit interest rate faced by firms. In the sample under consideration, financial factors prove to have a non-negligible effect on the respective investment decisions. In particular, interest payments, the indebtedness level and operating profitability play an important role in investment decisions. However, these effects do not differ in periods of economic slowdown. Moreover, it can be concluded that a number of factors have an impact on the sensitivity of investment to interest payments: whether the firm is export-oriented, its size, the number of bank lending relationships, and the existence of past due credit. The analysis is mainly based on data from the Central Balance Sheet Database, obtained from an annual survey conducted by Banco de Portugal to a sample of Portuguese non-financial corporations. The database includes economic and financial data on an accounting basis for the 1995-2005 period.

This article is organised as follows. Section 2 characterises the financial standing of Portuguese firms, at an aggregate level, for the 1995-2006 period. Stress is laid on developments in interest burden, indebtedness, cost of financing and the profitability of Portuguese non-financial corporations. This section is essentially based on statistical information on non-financial national accounts (produced by National Statistics Institute - *INE*) and national financial accounts[1] (produced by Banco de Portugal). Section 3 characterises the financial standing of Portuguese firms, at an individual level, and qualifies

(1) The analysis depends on data availability: non-financial national accounts are available only up to 2004 and financial national accounts up to 2006.

investment by these firms. The analysis is based on the financial statements of non-financial corporations reporting to the Central Balance Sheet Database. Section 4 presents the econometric model adopted and its results. Finally, Section 5 draws the main conclusions.

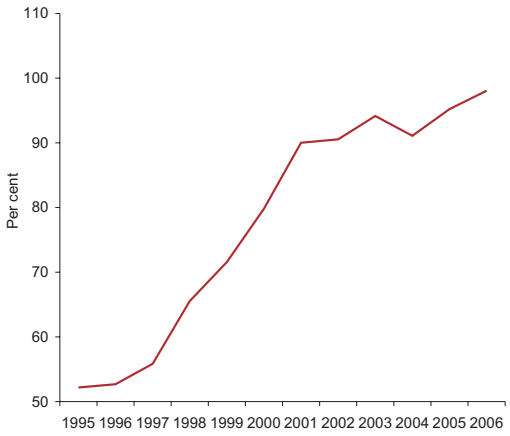
2. DEVELOPMENTS IN THE FINANCIAL STANDING OF PORTUGUESE FIRMS

In the 1990s, particularly in the second half, there was a significant increase in the indebtedness level of the Portuguese private sector in general, and of non-financial corporations in particular (Chart 1). 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, spilled over into a considerable decline in the level of interest rates and their volatility. Hence, although there was an increase of the indebtedness level of non-financial firms, there was no consequent rise in the share of the economy's output allocated to corporate interest payments. Interest payments as a percentage of GDP declined, stabilising afterwards (Chart 2). When assessing the relative weight of this burden on total corporate operating income similar patterns can be observed, as regards both the non-financial corporations aggregate and the set of firms with information available at the Central Balance Sheet Database[2] (Chart 3).

The ratio of the debt burden to gross operating income (*B*) is also a first proxy for the "financial pressure" faced by a given firm, insofar as it makes it possible to assess the capacity of the firm to make interest payments through internally generated resources arising from the respective business activity. In parallel, this indicator summarises different financial features of the firm, namely the average cost of financing (*C*), indebtedness (*D*) and gross operating profitability (*R*), since the interest payment indicator can be broken down into these three ratios (equation (1)). Hence, the analysis of developments in

Chart 1

FINANCIAL DEBT OF NON-FINANCIAL FIRMS
As a percentage of GDP

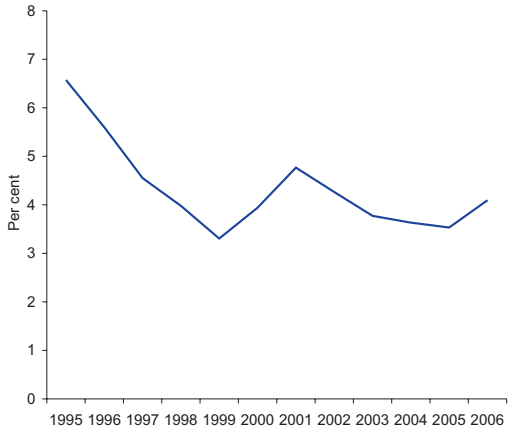


Sources: *INE* (Non-Financial National Accounts) and Banco de Portugal (Financial National Accounts).
Note: Financial Debt defined as the sum of loans and debt securities.

(2) With regard to data obtained from the Central Balance Sheet Database, only a smaller group of firms was taken into consideration, after applying a set of filters to the raw data to ensure the consistency in the analysis throughout the study. The criteria applied are presented in Section 3.1. Data.

Chart 2

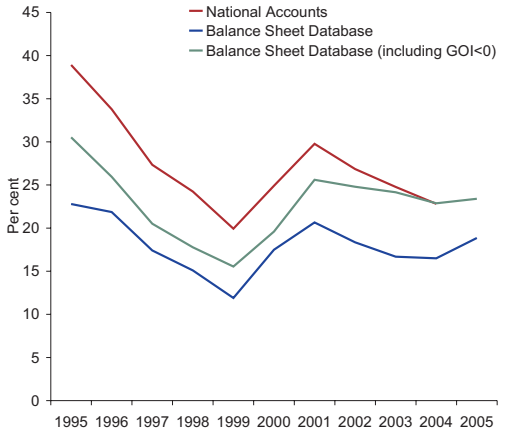
INTEREST PAID BY NON-FINANCIAL FIRMS
As a percentage of GDP



Sources: *INE* (Non-Financial National Accounts) and Banco de Portugal (estimates).

Chart 3

INTEREST PAID BY NON-FINANCIAL FIRMS
As a percentage of operating income



Sources: *INE* (Non-Financial National Accounts) and Banco de Portugal (estimates and Balance Sheet Database).
Note: GOI – Gross Operating Income

these variables over time allows a finer understanding on the sources of the change in financial pressure (or lack of it) in a company.

$$\underbrace{\frac{IP}{GOI}}_{B} = \underbrace{\frac{IP}{FD}}_{C} x \underbrace{\frac{FD}{NA}}_{D} x \underbrace{\frac{NA}{GOI}}_{1/R} \qquad (1)$$

IP – Interest payable FD – Financial debt

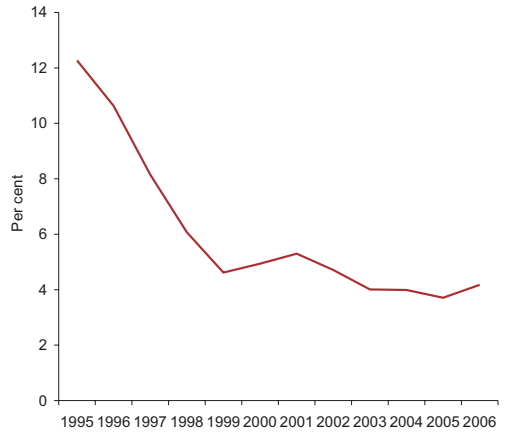
GOI – Gross operating income NA – Net assets

Charts 4, 5 and 6 highlight the three ratios resulting from the breakdown shown in equation (1), using national accounts when available and estimates based on the Central Balance Sheet Database for the most recent period. Indebtedness growth, as can be seen in Chart 5, mirrors the significant decline in the average cost of financing in the period under analysis, shown in Chart 4, which, in turn, followed quite closely developments in interest rates on loans to non-financial corporations in Portugal. Indeed, the period preceding participation in the euro area was characterised by a sharp reduction in nominal interest rates in Portugal, previously well above the average of the group of countries that gave rise to the euro area. This decline was interrupted in 1999 and 2000, in parallel with the rise in the ECB's reference rates. From 2001 to end-2005, a period when key ECB interest rates declined and stabilised at historically low levels, the average cost of corporate financing decreased again considerably. In 2006, the average cost of financing started to rise again, following the increase in money market interest rates, underlying the successive rises in key ECB interest rates as from late 2005, which totalled 1.5 p.p. in accumulated terms until the end of 2006. The parallelism between money market interest rate and the cost of corporate financing developments reflects the fact that a large share of the financial debt of non-financial corporations in Portugal has a short term maturity or is index-linked to money market interest rates, thereby implying a rapid pass-through of monetary policy impulses to the actual cost of total corporate debt.

Chart 4

FINANCING COST

Interest payable as a percentage of financial debt [(a)]

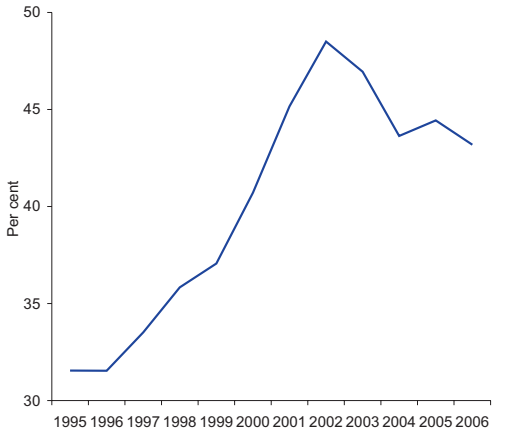


Source: Banco de Portugal (Financial National Accounts).
Note: **(a)** Cost of financing defined as the ratio of interest payable to financial debt, defined as the sum of loans and debt securities.

Chart 5

INDEBTEDNESS OF NON-FINANCIAL FIRMS

Financial debt as a percentage of total asset [(a)]

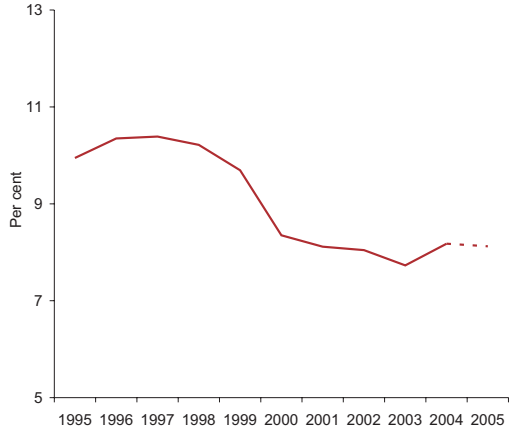


Source: Banco de Portugal (Financial National Accounts).
Note: **(a)** Financial Debt defined as the sum of loans and debt securities. Total asset was approximated by the sum of financial liabilities, including debt securities.

In addition, the strong increase in financial debt, as shown in Chart 1, was not equally reflected in the degree of financial corporate leverage.[3] The reason is that the expansion in financial debt was followed by an increase, albeit to a lesser extent, in corporate equity, giving rise to significant asset accumulation by firms. In fact, the measure of financial leverage, calculated on the basis of national financial accounts, declined as from 2002, in line with the slowdown in corporate financial debt (Chart 5). The

Chart 6

OPERATIONAL PROFITABILITY[(a)]



Sources: *INE* (Non-Financial National Accounts) and Banco de Portugal (Financial National Accounts and Balance Sheet Database).
Notes: National Accounts until 2004 and estimative for 2005 based on Balance Sheet Database. **(a)** Ratio of operating results (approximated by the gross operating results adjusted of net premium of non-life insurance) and total assets (adjusted of revaluations effects).

(3) The degree of financial leverage is considered to be the share of assets that is financed by financial debt, as shown in Chart 5.

considerable rise in the second half of the 1990s should have reflected the increase in financing needs related to fixed capital investment, economic group restructuring, as well as the internationalisation of a few large firms, against the background of economic expansion, financial market development and sharp interest rate declines.

In turn, the operating profitability declined in the second half of the 1990s, possibly reflecting the structural change in the Portuguese economy related to the nominal convergence process and subsequent participation in the euro area. In fact, in a context of substantially higher nominal interest rates than in the current economic regime, nominal gross margins were wider. The ongoing downward trend of nominal interest rates, in parallel with increased competition, was followed by a compression of nominal operating profitability, without apparently implying greater financial weakness for firms. After 2000, nominal operating profitability has remained at a lower level than at the start of the sample period (Chart 6).

3. MICRO LEVEL DESCRIPTION OF DEVELOPMENTS IN INVESTMENT AND IN THE FINANCIAL STANDING OF PORTUGUESE FIRMS

3.1. Data

Microeconomic data used in the analysis that follows corresponds to the annual information of the Central Balance Sheet Database. The sample covers a high share of corporate economic activity, with an emphasis in larger firms. Amongst the group of small and medium-sized enterprises, those with a better financial standing are over-represented, reflecting the survey's voluntary nature. In sectoral terms,[4] "manufacturing", "electricity, gas and water" and "transport and communication" are the sectors with the highest coverage. In 2005 firms reporting annual data for 2004 and 2005 simultaneously accounted for 4.6 per cent of non-financial corporations, 36.0 per cent of the number of employees and 58.7 per cent of nominal gross value added.

Given the specificities of this study, it was necessary to put in place a few selection criteria for the group of firms to be analysed. As such, in addition to eliminating the incoherent or incomplete observations reported, observations that did not present strictly positive sales, financial debt and interest paid were also excluded. Moreover, self-employed persons, firms whose primary purpose was the holding of financial assets, as well as those that had not been considered in the database for a minimum period of three consecutive years were not considered in the analysis. In addition, regarding the annual rate of change in fixed assets, a criterion was also required in an attempt to eliminate the extreme values of the distribution.[5] In order to ensure overall consistency, namely a monotone relationship between the interest payment indicator and the corporate financial standing, observations for firms with negative gross operating income were also eliminated, corresponding to around 10 per cent of the sample. After applying the above criteria, a non-balanced panel of 29 253 observations was obtained, corresponding to 5 867 firms. In the following sections, the study is restricted to the analysis of this panel, and, as such, care should be taken in extrapolating the results to the Portuguese corporate sector at large.

(4) In 2000, the criteria for data collection for the Central Balance Sheet Database were changed, with a view to covering all sectors of economic activity, except financial intermediation, general government, households and international organisations and other non-resident institutions (for further information on the Central Balance Sheet Database, see Banco de Portugal's Booklet No 7).

(5) In this context, account was only taken of firms whose fixed assets increased less than 500 per cent or decreased less than 75 per cent, which corresponds to eliminating approximately 5 per cent of initial sample observations.

3.2. Developments in investment and in the financial standing of Portuguese firms

This section describes the group of firms under analysis as regards the distribution of the rate of corporate investment,[6] the interest payment indicator and its respective components, as shown in the equation (1).

Chart 7 shows the unweighted distribution of the variables mentioned for the different years under analysis, considering the simple percentiles of order 10, 25, 50, 75 and 90. This approach makes it possible to evaluate the evolution of the representative firm (i.e. the median firm every year), as well as the evolution of more financial constrained firms. It is worth noting the downward trend of the investment rate, in particular for firms above the median, which also show higher dispersion. This distribution asymmetry, although present in all variables characterising corporate financial conditions, is more pronounced for the interest burden and average cost of debt financing distribution. In particular, for the interest burden variable, on average, the spread between the 90 and 75 percentiles is approximately four and a half times the one observed between the 25 and 10 percentiles. The distributions of the indebtedness and profitability variables, in addition to being less asymmetric, reveal higher stability in the time series dimension. The stability observed in the distribution of indebtedness is not inconsistent with the increase in aggregate debt (Charts 1 and 5), as Chart 7 depicts cross sections of the unweighted distribution. In fact, firms for which debt growth was stronger correspond to those with more marked asset accumulation, and larger firms raised their indebtedness level more markedly.[7] This implies very smooth developments in the unweighted distribution, in clear contrast to aggregate values that correspond to the weighted averages of this variable. It should be stressed also that the credit granted by the Portuguese financial sector is strongly concentrated, with 5 per cent of firms that resorted to credit accounting for 80 per cent of credit granted. However, in spite of the higher idiosyncratic risk of these firms, their default rates, in general, are much lower than in the remaining firms.

In order to evaluate the persistence of investment as well as financial characteristics of firms, the one-year transition between different quintiles of the distribution are presented (Table 1). As regards interest burden and the variables into which it can be broken down, there is a high persistence of firms in the same distribution quintile. This phenomenon is mainly observed in extreme quintiles, where the probabilities always exceed 50 per cent. Worthy of note are, in particular, the interest burden and indebtedness variables, for which the probability that, in a given year, a firm in the highest quintile does not move to another quintile stands at 64 and 71 per cent respectively. The degree of persistence of corporate investment, in turn, is not as high, even though the probability that a firm will remain in the same quintile for two consecutive years is higher than the probability of moving to any of the other quintiles. Moreover, moves occur chiefly into quintiles that are adjacent to the quintile where the firm initially was.

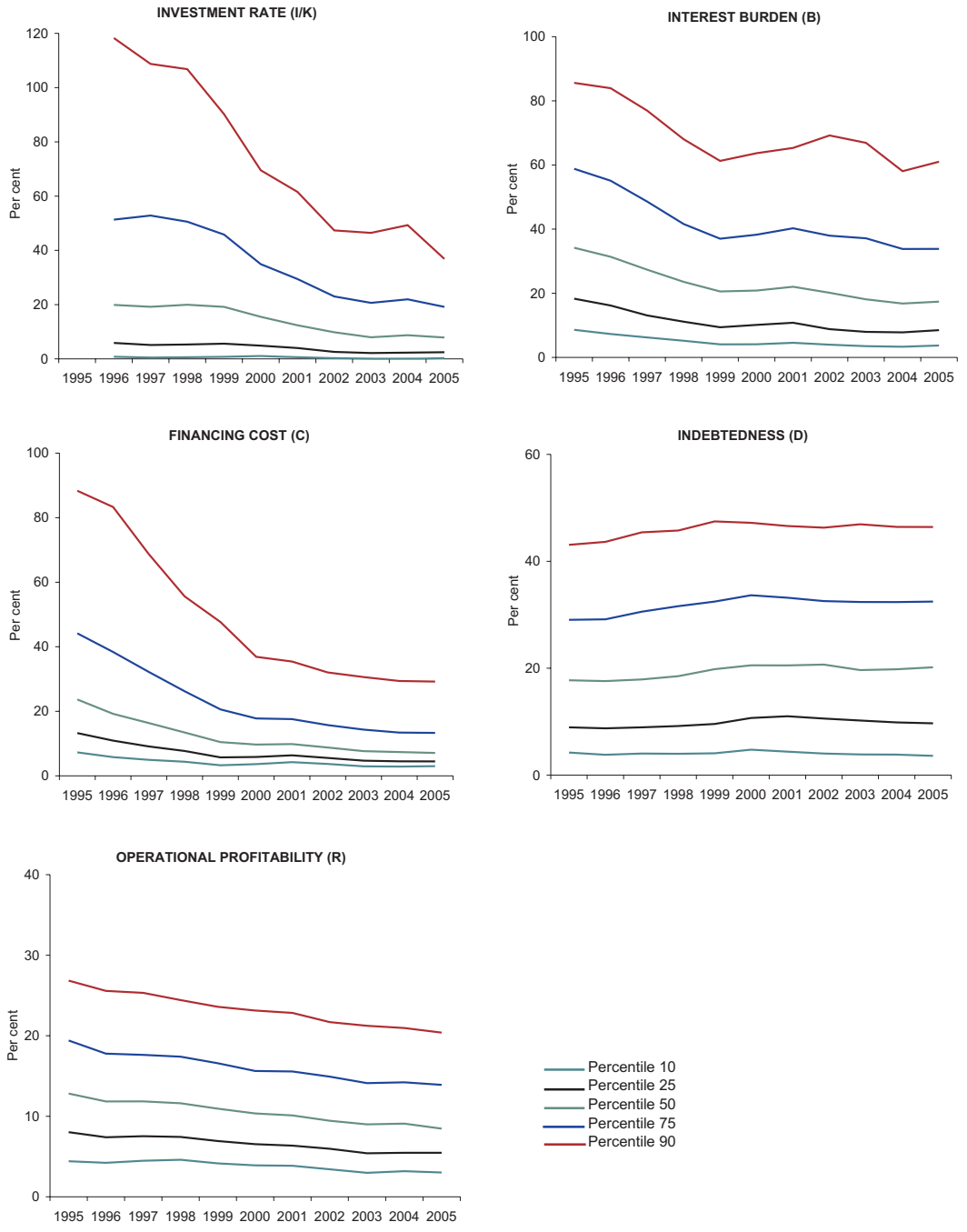
Based on the above distributions, and with a view to obtaining a first perception of the relationship between the investment rate of a given firm and its financial standing, the median investment rate was annually calculated for the group of firms that in the previous year were in different percentiles of distribution of the financial variables under review (Chart 8). In particular, firms in the first decile, in the last decile and the firms between percentiles 45 and 55 were considered. The observation of the chart suggests that the financial variables affect corporate investment decisions. Indeed, firms with higher interest burden tend to report lower investment rates in the subsequent year. This effect is coherent

(6) The investment rate variable was built as the ratio of the change in corporate fixed assets during a given period to the capital stock at the start of the period. In turn, underlying the capital stock is a constant depreciation rate (10 per cent), as well as an initial value adjusted for future revaluations.

(7) For illustration, the firms that in 1996 were in the 90 percentile, in terms of total assets, accounted for 77 per cent of total financial debt, compared to 84 per cent in 2005.

Chart 7

EVOLUTION OF INVESTMENT RATE AND FINANCIAL VARIABLES



Note: The financial variables presented in the chart correspond to those defined in equation (1). Thus, the above panels correspond to the distributions of the investment by unit of capital stock (I/K), of interest payable as a percentage of gross operating income (B), of interest payable as a percentage of financial debt (C), of financial debt as a percentage of total asset (D), and of gross operating income as a percentage of total asset (R).

Table 1

TRANSITION MATRICES FOR ONE-YEAR TRANSITIONS BETWEEN QUINTILES

INVESTMENT RATE (I/K)

	1	2	3	4	5
Quintile 1	**40%**	22%	14%	12%	12%
Quintile 2	24%	**28%**	21%	16%	11%
Quintile 3	14%	22%	**26%**	22%	16%
Quintile 4	13%	17%	23%	**25%**	22%
Quintile 5	14%	16%	18%	25%	**28%**

INTEREST BURDEN (B)

	1	2	3	4	5
Quintile 1	**64%**	23%	8%	3%	2%
Quintile 2	21%	**43%**	23%	9%	4%
Quintile 3	5%	21%	**39%**	25%	10%
Quintile 4	2%	7%	21%	**44%**	26%
Quintile 5	2%	4%	9%	22%	**64%**

FINANCING COST (C)

	1	2	3	4	5
Quintile 1	**53%**	25%	11%	6%	5%
Quintile 2	20%	**40%**	25%	10%	4%
Quintile 3	9%	20%	**37%**	25%	9%
Quintile 4	5%	9%	20%	**41%**	25%
Quintile 5	5%	5%	8%	21%	**61%**

INDEBTEDNESS (D)

	1	2	3	4	5
Quintile 1	**62%**	22%	8%	5%	2%
Quintile 2	25%	**45%**	20%	7%	3%
Quintile 3	7%	24%	**43%**	20%	6%
Quintile 4	3%	7%	24%	**48%**	18%
Quintile 5	2%	2%	5%	20%	**71%**

OPERATIONAL PROFITABILITY (R)

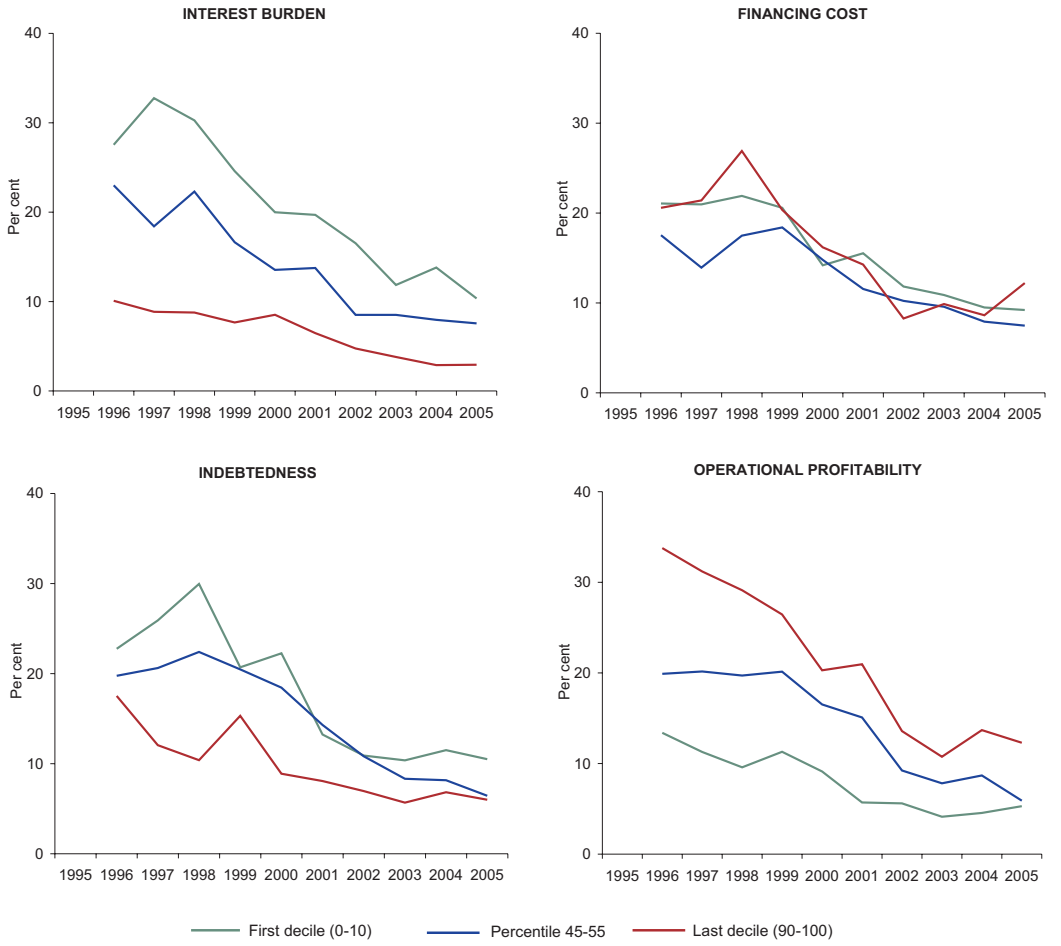
	1	2	3	4	5
Quintile 1	**58%**	24%	10%	5%	3%
Quintile 2	25%	**39%**	22%	10%	4%
Quintile 3	9%	23%	**36%**	23%	8%
Quintile 4	6%	10%	24%	**39%**	22%
Quintile 5	3%	4%	8%	23%	**62%**

Note: Empirical one-year transitions in the period 1995 - 2005.

with the heterogeneity of investment presented by firms with different operating profitability and indebtedness. It what concerns average cost of financing, the effect is not so evident.

Chart 8

EVOLUTION OF INVESTMENT RATE FOR DIFFERENT LEVELS OF THE FINANCIAL VARIABLES



Note: In each panel the median investment rate is represented for firms located in the first decile, between the percentile 45 and 55, and in the last decile of the distribution of the financial variable under analysis.

4. ECONOMETRIC ANALYSIS

4.1 Methodology and estimated model

This section empirically tests the hypothesis that corporate investment decisions depend on their financial position, and attempts to characterize the way in which this dependence can be expressed. For this purpose, the following econometric specification was adopted:

$$Inv_{it} = \alpha_i + \gamma Inv_{it-1} + \beta x_{it-1} + \delta \Delta Sales_{it-1} + \varphi Size_{it-1} + \varepsilon_{it}, \quad (2)$$

where the investment rate (Inv_{it}), defined as the investment/capital stock ratio, is the dependent variable. Investment was deemed to be a function of investment made in the previous period, incorporating possible adjustment costs of the capital stock, as well as of other variables characterising the financial standing of Portuguese firms (x_{it-1}). The financial variables considered were the interest burden (*b*), cost of financing (*c*), indebtedness (*d*) and gross operating profitability (*r*), which were pre-

sented as logarithms and as deviations from the sample mean in order to facilitate the reading of results.[8] The estimated equations included variables controlling for corporate size, measured by the logarithm of total asset at constant prices, also in terms of deviations from the sample mean (Size_{it-1}), and for the corporate growth potential, measured by the growth rate of the logarithm of sales $(\Delta\text{Sales}_{it-1})$. Controls for macroeconomic context over investment (common to all firms) and for systematic effects associated with economic sector in which the firm operates were also considered.

Due to endogeneity problems in the specified equation, estimations were performed using the GMM System estimator. This method, proposed by Arellano and Bover (1995) and examined in detail in Blundell and Bond (1998), represents an extension of the estimator initially presented by Arellano and Bond (1991). Using this methodology, equations are estimated in levels and differences and instruments are the lagged values of the non-strictly exogenous explicative variables.

In what follows, the above specification was implemented, evaluating the impact on the investment rate of the variables characterising the financial position of the Portuguese firms under review. At a latter stage, the existence of differentiated effects in different stages of the economic cycle as well as the level of internationalisation, firm size, number of bank lending relationships and possible default situations were tested.

4.2 Results

In all regressions, the coefficient associated with the 1-period lagged investment rate assumes a positive value, in line with most empirical approaches to corporate investment at micro-economic level (e.g. Benito and Young (2002) and Bond (2002)). Firm size[9] shows a negative coefficient, suggesting that larger firms tend to present lower investment rates, in line with our prior that these firms are more mature in the respective life cycle. In turn, sales growth, a variable that seeks to capture corporate growth potential, shows a positive coefficient, validating the idea that corporate investment is sensitive to changes in demand for its goods and services. As regards financial variables, the interest burden variable is relevant in the analysis of Portuguese corporate investment, contributing negatively to its own development (column 1 of Table 2). A similar result was obtained by Benito and Young (2002)[10] and by Benito and Hernando (2002), for a sample of firms in the United Kingdom and Spain respectively. This outcome is also in line with the results obtained by Nickell and Nicolitsas (1999), which established a relationship between financial pressure and employment, wages and productivity in UK firms. Table 2 (column 2) shows the results of the estimation, considering as regressors the financial variables presented in equation (1), namely the average cost of financing, indebtedness and the inverse of gross operating profitability. These variables were introduced in the regression after the logarithmic change and in deviations from their sample mean. The simple observation of the coefficients associated with the three variables in question suggests that the parameters associated with these variables are different, which is corroborated by the Wald test for parameter equality. The evidence of the coefficients estimated is consistent with the literature. On the one hand, firms with a higher debt cost or a higher indebtedness level tend to show lower investment rates in the subsequent year, although only in the latter case the associated coefficient is statistically significant. On the other hand, firms with low profitability tend to show lower investment rates in the subsequent year.

(8) The specification in question corresponds to considering for the interest burden *(B)*, for instance, the variable $b_{it} = \ln(B_{it}) - \overline{\ln(B)}$, where $\overline{\ln(B)}$ is the sample mean.

(9) Measured by the (natural) logarithm of the asset at constant prices.

(10) In addition to the evaluation of the impact of financial pressure on investment, an evaluation was also made of the impact of this variable on other variables, namely the corporate dividend policy.

Table 2

ECONOMETRIC RESULTS FOR THE INVESTMENT RATE (Inv_{it})

	BASE MODEL		BUSINESS CYCLE EFFECT D_{it} = 1 if $t \in \{2001,\ldots,2005\}$	
	(1)	(2)	(3)	(4)
Inv_{it-1}	0.0475	0.0493	0.0453	0.0485
	(0.000)	(0.000)	(0.000)	(0.000)
$Size_{it-1}$	-0.0253	-0.0258	-0.0254	-0.0257
	(0.000)	(0.000)	(0.000)	(0.000)
$\Delta Sales_{it-1}$	0.0854	0.0963	0.0809	0.0966
	(0.000)	(0.000)	(0.000)	(0.000)
$Interest\ burden_{it-1}$	-0.0556		-0.0617	
	(0.011)		(0.006)	
$Financing\ cost_{it-1}$		-0.0388		-0.0173
		(0.218)		(0.626)
$Indebtedness_{it-1}$		-0.0668		-0.0479
		(0.033)		(0.136)
(*Inverse of*) $Profitability_{it-1}$		-0.0215		-0.0204
		(0.003)		(0.057)
$Interest\ burden_{it-1} D_{it-1}$			-0.0199	
			(0.125)	
$Financing\ cost_{it-1} D_{it-1}$				-0.0372
				(0.258)
$Indebtedness_{it-1} D_{it-1}$				-0.0416
				(0.130)
(*Inverse of*) $Profitability_{it-1} D_{it-1}$				0.0019
				(0.876)
Hansen (*p-value*)	0.866	0.782	0.916	0.854
AR 1 (*p-value*)	0.000	0.000	0.000	0.000
AR 2 (*p-value*)	0.654	0.681	0.651	0.739
Observations	17 519	17 519	17 519	17 519
N of firms	5 867	5 867	5 867	5 867

Note: Estimation by GMM system estimator, using the routine xtabond2 (Stata 9.0), developed by Roodman (2005). In all estimated equations, lagged investment rates were used as instruments. In first-differences equations, lags 2 and 3 of the investment rate were considered, while in levels equations only the lag 2 was introduced as instrument. The variables firm size and sales growth were used as standard instruments, even thought the latter was only considered as instrument in levels equations. In column 1, lags 3 and 4 of interest burden were also included as instrument in level equations. In column 2, the additional instruments for first-difference equation were lags 2 and 3 of indebtedness and for levels equation the lags 2 and 4 of financing cost. The profitability was taken as strictly exogenous. Finally, in estimations presented in columns 3 and 4, lagged values for the interaction terms of financial variables and the dummy variable were also introduced as instruments.

Columns (3) and (4) of the same table show the results of the previous econometric specifications, but recognising that the coefficients associated with the financial variables may be different, depending on the macroeconomic framework. The sample was therefore divided into two sub-periods: the first one was characterised by high growth of the gross domestic product (1995-2000) and the second one by a marked economic slowdown (2001-2005). A categoric variable was introduced in the regression, interacting with the financial variables under review. The coefficients of the financial variables in the period of lower economic growth are not statistically different from the coefficients for the 1995-2000 period, suggesting that investment does not show different types of sensitivity to the different financial variables over the economic cycle. However, the observation of the coefficients of the temporal dummies[11] indicates a substantial difference at the level of the investment rate in both periods under review, confirming lower investment rates in periods of economic slowdown, given the strong pro-cyclical nature of investment.

In order to better characterize the impact that corporate financial standing may have on firms' investment decisions, we test the role of that other corporate characteristics may play in investment sensitivity to interest burden. Hence, we test for the differentiated sensitivity associated with the strength of the participation of the firm in export market, its size, the number of bank lending relationships and the existence of past due credit of the concerned firm, which tend to be related to a more precarious financial standing.

(11) These coefficients are not reported in the present article.

First the effect of the firm's presence in the external market on the coefficient of the interest burden variable was tested. The direct effect that the presence in the external market may have on the investment rate was also considered. This procedure consisted on estimating the following model:

$$\begin{aligned} Inv_{it} &= \alpha_i + \gamma\, Inv_{it-1} + b_{it}\left[\beta_0 D^{NE}_{it-1} + \beta_1 D^{E}_{it-1} + \beta_2 s_{it-1} + \beta_3 s^2_{it-1}\right] \\ &+\lambda_0 D^{E}_{it-1} + \lambda_1 s_{it-1}\lambda_2 s^2_{it-1} + \delta \Delta Sales_{it-1} + \varphi\, Size_{it-1} + \varepsilon_{it} \end{aligned} \quad (3)$$

where variables pertaining to the participation of firms in international trade interact with the interest burden variable (b_{it}). Therefore the regression includes the share of sales to the external market of firm *i* in period *t* (s_{it}) and the categoric variables D^E_{it} and D^{NE}_{it} that assume the value 1 when firm *i* in period *t* is an exporting firm and when firm *i* in period *t* does not report sales to the external markets respectively. In this context, the coefficient β_0 is interpreted as the sensitivity of investment to interest burden, in the cases where the whole production of goods and services is placed on the domestic market. As regards exporting firms, when compared with the other firms, it is reasonable to acknowledge two driving forces behind higher or lower sensitivity. On the one hand, the firms present in export markets tend to show higher productivity (see e.g. Jensen, Redding and Schott (2007)), and their investment decisions should depend mainly on changes in marginal capital productivity, while the respective financial situation is less relevant. On the other hand, as the share of turnover in export markets grows, it is to be expected that firms become increasingly subject to more aggressive competition. Investment may even become gradually more sensitive to the corporate financial position, as a result of higher exposure to competition in markets of destination of exports. Table 3 (column (1)) shows the values estimated for the above equation, focusing on the different behaviour of exporting firms, as opposed to non-exporting firms. The results for the latter suggest that corporate investment is influenced by interest payments, since β_0 shows a negative and statistically significant value. As regards exporting firms, the focus is on the positive direct effect that their presence in the external market seems to have on the investment rate and on the (non-linear) impact of the export share on the coefficient of the interest burden variable, in line with the above reasoning. β_2 and β_3 indicate that, as regards exporting firms, there is an inverted-U relationship between the share of production placed in external markets and the sensitivity of investment to the corporate financial situation, although the coefficients are not statistically significant for a large percentage of the sample. Chart 9 shows estimates for the marginal impact of the interest burden variable on the share of sales assigned to the export markets, as well as the respective confidence intervals at 95 per cent probability. At a 5 per cent level of significance, such impact is negative and statistically significant and for the group of firms that export almost all their production, while not statistically different from zero for the remaining firms.

In what follows the possibility that the sensitivity of investment depends on corporate size is tested. This is relevant in terms of economic policy, since it is to be expected that smaller firms face higher constraints when obtaining external financing, given that they are less transparent in terms of information available to the general public. Therefore, the base model, presented in equation (2), is re-estimated considering that the coefficient of the interest burden variable changes linearly with size,[12] i.e.

$$\beta = \beta_0 + \beta_1\left[Size_{it-1}\right]$$

where the $Size_{it-1}$ variable corresponds to the deviations of the natural logarithm of total assets of each firm (at constant prices), *vis-à-vis* the respective sample mean, as previously mentioned. The value estimated for the coefficient β_1 was expected to be positive, since larger firms would tend to make the respective investment decisions in line with marginal capital productivity, wherefore the aspects associated with their financial structure would be less relevant. The estimations obtained confirm this hy-

(12) A specification with a quadratic term was tested, but it was not statistically significant.

pothesis (column (2) of Table 3 and Chart 9). In the case of large firms, the fact that their interest burden is higher during a given period is not a relevant constraint to investment in the future. This may be warranted by the more persistent and phased nature of investment by these firms, for which interest payments may be the result of the investment cycle led by the firm.

In addition, an analysis was made of whether the sensitivity of investment to interest payments depended on other variables characterising the corporate financial position, namely the number of bank lending relationships and the existence of default situations.[13] In order to check the impact of the number of the abovementioned banking relationships, a model similar to that shown in equation (3) was estimated, where the variable share of exports was replaced by the variable number of banking

Table 3

DIFFERENCIATED IMPACT ON THE INVESTMENT RATE (Inv_{it})

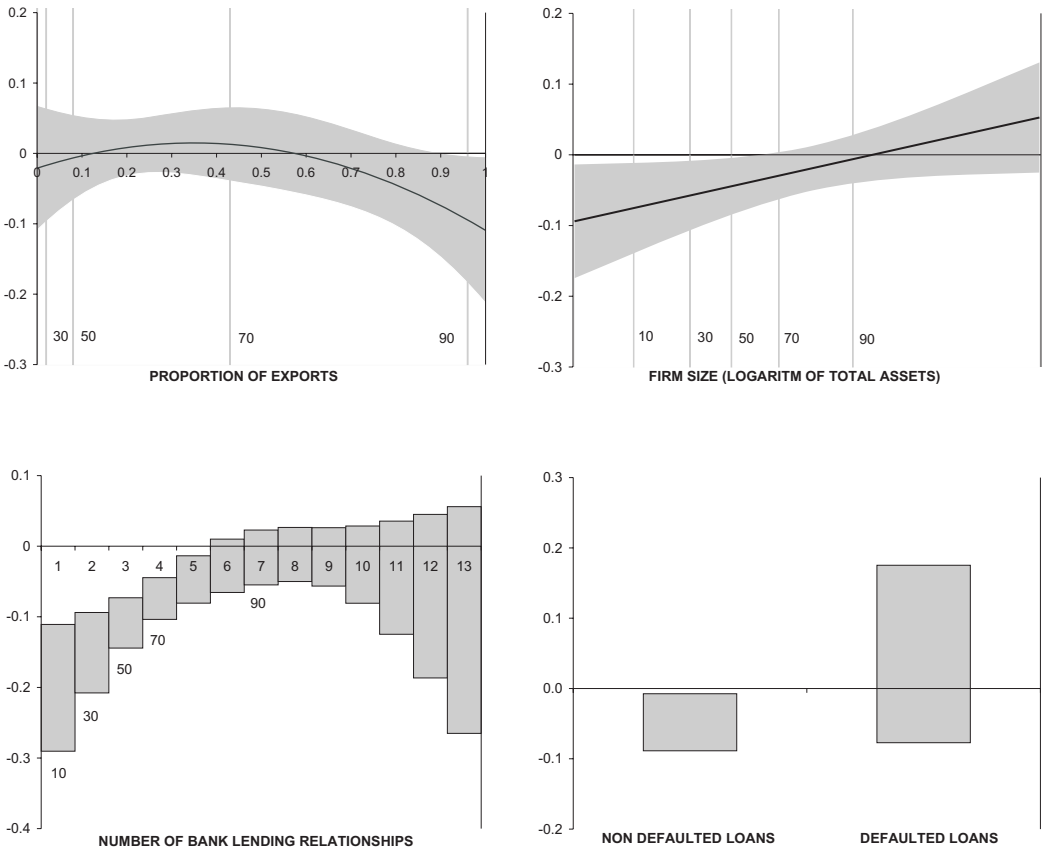
	EXTERNAL MARKET EFFECT	FIRM SIZE EFFECT	BANK RELATIONSHIP EFFECT	DEFAULT LOANS EFFECT
	(1)	(2)	(3)	(4)
Ψ_{it-1}	Exportation share	Firm size	Number of bank lending relationship	
Inv_{it-1}	0.0529	0.0507	0.0368	0.0476
	(0.000)	(0.000)	(0.000)	(0.000)
$Size_{it-1}$	-0.0251	-0.022	-0.0281	-0.0254
	(0.000)	(0.000)	(0.000)	(0.000)
$\Delta Sales_{it-1}$	0.0833	0.088	0.08	0.0888
	(0.000)	(0.000)	(0.000)	(0.000)
$Interest\ burden_{it-1}.\bar{D}_{it-1}$	-0.0631		-0.0671	-0.048
	(0.009)		(0.267)	(0.020)
$Interest\ burden_{it-1}.D_{it-1}$	-0.0211		-0.2005	0.0491
	(0.638)		(0.000)	(0.446)
$Interest\ burden_{it-1}$		-0.0442		
		(0.030)		
$Interest\ burden_{it-1}\Psi_{it-1}$	0.2054	0.0187	0.0535	
	(0.379)	(0.048)	(0.010)	
$Interest\ burden_{it-1}\Psi^2_{it-1}$	-0.2938		-0.0038	
	(0.189)		(0.048)	
Ψ_{it-1}	-0.0284		-0.0058	
	(0.636)		(0.010)	
Ψ^2_{it-1}	0.0263		-0.0038	
	(0.664)		(0.048)	
D_{it-1}	0.0146			-0.0973
	(0.109)			(0.017)
Hansen (*p-value*)	0.492	0.874	0.730	0.848
AR 1 (*p-value*)	0.000	0.000	0.000	0.000
AR 2 (*p-value*)	0.437	0.619	0.945	0.657
Observations	17 519	17 519	17 519	17 519
N of firms	5 867	5 867	5 867	5 867

Notes: The variable Ψ_{it-1} corresponds to exportation share, firm size and bank lending relationship in the estimations presented in columns 1, 2 and 3, respectively. In column 1, the dummy variable D_{it-1} takes the value one if firm *i* in period *t-1* exported and it takes the value zero otherwise. In turn, the variable $\bar{D}_{it-1}$ takes the value one if firm *i* in period *t-1* did not export and it takes the value zero otherwise. In column 3, the dummy variable D_{it-1} takes the value one if firm *i* in period *t-1* presented at least a bank lending relationship and it takes the value zero otherwise, while the dummy $\bar{D}_{it-1}$ takes the value one if firm *i* in period *t-1* did not have any bank lending relationship and it takes the value zero otherwise. In column 4, the dummy variable D_{it-1} takes the value one if the firm *i* in period *t-1* presented non-performing loans and it takes the value zero otherwise, while the dummy variable $\bar{D}_{it-1}$ takes the value one if the firm *i* in the period *t-1* did not present any default loan and it takes the value zero otherwise. Estimation by GMM system estimator, using the routine xtabond2 (Stata 9.0), developed by Roodman (2005), similarly to table 2. Regarding instruments, besides instruments mentioned in table 2, it was also taken into account in first-differences equations the values of the variables $b_{it-1}D_{it}$ and $b_{it}\bar{D}_{it}$, and in levels equations the values of the variables $b_{it}\Psi_{it}$ and $b_{it}\Psi_{it}$, for lags 2 and 3, when applicable. The remaining regressors were considered as strictly exogenous.

(13) Information on this variable can be found in the Central Credit Register (CCR), which is a database managed by Banco de Portugal, using information relating to credit reported by all credit institutions extending credit, and presents both the total outstanding amount of loans and past due situations (for further information on the CCR see Banco de Portugal's Booklet No 5). The number of bank lending relationships corresponds to the number of financial institutions reporting on-balance sheet claims *vis-a-vis* the concerning firm. A firm is deemed to be in default when, at end of the year, at least one financial institution reports past due loans.

Chart 9

CONFIDENCE INTERVAL FOR THE COEFFICIENT OF THE INTEREST BURDEN VARIABLE



Note: The panels present the confidence interval (at 95 per cent) of the coefficient of the interest burden variable as a function of the share of exports, firm size, number of bank lending relationships and the presence non-performing loans. Additionally, it is also presented some percentiles of the distribution of the exports share, firm size and number of bank lending relationships. However, it should be noted that in the panel related with the exports share, only exporting firms were taken into account in the computation of confidence interval and the respective percentiles.

relationships. In the literature, there is no consensus regarding the impact of the number of bank lending relationships on financing availability. On the one hand, Fama (1985) and Petersen and Rajan (1994) argue that the existence of close relationships with a small number of banking institutions raises the availability of additional financing, and associated financing conditions are better. On the other hand, Rajan (1992) and Bolton and Scharfstein (1996) suggest that the optimum debt structure depends on efficient bargaining, which has associated a sufficiently large number of banks. The estimated values for the coefficients β_2 and β_3 shown in column (3) of Table 3 corroborate the thesis that multiple bank lending relationships raise the bargaining power of the firm. For most firms considered in the analysis, the increase in the number of bank relationships contributes to weaken the sensitivity of investment to the initial financial standing.

Finally, it was examined whether the sensitivity of investment to the interest burden is differentiated for firms with loans in default, which correspond to approximately 4 per cent of the sample under review. The results obtained suggest that corporate investment of those firms with loans in arrears is, on average, significantly lower than in firms without loans in arrears (column (4) of Table 3). In addition, investment does not seem to be statistically sensitive to changes in the interest burden, to the extent that

marginal improvements in the respective financial standing are more likely to improve the value of the creditors' claims than the remaining stock holders.

5. CONCLUSIONS

Indebtedness of non-financial corporations, when evaluated as a percentage of GDP, has increased very significantly since the mid-1990s. This increase was also seen in the indicators calculated from the balance sheet items of the sector, namely the ratio of financial debt to total assets, in spite of the less marked development of this indicator.[14] The increase in indebtedness occurred against the background of a decline in the average level of nominal interest rates, which was associated with the nominal convergence process and subsequent participation in the euro area. Thus, it was the result of a change in the sustainable level of debt in this sector. In this context, the increase in aggregate indebtedness should be qualified on the basis of indicators measuring the capacity of firms to service debt, namely monitoring the ratio of interest payable to corporate current income, and the distribution of this indicator across firms. In aggregate terms, in recent years, this indicator has remained at a lower level than in the mid-1990s, with a much more marked decline in firms that posted the highest levels at the beginning of the period under study. The developments in this indicator corroborates the notion that the strong increase in corporate indebtedness may correspond to a structural change associated with the new economic regime underlying participation in the euro area, characterised by a lower interest rate level and volatility.

As regards monitoring financial stability, it is relevant to focus on the fact that the growth pace of financial debt was more marked for larger firms in the sample period. However, in the period under review, the strong asset accumulation was also higher in the group of larger firms, which partly corresponds to the buoyancy of the restructuring and internationalisation of Portuguese economic groups. Moreover, the corporate credit portfolio of Portuguese banks is significantly concentrated in a small number of large firms, which, in spite of their higher idiosyncratic risk, are usually associated with low default rates.

Monitoring this type of indicators is the more relevant the more the corporate financial standing is liable to affect the development of real activity, in a context of imperfect financial markets. This work reviews investment decisions by a group of non-financial corporations, using individual data for the period from 1995 to 2005. In particular, it gauges the manner in which financial pressure of a given firm, evaluated by the share of operating income allocated to interest payments in each period, has an effect on its investment in the subsequent period. Against this background, the results obtained for firms in the sample suggest that the financial standing is relevant for investment.

Therefore, for the group of firms under review, a negative relationship was found among the variables that measure the financial pressure of firms and their investment. Nonetheless, this sensitivity is not uniform across firms and depends on some of their specific characteristics. In particular, investment is less sensitive to financial pressure in larger firms and does not reveal any sensitivity if the firm has defaulted in its credits. It should be noted, however, that firms in default tend to show lower investment rates. Participation in international trade and the number of bank lending relationships have a non-linear effect on the sensitivity of investment to financial pressure of the firm. For most firms in the sample, though, the increased participation in world trade and the higher number of bank relationships imply a decrease in the sensitivity of investment to its financial standing. When considering the factors that are common to all companies, namely the macroeconomic context, different effects do not seem to exist in

(14) In fact, the debt to assets ratio declined somewhat in the most recent period.

sensitivity of investment to the financial standing between downturns and upturns of economic activity (notwithstanding the pro-cyclical component characterising investment).

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JOB CREATION AND DESTRUCTION IN PORTUGAL*

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> *The fundamental impulse that keeps the capitalist engine in motion comes from the new consumers' goods, the new methods of production or transportation, the new markets… [The process] incessantly revolutionizes from within, incessantly destroying the old one, incessantly creating a new one. This process of Creative Destruction is the essential fact about capitalism.*
>
> *Schumpeter, 1942*

1. INTRODUCTION

In the Portuguese economy, in each quarter of the year, 24 per cent of firms are net creators of jobs while 26 per cent shed labour.[1] The remaining 50 per cent make no change to the size of their work force, though they often modify their structure. The evolution of net employment in the Portuguese economy is related to a process of job creation and destruction, affecting at any one time 125 thousand companies employing 2.1 million workers.

Labour market statistics show that constant job creation and destruction fits in with the Schumpeter definition of economic growth. From the microeconomic point of view, this process is characterised by the search for a perfect match between worker and firm, in a process which could be simply defined as trial and error. As employment is reallocated, with creation and destruction often happening in one firm at the same time, so economic productivity is boosted. The best worker/company matches will last over time, while the less successful will cease, to be replaced by others which will tend to be more productive (Jovanovic, 1979 and Aghion and Howitt, 1992).

The search for a job is therefore one of the most important investments that people make in the labour market, mainly when they are out of work, but also when they are in a job and looking to move. The same happens with companies, for which filling a vacancy is one of their priorities. On both sides – supply and demand – the main aim is to make the process as efficient as possible.

In this article we look at just one side of this equation, that relating to the enterprise, even though this means leaving one important aspect untouched. Indeed, as firms take on new workers, others leave (either because they are made redundant or they choose to leave). In any three-month period in Portugal, 9.5 per cent of those in employment began work less than three months earlier and 9.2 per cent leave an employer, either to move to another job or to inactivity. Quarterly flows of workers therefore in-

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(1) Excluding firms that employ only one work and that decide to maintain that same level of employment.

volve 18.7 per cent of the country's employment level.

There is quite clearly a major reallocation process, both annual and quarterly terms. This is well attested by the number of contractual arrangements set up in the past few years: between January 2000 and June 2007 more than 10.7 million individual relationships (understood as a contractual tie between an employer and a worker) were recorded in the country's social security service. Five million people were involved in this process. Of these, 2.1 million workers had only one employer and 2.7 million had jobs that lasted less than the median duration, 13 months.

The rate of job creation fluctuated at around 14 per cent and job destruction at around 12 per cent. These rates have been falling over time, a situation visible in other developed economies. Quarterly rates, which picture short-term fluctuations, stood at around 6 per cent between 2001 and 2006. It is important to highlight the impact of new companies on the job creation process (35 per cent of the total) and of firms that exited the market as part of the process of job destruction (40 per cent of the total). In international terms, the annual rates are close to those observed in other European countries. However, in quarterly figures for the US and New Zealand, two countries with job protection way below the level in Portugal, the figures come in at around one percentage point (p.p.) higher.

High rates of job creation and destruction are visible across the sectors, but construction and services are higher than manufacturing. The distribution of the rates of employment variation measured at company level shows that there is a significant concentration of gross employment flows in a relatively small number of companies, where there are very high levels of expansion and contraction. This concentration is smaller in services than in manufacturing, given the greater flexibility in the first of these sectors.

Small firms play a significant part in the creation and destruction process, although in net terms it is the large firms that contribute most to job creation. There is a higher creation/destruction rate in firms with lower paid workers (where specific human capital is less important). In these firms, the rates are more than twice what they are in companies with higher salaries, and the former play an essential role in the job creation process. In manufacturing, there is even a significant loss of employment in firms where average salaries are in the higher quintiles.

Finally, it should be pointed out that there is a reduction in net creation of employment as firms age, a situation which reflects the theories of company life cycles. There is also no evidence of regional employment mismatch, since in the period under review (1996-2005) there is a net growth of employment in the 7 regions of Portugal that are analysed.

These results illustrate the enormous heterogeneity in the employment reallocation process. Market conditions have a considerable impact on the determination of these employment flows. Entry conditions, namely, the initial smaller dimension, and the initial internal flexibility (*e.g.*, insipient internal labour markets), often associated with learning new technologies, has an important impact on the determination of employment flows.

In addition, the institutional framework has a major impact on certain aspects of mobility in the labour market (Antunes and Centeno, 2007). In a recent article, Haltiwanger *et al*. (2006) study the relation between regulations in the goods and labour markets and employment flows. The empirical results of an analysis that covers several countries suggest that job protection legislation reduces the rate of reallocation of labour, mainly in sectors that require more frequent adjustments in labour. These results are fundamentally in line with those detailed in this article regarding Portugal. For example, a comparison with the US shows that the main difference in rates of job reallocation is in the services sector, which is the sector where adjustments are more frequent.

2. JOB CREATION AND CREATIVE DESTRUCTION

Labour market efficiency should be measured by its capacity for adjustment and the creation of new jobs that are more productive than those destroyed. These adjustment processes, involving both sides of the equation, frequently occur at the same time in a specific firm.

The capacity for firms to adjust their level of employment and its structure therefore constitute an element fundamental to their productivity. In the same way, the capacity for workers to adapt to these developments is one of the crucial factors for their success in the labour market. Labour market efficiency is the result of an adequate matching of what both workers and firms want. The Schumpeterian vision of the way modern economies work has recently been formalised in a number of macroeconomic models, such as the economic growth model put forward by Aghion and Howitt (1992). Here, endogenous innovation generates creative destruction and economic growth, while in the *vintage* capital models of Caballero and Hammour (1994), the role of firm exits and entries is highlighted as a way of adopting new technologies.

From a microeconomic point of view, the importance of reallocation in the labour market is based on the concept of "employment as an experience good", as defined by Jovanovich (1979). In this context, new jobs have an unknown quality, which is revealed over time as the jobs are "experienced". As a result, the good jobs survive and the bad jobs disappear. This form of adjustment has important consequences for the way the labour market works, as shown by Topel and Ward (1992), Farber (1999), and Arozamena and Centeno (2006).

When analysing the way the labour market works, we should always bear in mind that its capacity for adjustment is boosted, and therefore also limited, by the level of competition existing in the markets of goods and services. In the presence of competitive product markets, productivity growth, which translates into higher salaries and more employment, is obtained mainly by low productivity firms being replaced by more highly productive ones. In tandem there is the replacement of low productivity jobs in existing firms by more efficient jobs. In this way, it is crucial to guarantee the existence of a competitive environment in markets that use "labour" as a productive factor, but also to reflect this environment in the competitive activity of firms in the labour market.

Two factors – changes in the way economies are developing on a global scale, and the opening up of markets – have bolstered the calls for greater flexibility in market organisations and, inevitably, in the labour market. When the economic environment in Portugal changed, due to the integration in the euro area, there came an increased need to have a labour market capable of withstanding shocks and economic fluctuations.

The process of job creation and destruction witnessed in today's labour market can be measured by the activities of firms operating in it. Labour law protects jobs directly through restrictions on the capacity of employers to sever a tie. One example of this is that the law sets out specific conditions, economic and otherwise, in which severance is possible. In addition, in most European nations, direct financial costs are entailed, for example through compensation and procedural costs, this latter by making it compulsory to announce redundancies beforehand.

In most of Europe, job protection cuts in as the response of governments to protect workers in the face of the possibility of losing their jobs. Inevitably, however, restrictions on how companies can destroy jobs impacts on their ability to create new ones. The results, in all cases, are three-fold: fewer creation/destruction flows in employment, the maintenance of inefficient, non-productive jobs and a lower capacity in the economy for reallocation of available resources.

In Lazear (1990), there is an important contribution to the discussion on the impact of different aspects of job protection legislation on the level of employment. The legislation covering compulsory redundancy compensation does not have a real impact (for example on the level of employment), since the company can minimise the effects of severance pay by (hypothetically) imposing a transfer fee on the employee at the start of the contract or else by lowering the initial salary. In practice, given the difficulty of using the transfer fee in the context of workers' financial constraints, the biggest impact of the legislation results in lower salaries throughout the professional career.

The interaction of the various elements in the job protection system has been described in Bertola and Rogerson (1997). Fewer job flows resulting from job protection can be offset by turnover, a factor which is made easier for the employer by the generosity of the unemployment insurance system or other forms of wage compression used in the welfare state. The work of Bertola and Rogerson can be seen in conceptual terms as a way of bringing the two systems of protection into an articulate whole.

These findings imply that there will be lower rates of job creation/destruction in countries with more rigid labour laws. However, in most of such countries, the law itself introduces ways of making the market more flexible and these over time generate polarization and a dual labour market, where two groups co-exist: one, with protection and lower creation/destruction rates and another which feels almost all the impact of short term economic adjustments. The second of these is considerably exposed and has high but inefficient job creation/destruction rates.

The wealth of evidence collated in Davis and Haltiwanger (1999) points to three main determinants in the reallocation of employment in an economy: the sectoral distribution of employment and the size and age of the firms. In general, the services sector has higher rates of job reallocation, while the manufacturing sector displays a wide range of job creation/destruction scenarios. Economies with a greater proportion of services will therefore tend to have higher creation/destruction rates. Such rates are also lower for larger firms and older firms. Any comparison between countries should therefore bear in mind the different situation regarding all three elements outlined above.

3. DATA

There are two statistical sources available for an analysis of job creation and destruction in the Portuguese economy. This means that the results can be cross-checked for validation and also, more importantly, it is possible to look at different angles of the whole job creation/destruction process. The statistical sources are the *Quadros de Pessoal* (*QP*) collected by the Office of Strategy and Planning in the Ministry of Labour and Social Solidarity (*GEP/MTSS*) and the database for the records of wages available through the Social Security Structure (*BDRSS*), collected by the Ministry's Institute of Information Technology.

The data were all analysed in anonymous format and there is no possibility that the information published here could lead to identification of any individual or firm.

3.1. *Quadros de Pessoal*

QP are administrative data collected annually (in October of each year) by the *GEP/MTSS*. It brings together the data on all Portuguese firms employing at least one worker, although it leaves out public administration, organisations that employ temporary rural workers and domestic help. The coverage makes it practically a census, and as such it provides an extremely important source for a microeconomic analysis of employment in Portugal. The information allows for firms to be studied over time,

along with their establishments and labour force.

The specific analysis of employment turnover based on the figures in the *QP* was developed through a system for longitudinal analysis, more specifically the longitudinal information system to monitor the development of firms (o *Sistema de Informação de Acompanhamento das Trajectórias de Empresas e Estabelecimentos - SILATEE*).

The main figure for volume of employment used to calculate flows is the total number of people in a firm's service[2] at a specific time.

The analysis covers the period between 1995 and 2005, this last being the final year for which figures are available. For 1995, the information covers some 192 thousand firms employing around 2.2 million people. For 2005, the figures are around 340 thousand companies employing almost 3 million people.

Incoming and outgoing firms on the *SILATEE* database in theory account for the creation of new companies and the closure of others. However, even though the data is tantamount to a census, the *QP* do not always picture a longitudinal path for existing firms. From the information available for the period prior to this analysis, it was not possible to monitor 12 per cent of companies in 1995. These are considered to be "temporarily absent" from the database, to the extent that they do not figure on the *QP* for that period, though they are to be found there later. It should be noted, however, that this figure falls to half the total in 2004. The information for 2005 does not contain any "temporarily absent" companies, since no data are available for 2006. From this standpoint, it was taken that all companies not on the database in 2005 were closed. Figures for closures in that year are therefore overstated.

3.2. Database on wages from Social Security service (*BDRSS*)

The *BDRSS* is also administrative data, with monthly records which are permanently updated. Therefore, it constitutes a highly important source of information on short-term labour market movements.

Social Security information has come to be used ever more frequently in various countries where studies for the labour market are being carried out. These studies cover mobility and wage determination (see, for example, the work on job creation/destruction cited throughout this article). The information derives from statements of salaries subject to mandatory contribution for the Portuguese social security system and as such its reliability is, *a priori*, higher than any other available information on the labour market.

The *BDRSS* information used in this study covers the period from March 2000 to March 2007. It serves as a basis for a record for all the worker/employer matches for which at least one month of contributions is lodged at the Social Security, with the worker registered as being on the payroll. For each of these matches, a record was made of the information relating to the first and last month for which there is a salary stipulated, along with the number of months in the period when a salary was paid.

For around 75 per cent of jobs recorded here, there are no interruptions in the salary stream, so there was deemed to be one labour relationship. The remaining cases may have corresponded to a seamless working relationship within one contractual agreement but this had to be verified. Given that these cases are scattered and difficult to identify, all cases where there was only a one-month interruption in salary were not considered contractual interruptions.

(2) By people in a firm's service is meant all those who at that moment had work in the firm, however long it lasted, with the conditions being as follows: those with an employment contract and receiving a salary on the basis of it; those connected to the firm but without an employment contract and therefore not in receipt of a regular pay for time worked or supplied (for example owner-managers, unpaid family members, and staff working at cooperatives); those with a contract at another firm/organisation but paid direct by the firm where they actually work; those from the categories above away at the time, whether on holiday, or because of labour disputes, vocational training, sickness or accident from work.

For the remaining cases (interruptions of more than one month), the additional information in various databases was used to identify the justification for the interruption. These were the Records of Payment Equivalents, the Unemployment Records, the Record of Temporary Inability to Work, the Pension Qualification Records and the Additional Welfare Benefit Records. The criterion adopted for regarding a labour relationship as continuous was as follows: whenever there was a period when unemployment benefit was received, or any other subsidy not corresponding to a temporary inability to work (such as maternity or paternity leave or sickness), this was considered an actual break in a labour/contractual relationship; in the cases where the additional information was not conclusive, the decision was taken to consider the labour relationship as on-going, so as not to generate spurious labour market flows. Such situations covered 7 per cent of the total. The exhaustive search through the available databases made it possible to categorise the overwhelming majority of periods of absence from salary receipt situations described above.

These decisions, along with the fact that the database covers actual social security financial contributions, mean that the reported figures for job creation/destruction are lower bounds of the actual values.

4. CONCEPTS

In any study of job creation/destruction, there is a series of fundamental concepts based on the pioneering work of Davis, Haltiwanger and Schuh (1993). The concepts below are from this seminal work, the aim being to keep within the traditional framework and allow for international comparisons using the findings set out here.

Job creation – Job creation at time *t* equals employment gains summed over all firms that expand or start up between *t* and *t-1*.

Job destruction – Job destruction at time *t* equals employment losses summed over all firms that contract or shut down between *t* and *t-1*.

Net job creation – Net employment change at time *t* is the difference between employment at time *t* and *t-1*.

Job reallocation – Job reallocation at time *t* is the sum of all employment gains and losses that occur between *t* and *t-1*.

To convert these measures into rates, divide the flows by the average level of employment in the periods *t* and *t-1*. Davis, Haltiwanger and Schuh (1996) discuss the technical advantages of this measurement against traditional growth rates. For example, for those firms that did not exist at *t-1*, growth rates could not be calculated, while in the definition used in this article, they assumed value 2 (and for the case of firms closing down at time *t* the destruction rate is -2).

It should be noted that these ways of measuring job creation/destruction fail to take into account two important components in the reallocation process. Firstly, there is no assessment of the effects of changes in the composition of employment within any one company. For example, net zero variations may be associated with the creation and destruction of the same number of jobs (with a concomitant flow of workers) without this being reflected in the measurement defined above. Secondly, the measurements are made at fixed intervals and, therefore, calculations will not reflect job reallocation reverted within that time interval. In both cases, the measurements underestimate the total job reallocation. The databases used do allow worker flows to be analysed, though this degree of detail will be tackled in future research.

Firm size is an important characteristic in the job creation/destruction process. Size, however, relates

to the point when the assessment was made. Firms that enter the market may be measured prior to starting business, and will be classified as small (size zero) but if the measurement is taken during the setup period, they may come into any of the size categories. The conclusions of an analysis can therefore be influenced by the way measurement is carried out. In this study, the following categories of companies (N_t) are used:

i) **Current average**: $(N_t+N_{t-1})/2$. This uses the period when change in employment occurs to define the company size. Expansion or shrinkage will therefore affect the definition of size.

ii) **Previous average**: $(N_{t-1}+N_{t-2})/2$. This defines the size of the company in periods before the variation in employment. This measurement is subject to the mean regression fallacy (Friedman 1992).

iii) **Average of the period**: $(N_1 + \ldots + N_T)/T$. This defines the size of the company on the basis of average size during the period analysed. This, like the first, also depends on the expansion or shrinkage of employment.

The limitations on these alternative definitions have been widely discussed in the literature (Davis, Haltiwanger and Schuh (1996) and Davidsson, Lindmark and Olofsson (1998). See Hijzen, Upward and Wright (2007) for a summary).

5. JOB CREATION AND DESTRUCTION: OVERVIEW

There are many factors that influence how job creation/destruction is seen and one that is specifically important is the question of how often the measurement is made, given the way in which the labour market has been described. From this point of view, the *BDRSS* database can be seen as a fundamental tool in an analysis of the labour market in Portugal, since it is an all-embracing figure issued at monthly intervals. It is, however, rarely used, and this means that comparisons with other widely used databases are advisable. Particular attention is therefore given here to the comparison with the figures in the *QP*, where calculations should, a priori, be very similar.

5.1. Annual rates of job creation and destruction: *QP* and *BDRSS*

Job creation/destruction rates for Portugal since 1995 are high and comparable with those recorded in other developed countries. Similar values are obtained from an analysis of the period that the two databases have in common (2001-2005), which gives an added validation to their use. Average job creation rates differ by 0.2 per cent, standing at 13.9 per cent in the *BDRSS* and 13.7 per cent in the *QP*. Job destruction rates also differ slightly, at 12 per cent in the first and 12.4 per cent in the second (Table 1). In terms of profile, the two databases also show similar trends in the way job creation and destruction move: in the 2001-2005 period the rate of job creation fall continuously, and the highest rates of job destruction occur in 2002 and 2003, followed by a slowdown.

The *QP* figures are available for a longer period and if they are split according to the economic cycle – accelerating growth up to 2001 and then slowdown – it can be seen that job creation rates follow a clear path in line with the economic cycle, while job destruction rates rose during the recent slump. For the period 1996-2001, the job creation rate is 14.9 per cent and the destruction rate is 10.8 per cent, leading to a net rise of 4.1 per cent in employment. After 2001, the net figure for job creation fell steeply to 0.4 per cent as a result of the fall on the creation side and a rise, albeit less marked, on the destruction side. It is interesting to note that the poor state of the economy has had a greater impact on the capacity to create new jobs than on the number of jobs destroyed. In developed economies, the typical situa-

Table 1

ANNUAL RATES OF JOB FLOWS 1996 – 2006

Year	*BDRSS*				*QP*			
	Job creation rate	Job destruction rate	Net job creation rate	Job reallocation rate	Job creation rate	Job destruction rate	Net job creation rate	Job reallocation rate
1996	-	-	-	-	12.4	10.5	1.9	22.9
1997	-	-	-	-	14.2	9.8	4.5	24.0
1998	-	-	-	-	14.8	10.3	4.4	25.1
1999	-	-	-	-	14.3	10.5	3.8	24.8
2000	-	-	-	-	16.3	11.4	4.9	27.6
2001	17.1	9.7	7.4	26.7	17.4	12.3	5.1	29.6
2002	15.6	13.2	2.5	28.8	14.6	13.4	1.3	28.0
2003	13.1	13.3	-0.1	26.4	11.7	13.1	-1.4	24.8
2004	12.1	12.3	-0.1	24.4	11.8	11.8	-0.1	23.6
2005	11.5	11.6	-0.1	23.0	13.1	11.4	1.7	24.4
2006	11.3	11.1	0.2	22.5	-	-	-	-
Average								
Period	13.5	11.8	1.6	25.3	14.1	11.4	2.6	25.5
2001-2005	13.9	12.0	1.9	25.9	13.7	12.4	1.3	26.1
Standard deviation								
Period	2.4	1.4	3.0	2.4	1.9	1.2	2.3	2.2
2001-2005	2.4	1.5	3.3	2.2	2.4	0.8	2.5	2.6

Sources: *BDRSS* (2000-2006); *SILATEE* (1995-2005). Authors' calculations.

tion is that the process of job reallocation (both inevitable and desirable) leads to a net average rise on the creation side and Portugal is no exception. The 10-year period 1996-2005 shows an average 2.6 per cent rate of net job creation.

5.2. Quarterly creation and destruction rates on the *BDRSS*

There are inter-annual fluctuations in the job creation process, which become clearer at higher frequencies, but that are not captured in the annual adjustment of employment. In particular, there is a marked matching process through trial and error involving individual workers and companies, generating greater inter-annual fluctuations: companies lay off workers whose productivity is lower than expected and workers accept job offers from companies where their qualifications make a better match. Quarterly figures also capture other aspects of the fluctuations, which are smoothed out over the year.

Between March 2001 and March 2007, the volume of workers in employment rose from 2,911,763 to 2,955,841 (Table 2). This represents a gain of 44,078 jobs, but the figures hide the process whereby jobs are created and destroyed to reach this figure. In fact, over this period, new companies and those expanding created 3,704,081 new jobs, with 3,660,003 jobs destroyed as companies contracted or closed.[3]

In terms of the average volume of employment in two consecutive periods, job creation and destruction rates come in at a sizeable percentage of total employment: on average, 5.3 per cent of jobs in each quarter are new jobs, and 5.1 per cent of existing jobs from the previous quarter are destroyed (Table 2).

(3) As already mentioned in Section 4, the net increase in employment may involve hiring and severance of more than one worker for a given vacancy, so these numbers underestimate to a considerable extent the total number of labour relationships actually created and destroyed during this period.

Table 2

VOLUME AND RATES OF EMPLOYMENT FLOW, QUARTERLY, 2001 – 2007

Year : Month	Volume				Rate			
	Total employment	Job creation	Job destruction	Net job creation	Job creation	Job destruction	Net job creation	Job reallocation
2001 : 03	2 911 763	211 382	162 041	49 341	7.3	5.6	1.7	12.9
2001 : 06	2 975 957	191 702	127 508	64 194	6.5	4.3	2.2	10.8
2001 : 09	2 980 608	172 697	168 046	4 651	5.8	5.6	0.2	11.4
2001 : 12	2 972 000	178 979	187 587	- 8 608	6.0	6.3	-0.3	12.3
2002 : 03	2 985 130	212 311	199 181	13 130	7.1	6.7	0.4	13.8
2002 : 06	3 033 072	190 324	142 382	47 942	6.3	4.7	1.6	11.1
2002 : 09	3 013 779	149 666	168 959	- 19 293	5.0	5.6	-0.6	10.5
2002 : 12	2 997 156	157 379	174 002	- 16 623	5.2	5.8	-0.6	11.0
2003 : 03	2 981 162	179 563	195 557	- 15 994	6.0	6.5	-0.5	12.5
2003 : 06	2 993 268	156 693	144 587	12 106	5.2	4.8	0.4	10.1
2003 : 09	2 977 990	133 908	149 186	- 15 278	4.5	5.0	-0.5	9.5
2003 : 12	2 963 687	145 188	159 491	- 14 303	4.9	5.4	-0.5	10.3
2004 : 03	2 977 724	173 499	159 462	14 037	5.8	5.4	0.5	11.2
2004 : 06	3 016 933	158 235	119 026	39 209	5.3	4.0	1.3	9.3
2004 : 09	2 991 113	120 330	146 150	- 25 820	4.0	4.9	-0.9	8.9
2004 : 12	2 981 033	131 668	141 748	- 10 080	4.4	4.7	-0.3	9.2
2005 : 03	2 975 115	152 817	158 735	- 5 918	5.1	5.3	-0.2	10.5
2005 : 06	3 008 260	147 388	114 243	33 145	4.9	3.8	1.1	8.7
2005 : 09	2 990 062	121 587	139 785	- 18 198	4.1	4.7	-0.6	8.7
2005 : 12	2 976 249	129 020	142 833	- 13 813	4.3	4.8	-0.5	9.1
2006 : 03	2 981 057	154 445	149 637	4 808	5.2	5.0	0.2	10.2
2006 : 06	3 015 160	146 073	111 970	34 103	4.9	3.7	1.1	8.6
2006 : 09	2 991 211	119 643	143 592	- 23 949	4.0	4.8	-0.8	8.8
2006 : 12	2 963 515	119 504	147 200	- 27 696	4.0	4.9	-0.9	9.0
2007 : 03	2 955 841	161 462	169 136	- 7 674	5.5	5.7	-0.3	11.2
Average	2 984 354	156 619	152 882	3 737	5.3	5.1	0.1	10.4
Total (2001:06-2007:03)		3 704 081	3 660 003	44 078				
Standard deviation	23 839	27 117	22 632	26 619	0.9	0.8	0.9	1.5

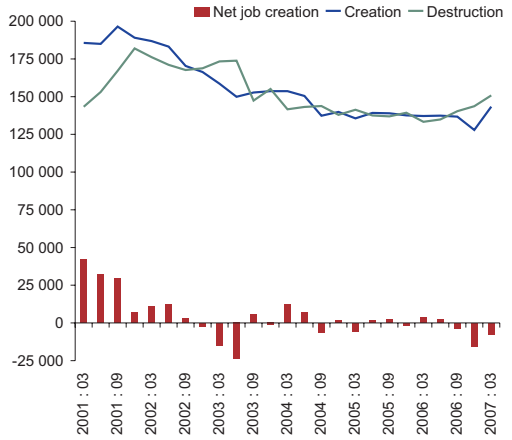
Sources: *BDRSS* (2000-2007). Authors' calculations.

It should be noted that these volumes show a big seasonal influence. The first quarter of any year shows a major job reallocation process. The third quarter is the period least used by firms to reallocate their workers. This pattern of activity in job creation/destruction is also visible in the intra-annual evolution of the unemployment rate, which has a similar seasonal pattern; the periods of greater reallocation are those when the unemployment rate adjusted for seasonal influences is lower than the unadjusted figure.

There is an interesting stylised fact, typical of developed economies: the increase in the unemployment rate in recent years has been associated fundamentally with a slowdown in job creation rates, since the job destruction rate has in fact fallen, even if only slightly (Chart 2). This goes against the commonly held opinion that globalisation has led to an increase in unemployment as it causes jobs to be destroyed. In terms of economic policies, these observations suggest that the emphasis should be on worker protection rather than on job protection and on providing better conditions for job creation: the existing legislation, which conditions strongly job destruction, is not only inefficient (it does not stop the destruction), but it is also ineffective (it cuts down the creative process of efficient reallocation of resources).

Chart 1

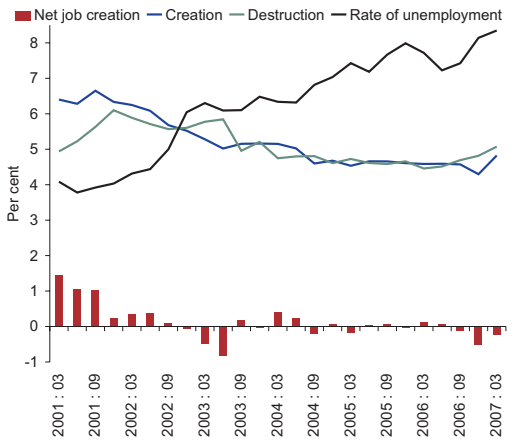
QUARTERLY JOB DESTRUCTION, 2001-2007 (VOLUME)



Sources: *BDRSS* (2001-2007). Authors' calculations.

Chart 2

QUARTERLY JOB CREATION RATES, 2001-2007



Sources: *BDRSS*; *INE* Employment survey (2001-2007). Authors' calculations.

6. THE CREATIVE PROCESS UNDER THE MICROSCOPE

An analysis of the labour market clearly gains from having statistical information that illustrates how job reallocation occurs. Various factors are important in the analytical process: the size of the firms, their age, their geographical spread, and the heterogeneity of reallocation by degree of average salaries in the firms. These factors are the subject of this section.

6.1. Decomposition: expansion, new entrants, contraction, closures

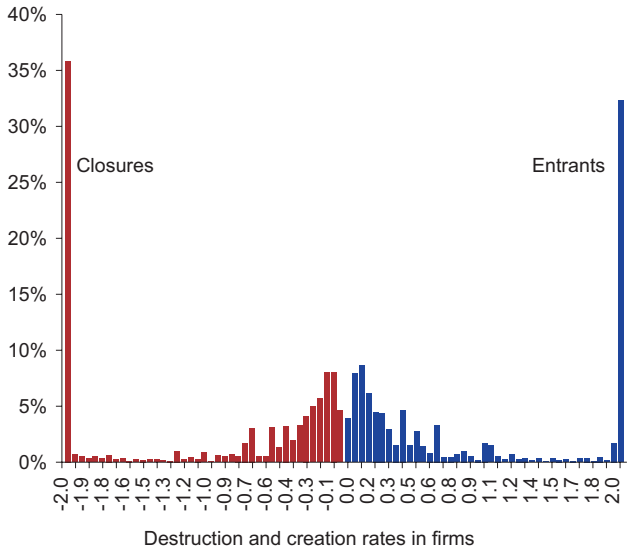
The process of job creation can be decomposed into firms that expand their labour force and new firms, while the job destruction process can be broken down similarly into those that contract and those that close down. New entries and closures are the two extremes on the distribution rates relating to employment growth. They should be seen in terms of the process whereby new capital is incorporated and obsolete capital is destroyed. This is in line with the view of economic growth in *vintage* capital models. The remaining points on the distribution also provide useful pointers: they give us a more complete view of the Schumpeterian process of creative destruction – new technologies and new consumer needs – and they give us the means to analyse the impact of adjustment costs in companies as they react to aggregate and one-off shocks.

Chart 3 shows the distribution in the rates of job variation at firm level for 2006. The bars furthest to the left and to the right correspond respectively to those companies that entered the market and those that closed down.

One of the most important facts that this chart illustrates is the considerable concentration of job reallocation in a relatively small number of firms, which tend to make considerable adjustments to their labour force, a fact that is in line with the findings of Davis and Haltiwanger (1999) and Foote (1998). This behaviour runs counter to the possible existence of quadratic adjustment costs, which would lead to smoother changes and would tend to support an explanation based on the existence of fixed adjustment costs and the use of policies with bands of inaction, *i.e.* that companies withstand a succession of

Chart 3

DISTRIBUTION OF JOB CREATION AND DESTRUCTION RATES, 2006



Sources: *BDRSS* (2001-2007). Authors' calculations.
Note: The left (right) of the chart shows the percentage of total employment destroyed (created) based on firms that contracted (expanded) their work force by less than 5 per cent, 5-10 per cent and so on in 5 p.p. intervals.

shocks before having recourse to labour force adjustments. Adjustments such as this, when they happen, are huge (Foote (1998)).

It should also be emphasised that the creative dynamism associated with the advent of new firms is similar to the dynamism of closure. During the period 2001-2006, new firms accounted on average for 35 per cent of job creation while companies closing accounted for 40 per cent of job destruction. This small difference is more than offset by the dynamism of expanding companies. These firms are more efficient and for that very reason they are in a better position to ensure their continuity and increase the number of jobs, as well as providing better conditions for their workers, who can get better salaries in return for higher productivity.

Fixed adjustment costs may explain the behaviour of companies in terms of job adjustment policies, illustrated in Chart 3. This would seem to have a different impact in sectors with different degrees of internal flexibility. With this in mind, a separate analysis was undertaken of firms in manufacturing and in services. The first is typically associated with higher adjustment costs and it should therefore have more concentrated creation and destruction rates.

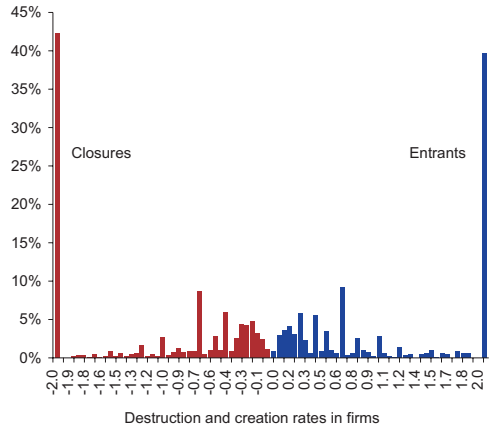
Charts 4 and 5 confirm this notion. Adjustments in manufacturing are more abrupt (more closures and bigger variations in employment, a picture also reflected on the job creation side). For the economy as a whole, job destruction in firms where there is more than a 20 per cent fall in their level of employment accounts for 77.3 per cent of total job destruction, in manufacturing this percentage is 84.3 per cent and in services 78.3 (Chart 3).

The importance and the size of job creation/destruction flows in companies raises considerable doubts about the validity of aggregate analysis by sector. Models based on a representative employer tend to smooth out the behaviour of firms as very heterogeneous patterns are aggregated.

Chart 4

DISTRIBUTION OF JOB CREATION AND DESTRUCTION RATES

Manufacturing, 2006

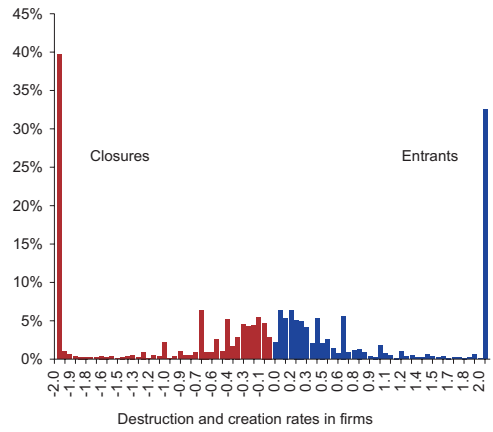


Sources: *BDRSS* (2001-2007). Authors' calculations.

Chart 5

DISTRIBUTION OF JOB CREATION AND DESTRUCTION RATES

Services, 2006



Sources: *BDRSS* (2001-2007). Authors' calculations.

Table 3

PERCENTAGE OF JOB CREATION AND DESTRUCTION BY RATES, 2006

Sector	Rates of destruction in firms			Rates of creation in firms		
	[-2,-1)	[-1,-0.2]	[-0.2, 0)	(0, 0.2]	(0.2, 1]	(1, 2]
Total of the economy	42.6	26.1	31.3	31.1	28.3	40.6
Manufacturing	49.4	35.0	15.7	14.8	37.4	47.9
Services	46.9	31.4	21.7	25.3	35.4	39.2
Manufacturing						
US	32.9	44.0	23.1	30.7	45.1	24.2
Denmark	45.9	33.7	20.4	23.4	37.4	39.1

Sources: *BDRSS* (2000-2007). Authors' calculations. Davis *et al.* (1996) for the US and Albæk and Sorensen (1998) for Denmark.

The importance and the concentration of major job creation/destruction flows create adjustment problems for workers and for the geographical areas in which the flows occur. These difficulties do not only occur in the destruction processes, where there are more acute problems for the worker looking for a new job, but they also have an effect on the job creation process, since they can lead to mass emigration and a scarcity of basic infrastructures needed to attract new people (schools, hospitals and so on).

6.2. Sectoral heterogeneity

An analysis of rates of job creation and destruction between sectors is another way of identifying the existence of idiosyncratic effects at sectoral level in the job creation/destruction process. In the construction industry, there are quarterly job creation rates that are two to three times higher than in manufacturing, which in its turn is slightly lower than in the services sector. The figures for destruction are slightly lower in all sectors.

The high rates of reallocation visible in most sectors and subsectors suggest that job flows are associated with intensive adjustments in each sector, rather than transfer between sectors. This phenomenon is important for an understanding of the impact of shocks in each sector on such variables as productivity and unemployment. These differences are also influenced by the role played by human resources management in each sector. This depends, for instance, on the importance given to human capital and the rate of mutually agreed severance versus lay offs. Ultimately, all these sectoral features have an impact on the equilibrium salary, which reflects the risk of losing a job (and then having to find another) along with the return on investment in the human capital of labour and help to explain the persistent salary gap between sectors.

In sectoral terms, the data reflect the tertiarisation of the Portuguese economy (Table 4). Quarterly job creation rates in services are higher than in manufacturing, though, contrary to expectations, destruction rates in manufacturing are lower than in services. The net loss of employment in manufacturing stems therefore from a lower job creation capacity. The restructuring process that the Portuguese economy is undergoing is affecting above all the job creation capacity of manufacturing where, since June 2001, there has been a negative net job creation.

Services, on the other hand, in spite of a slowdown, continue to provide a positive contribution to job creation. The primary and mining sectors together, like the construction industry, show higher and more volatile job creation and destruction rates. During the period between March 2001 and March 2007, construction had a positive effect on employment (a net creation rate of 0.6 per cent) and the other sectors came in negative (a net creation rate of -0.7 per cent).

Overall, the figures illustrate an important feature of the net job creation process: it is not necessarily the sector with lower job destruction rates that grows in net terms. In fact, jobs are created and destroyed persistently in a process which seems to be related to renovation of the productive structure: companies that are technologically inadequate are being replaced by more productive enterprises better fitted to face the new economic demands.

The heterogeneity visible in the sectors described above is even more visible when sub-sectors are analysed. Table 5 uses annual data and breaks down the information into two-digits classification of economic activity (*CAE*). A number of facts can be highlighted from this. Firstly, the rates of job destruction are higher in the textiles and leather industry (*CAE* code *DB* and *DC*) with annual figures at around 13 per cent. In the sub-sectors of manufacturing industry, with few exceptions, there are average annual job destruction figures above the job creation rates. As already mentioned, construction has the highest rates for job creation and destruction, at around 21 and 17 per cent respectively. The services sub-sectors show positive net job creation figures but also have higher rates for both creation and destruction.

6.3. Firm size[4]

One of the features of the entrepreneurial structure of the Portuguese economy is the large number of small firms. Defining firm size in terms of the average number of persons working in a firm between 1994 and 2005, the *QP* figures show that 3 out of every 4 firms have less than 5 employees. However, the biggest amount of employment is to be found in companies with between 10 and 49 staff, even though these only account for 10 per cent of existing firms.

In the job creation/destruction process, the size of the firm may play an important part. Bigger firms

(4) The findings presented in this section use the average volume of work in the period to classify companies according to their size (see Section 4). Calculations based on other definitions can be consulted in Centeno, Machado and Novo (2008).

Table 4

QUARTERLY JOB FLOWS BY SECTOR, 2001 – 2007

Year : Month	Agriculture, Fisheries and Mining			Manufacturing			Construction			Services		
	Job creation	Job destruction	Net job creation	Job creation	Job destruction	Net job creation	Job creation	Job destruction	Net job creation	Job creation	Job destruction	Net job creation
2001 : 03	9.5	7.6	**2.0**	5.0	4.7	**0.3**	15.0	6.6	**8.4**	6.9	5.9	**1.0**
2001 : 06	10.6	6.3	**4.4**	3.9	4.1	**-0.2**	12.0	7.3	**4.7**	6.5	3.9	**2.6**
2001 : 09	7.9	8.4	**-0.5**	4.2	4.8	**-0.5**	11.2	8.9	**2.4**	5.5	5.4	**0.1**
2001 : 12	7.3	11.6	**-4.3**	3.6	5.2	**-1.5**	9.7	8.3	**1.4**	6.4	6.0	**0.4**
2002 : 03	9.3	10.6	**-1.3**	5.3	5.3	**-0.1**	11.3	9.6	**1.7**	7.0	6.5	**0.5**
2002 : 06	10.2	7.2	**3.0**	3.7	4.0	**-0.4**	9.3	7.7	**1.6**	6.7	4.3	**2.4**
2002 : 09	8.8	9.2	**-0.4**	3.0	4.1	**-1.0**	7.2	8.6	**-1.3**	5.0	5.4	**-0.3**
2002 : 12	7.8	11.5	**-3.7**	3.0	4.4	**-1.4**	6.7	8.7	**-2.0**	5.6	5.4	**0.2**
2003 : 03	10.9	9.3	**1.6**	3.9	4.8	**-0.9**	9.7	9.9	**-0.2**	6.0	6.0	**-0.1**
2003 : 06	9.7	7.7	**2.0**	2.9	3.8	**-0.9**	7.1	7.7	**-0.7**	5.7	4.1	**1.5**
2003 : 09	8.1	9.1	**-1.0**	2.6	3.6	**-1.0**	6.5	7.5	**-1.0**	4.6	4.9	**-0.3**
2003 : 12	7.0	9.8	**-2.8**	2.6	3.9	**-1.3**	6.7	7.7	**-1.1**	5.6	5.2	**0.3**
2004 : 03	8.4	7.8	**0.6**	3.9	4.2	**-0.3**	8.8	7.1	**1.8**	6.1	5.4	**0.6**
2004 : 06	8.6	6.6	**2.0**	2.5	3.5	**-1.0**	6.8	6.6	**0.3**	6.0	3.6	**2.4**
2004 : 09	6.3	7.7	**-1.5**	2.5	3.6	**-1.1**	6.1	7.3	**-1.2**	4.2	4.8	**-0.6**
2004 : 12	6.7	9.5	**-2.8**	2.3	3.7	**-1.4**	6.0	6.9	**-0.9**	5.0	4.5	**0.5**
2005 : 03	6.5	8.6	**-2.0**	3.4	4.5	**-1.2**	8.4	7.4	**1.1**	5.4	5.2	**0.2**
2005 : 06	8.6	6.4	**2.3**	2.6	3.6	**-1.1**	7.1	6.5	**0.7**	5.4	3.3	**2.1**
2005 : 09	6.3	7.6	**-1.3**	2.6	3.6	**-1.0**	6.5	6.7	**-0.2**	4.2	4.6	**-0.4**
2005 : 12	6.1	8.7	**-2.6**	2.4	3.8	**-1.4**	6.1	6.8	**-0.7**	4.8	4.5	**0.3**
2006 : 03	6.5	8.8	**-2.4**	3.8	3.8	**0.0**	9.2	7.3	**1.8**	5.1	4.7	**0.4**
2006 : 06	9.3	6.6	**2.7**	2.9	3.2	**-0.3**	6.7	7.2	**-0.4**	5.1	3.2	**2.0**
2006 : 09	6.8	9.7	**-2.9**	2.7	3.5	**-0.8**	6.4	7.4	**-1.0**	4.0	4.6	**-0.5**
2006 : 12	6.0	10.2	**-4.2**	2.6	4.0	**-1.5**	6.4	7.0	**-0.7**	4.1	4.7	**-0.5**
2007 : 03	6.9	10.9	**-4.0**	4.0	4.8	**-0.8**	9.7	8.0	**1.7**	5.4	5.4	**0.1**
Average	8.0	8.7	**-0.7**	3.3	4.1	**-0.8**	8.3	7.6	**0.6**	5.4	4.8	**0.6**
Standard deviation	1.5	1.6	**2.6**	0.8	0.6	**0.5**	2.3	0.9	**2.2**	0.9	0.8	**1.0**

Sources: *BDRSS* (2000-2007). Authors' calculations.

Table 5

AVERAGE ANNUAL JOB FLOWS PER SECTOR (*CAE* 2 DIGITS), 2001 – 2006

Classification of economic activities (*CAE* 2 digits)		Rate			
Code	Designation	Job creation	Job destruction	Net job creation	Job reallocation
AA	Agriculture	16.1	15.9	0.2	32.0
BB	Fishing	15.3	20.4	-5.1	35.7
CA	Energy production	17.6	18.5	-0.9	36.1
CB	Mining	10.3	11.5	-1.2	21.8
DA	Food and beverage	8.9	8.7	0.2	17.6
DB	Textiles	8.5	13.6	-5.1	22.1
DC	Leather goods	8.4	13.3	-4.9	21.7
DD	Wood and cork	9.8	11.8	-2.0	21.6
DE	Paper, pulp and printing	8.1	10.5	-2.3	18.6
DF	Oil related	3.8	6.7	-2.9	10.4
DG	Chemical and synthetic fibre production	6.5	7.2	-0.7	13.7
DH	Rubber and plastics	8.1	6.2	1.9	14.2
DI	Other non-metal mining	7.8	11.0	-3.2	18.8
DJ	Metallurgical products	9.9	10.6	-0.7	20.4
DK	Machines and machine tools	7.9	8.0	-0.1	15.9
DL	Electrical and optical equipment	8.9	11.3	-2.5	20.2
DM	Transport equipment production	7.9	10.4	-2.4	18.3
DN	Furniture, jewellery, recycling and others	9.4	11.0	-1.6	20.3
EE	Electricity production and distribution	7.1	8.5	-1.3	15.6
FF	Construction	21.1	17.2	3.8	38.3
GG	Wholesale and retail	12.1	11.3	0.8	23.5
HH	Lodging, restaurants	15.1	11.5	3.6	26.6
II	Transport	12.8	11.2	1.6	24.0
KK	Property	19.0	11.8	7.2	30.8

Sources: *BDRSS* (2000-2007). Authors' calculations.
Note: Some sectors are omitted due to their small size or lack of cover in the Social Security system (for example those that are covered by a different system).

tend to find it easier to react to economic shocks without adjusting their level of employment, but any adjustments that may occur in their productive process have a larger impact on the economy.

Table 6 shows the average quarterly rates for job creation and destruction decomposed into firm size (7 groups), covering the period March 2001 to March 2007. The creation/destruction rates fall monotonically with the size of the firm.

The decomposition in job creation between expansion and new entrants confirms the close relationship between job creation and size. The rates resulting from companies coming into the market are substantially higher for micro enterprises, a fact that can be explained by company life cycle (since firms tend to start on the small size) and by the preponderance of small firms in the country. In the process of job destruction, the split between firms contracting and those closing down shows a similar pattern: if large companies disappear from the market, their regional impact may reach the media, but their closure results in a job destruction figure that is clearly lower than that for small firms.

Table 7 complements the information on rates of job creation and destruction by indicating the proportion of each group of firms in total job creation and destruction. It is clear that smaller companies not only have the biggest rates for job creation and destruction but are also those which contribute most to the total process of job reallocation in the economy. Firms with less than 50 workers, for example, account for around three-quarters of creation and only slightly less than three-quarters of job destruction, a figure well above their importance in the total employment of the economy.

Table 6

AVERAGE RATES OF JOB FLOWS PER COMPANY SIZE, 2001:03 – 2007:03

Size	Creation			Destruction			Net Creation
	Total	Expansion	Entrant	Total	Contraction	Closure	
Average for the period							
0-4	9.2	4.8	4.3	9.1	5.0	4.1	0.1
5-9	7.0	5.5	1.5	6.7	5.2	1.5	0.3
10-49	5.5	4.7	0.8	5.2	4.3	0.9	0.3
50-99	3.9	3.5	0.4	3.8	3.3	0.5	0.1
100-249	3.2	2.9	0.3	3.3	2.8	0.4	0.0
250-499	3.6	3.3	0.3	3.4	2.9	0.5	0.1
≥ 500	2.7	2.5	0.2	2.4	2.2	0.2	0.3

Sources: *BDRSS* (2000-2006). Authors' calculations.

Table 7

PROPORTIONS OF AVERAGE QUARTERLY JOB FLOWS BY FIRM SIZE, 2001:03 – 2007:03

Size	Percentage of total employment	Creation			Destruction		
		Total	Expansion	Creation	Total	Contraction	Closure
Average for the period							
0-4	17.0	29.6	20.5	60.4	30.7	22.5	57.3
5-9	10.8	14.3	14.6	13.1	14.2	14.8	12.1
10-49	27.1	28.3	31.7	16.5	27.9	30.9	17.9
50-99	10.6	7.8	9.2	3.2	7.9	9.1	4.1
100-249	11.3	7.0	8.2	2.7	7.2	8.3	3.6
250-499	7.0	4.7	5.7	1.5	4.6	5.3	2.3
≥ 500	16.2	8.4	10.1	2.5	7.5	9.1	2.7
Average for the period							
< 50	54.9	72.1	66.8	90.1	72.8	68.2	87.3

Sources: *BDRSS* (2000-2007). Authors' calculations.

Smaller firms may well show reallocation rates significantly higher but the net rates are close to those of other companies. There is, in fact, no pattern that can be drawn between firm size and the net rate of job creation. Between 2001 and 2007, the relative importance of large firms for the net creation of employment is above its proportion of total employment, a fact that runs counter to the idea that the net creation of jobs is fundamentally associated with small companies.

It is possible to decompose the process even more by checking firm size against the sector (Table 8). In the services sector, there are around 2 p.p. higher rates of job creation than in manufacturing and destruction rates are also higher, though only by 0.5 p.p. The most relevant fact in Table 8 is the greater creative dynamics in the services sector, above all in the rate of job creation in bigger companies, in contrast to the net job destruction in the biggest firms in the manufacturing sector.

Charts 6 and 7 show the dynamics of job reallocation in smaller companies, using *QP* data. Chart 6 suggests that companies with three people in their service are those which on average have reallocated a larger number of jobs. As a firm grows, the creation/destruction rate falls rapidly, but job de-

Table 8

AVERAGE QUARTERLY JOB FLOWS PER SIZE OF FIRM AND SECTOR, 2001:03 – 2007:03

Size	Creation						Destruction					
	Total		Expansion		Creation		Total		Contraction		Closure	
	M [a]	Sv [b]	M [a]	Sv [b]	M [a]	Sv [b]	M [a]	Sv [b]	M [a]	Sv [b]	M [a]	Sv [b]
Average for the period												
0-4	7.5	8.6	4.3	4.6	3.2	4.1	8.5	8.3	4.9	4.6	3.6	3.6
5-9	5.7	6.3	4.2	5.1	1.5	1.2	6.1	5.7	4.4	4.7	1.7	1.0
10-49	3.7	5.6	3.0	4.9	0.7	0.7	4.2	5.0	3.3	4.2	1.0	0.8
50-99	2.4	4.5	2.1	4.0	0.3	0.5	3.3	3.7	2.7	3.3	0.6	0.5
100-249	2.1	4.0	1.8	3.6	0.3	0.3	2.9	3.5	2.5	3.0	0.4	0.5
250-499	2.0	4.7	1.7	4.3	0.2	0.4	2.8	3.7	2.6	3.1	0.3	0.7
≥ 500	1.3	3.2	1.2	3.0	0.1	0.2	2.4	2.3	2.2	2.1	0.2	0.2

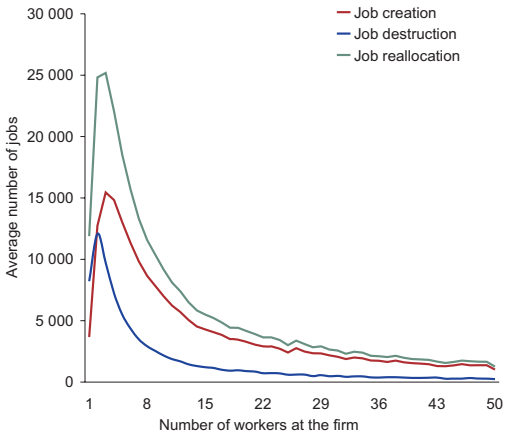
Sources: *BDRSS* (2000-2007). Authors' calculations.
Notes: **(a)** M – Manufacturing, **(b)** Sv – Services.

struction falls more markedly than job creation.

Micro enterprises come into and leave the market very quickly and that in itself justifies the high job reallocation level in most firms of this size. The high level of job creation and destruction in companies that enter and exit the market stands out in contrast with the low level in firms which are expanding or contracting. This can be seen clearly in Chart 7. As opposed to this, more than 70 per cent of employment created and destroyed by medium-sized and large companies stems from the job expansion/contraction strategies of those companies that remain in the market.

Chart 6

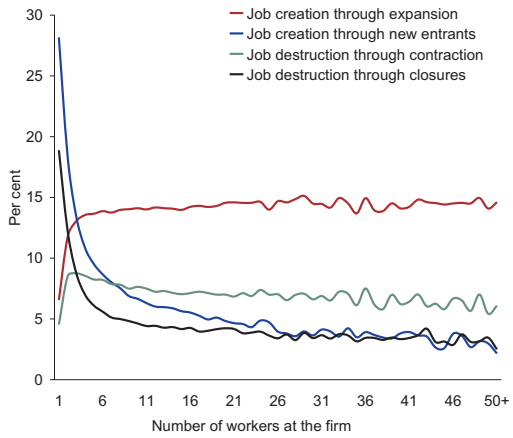
ANNUAL FLOW OF JOB CREATION, DESTRUCTION AND REALLOCATION BY SIZE OF FIRM 1995-2005



Sources: *SILATEE* (1995-2005). Authors' calculations.

Chart 7

ANNUAL RATE OF JOB CREATION AND DESTRUCTION (NEW FIRMS, CLOSURES AND THOSE OPERATING), BY SIZE 1995-2005



Sources: *SILATEE* (1995-2005). Authors' calculations.

6.4. The Regional perspective[5]

The regional perspective associated with job reallocation is important for an interpretation of possible problems related to matching supply in geographical terms. If major and persistent regional differences in the net creation of jobs are observed, there must be internal migration flows to level unemployment rates, or the existence of flexible salaries that lead to a match in the net flows of job creation between the regions.

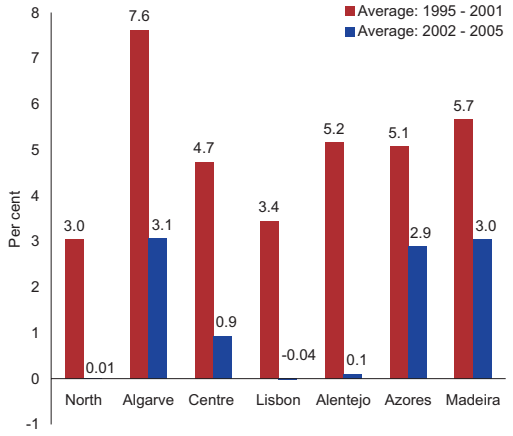
A regional analysis of the job creation/destruction flows over the longer period covering 1995 to 2005 points to positive net job creation, relatively stable, over most regions in the country up to 2001 (Chart 8). From that year on, the rate of net job creation becomes virtually nil in those regions where there are most workers (Lisbon, the North and the Centre). The autonomous regions and the Algarve have positive net job creation rates for the most critical period, from 2002 to 2005, with figures of around 3 per cent. The Algarve stands out with a major increase in job creation in 2001, mainly in the construction sector.

As opposed to the northern part of the country, where there has been a modest rate of job creation (with an average of 2 per cent over the period under review), the south has seen a net figure on average of almost 6 per cent. And the south has also seen a larger job reallocation process. In average terms, the Algarve has witnessed an annual job creation rate of 19 per cent and the Alentejo 17 per cent, with job destruction in both regions at around 13 per cent.

Net job creation in the north and in the Algarve may well be at opposite poles, but in terms of jobs stemming from new companies and destruction from those closing, the picture is structurally similar, as can be seen from Table 9. In Lisbon, the job dynamics stem mainly from expansion and contraction, with more than 65 per cent of jobs created in this region coming from expansion and a similar proportion coming from contraction. This scenario also stems from the fact that the average size of Lisbon companies is greater.

Chart 8

ANNUAL NET JOB CREATION RATES, BY REGION
NUTS II, 1995-2005



Source: *SILATEE* (1995-2005).

(5) This section is based exclusively on annual data from the *Quadros de Pessoal*.

Table 9

JOB CREATION AND DESTRUCTION: RATES AND DISTRIBUTION BY REGION NUTS II, 1995-2005

Regions (NUTS II)	Annual rates (%)				Distribution (%)			
	Job creation		Job destruction		Job creation		Job destruction	
	Entrant	Expansion	Closure	Contraction	Entrant	Expansion	Closure	Contraction
North	6.3	7.7	5.4	6.7	45.1	54.9	44.6	55.4
Algarve	8.8	10.3	5.5	7.8	46.2	53.8	41.2	58.8
Centre	6.0	8.0	4.2	6.5	42.7	57.3	39.5	60.5
Lisbon	4.6	8.8	3.8	7.4	34.3	65.7	34.0	66.0
Alentejo	7.2	9.6	5.1	8.6	43.1	56.9	37.4	62.6
Azores	5.2	9.7	3.9	6.9	35.1	64.9	36.4	63.6
Madeira	6.7	9.0	4.3	6.9	42.7	57.3	38.7	61.3

Source: *SILATEE* (1995-2005).

At a regional level, there is no visible problem related to a persistent net fall in jobs that can be associated to problems of adjustment to the volume of work on offer. There may well be a wide range of experience in the regions in sectoral terms, with the Algarve seeing a higher rate of job creation in construction and services; but the fall in manufacturing jobs has been common to most regions and the regional differences in unemployment figures may well be associated with the size of shocks in certain specific areas.

6.5. Average salary levels[6]

The job creation/destruction process is a phenomenon that follows certain economic principles pertaining to market economies, whatever the existing judicial and legal framework. In competitive environments, firms and workers are constantly involved in the search for more productive matches, which not only permit companies to survive but also provide workers with better salaries. In the absence of a direct measurement of productivity, Table 10 makes an approximation through the average level of wages in firms. From this a calculation can be made of the job creation/destruction rates per quintile of salaries.

The findings show that the biggest job creation and destruction rates relate to firms where the average wage is in the lower quintiles. These firms, in fact, also account most for net job creation; net rates go down in parallel with the quintiles. This result is not surprising if we see wages as reflecting the productive skills of the workers: the more productive the worker, the higher the wage paid and the less likely they are to give up a job, not only because of its quality but because of the difficulty there would be in getting another. In specific terms, this difference is particularly visible in the part played in these rates by new firms arriving and others closing: the arrival of firms with lower salaries contribute five times more to the rate of job creation at this level of income than the arrival of firms with higher average wages.

The differences in the creation and destruction rates in terms of wage differentials are not surprising, given the arguments already laid out. The same, in fact, happens in the US (Table10, last two columns). Looking at the rates for manufacturing, however, the ratio of average annual creation in firms with “very low” wages to those with “very high” wages is bigger in Portugal, standing at 2.7 as against

(6) This section uses the annual data of the *QP*.

Table 10

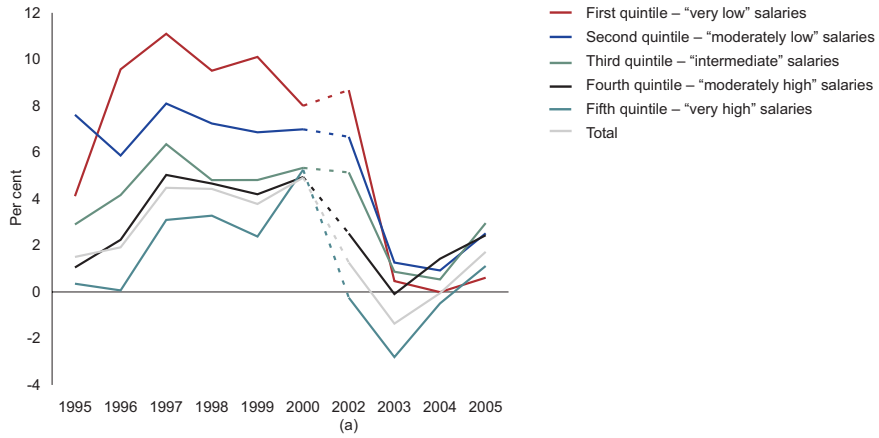
ANNUAL JOB FLOWS BY QUINTILE OF THE AVERAGE SALARY IN THE FIRM, 1996 – 2005

Quintiles of the average salary	Job creation			Job destruction			Net job creation	Job reallocation	US (1973-1988)	
	Entrant	Expansion	Total	Closure	Contraction	Total			Creation	Destruction
Total in the economy										
Very low	15.1	8.6	23.7	9.8	8.3	18.1	5.7	41.8	-	-
Moderately low	9.7	9.6	19.3	6.8	7.3	14.2	5.1	33.4	-	-
Intermediate	6.9	9.4	16.3	5.4	7.2	12.6	3.7	29.0	-	-
Moderately high	4.1	9.0	13.1	3.5	6.8	10.3	2.8	23.4	-	-
Very high	3.0	7.3	10.3	2.7	6.5	9.2	1.1	19.5	-	-
Manufacturing										
Very low	12.1	7.9	20.0	10.3	7.5	17.8	2.2	37.8	12.5	13.3
Moderately low	6.8	7.3	14.1	7.3	6.4	13.7	0.4	27.8	10.4	10.4
Intermediate	4.2	6.1	10.3	5.4	6.1	11.5	-1.2	21.8	9.2	9.5
Moderately high	2.3	5.6	7.9	3.5	6.4	9.9	-2.0	17.7	7.0	8.3
Very high	2.2	5.2	7.5	2.6	6.7	9.3	-1.8	16.7	6.4	9.0

Source: *SILATEE* (1995-2005); Davis *et al*. (1996) for the US.
Notes: The average salary was calculated for the set of TCO, full time and fully paid. The information relating to salaries is not available for 2001, so that year is not used for the analysis. Job creation and destruction for 2001 is however included. For those firms that closed in 2002, the quintiles refer to the 2000 figure. Average salaries in the first quantile are designated "Very low", the second quantile "Moderately low" and so on.

Chart 9

ANNUAL NET JOB CREATION RATES BY QUINTILE AVERAGE SALARIES IN FIRMS, 1996-2005



Sources: *SILATEE* (1995-2005). Authors' calculations.
Note: **(a)** With salary figures for 2001 unavailable, so that year is not used for the analysis. Job creation and destruction for 2001 is however included. For those firms that closed in 2002, the quantiles refer to the 2000 figure.

2.0. The same is true for destruction, though the difference is smaller, with 1.9 in Portugal and 1.5 in the US The periods used are in fact not the same, which limits the comparison, but even so, it is likely that part of the difference is due to the greater polarization of the Portuguese economy. The greater protection given to workers on contracts with no fixed term leads to a larger and less efficient turnover of workers with fixed term contracts. These are over-represented in the "very low" wage group (Portugal, 1999).

In short, these data suggest: (i) lower income is related to greater job volatility, but also to higher net job creation rates; (ii) existing policies to protect jobs have failed to protect those on lower income (greater destruction rates) and this situation can also be imputed to the workers themselves, causing more turnover as they look for better jobs; and (iii) as a corollary, new policies geared to job protection should focus on these income brackets.[7]

Chart 9 illustrates how wage quintiles moved between 1995 and 2005. A salient fact here is that every firm reacted to the change in the economic cycle, with lower job creation rates after 2001. In fact, those firms with higher average wages even came in with negative figures (job destruction) after 2001. And firms with lower wages (the first quintile – average wage less than 410 euros in 2005) shift from being the most dynamic to the least, at the bottom of the list of firms that create jobs. Although not depicted, these changes are related to the lower rates of job creation in new firms and in tandem, to a rise in the rate of job destruction through the closure of this type of firm.

6.6. The age of the firm[8]

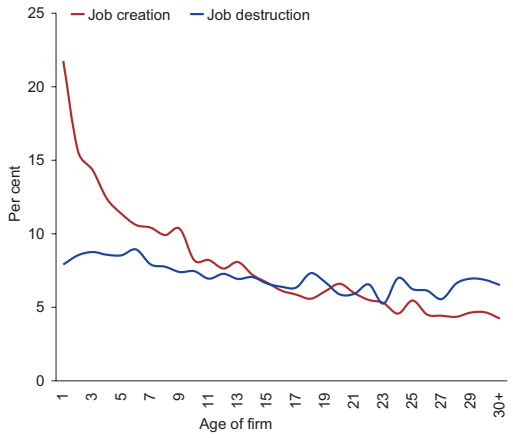
The age of the firm is the indicator normally used to analyse the life cycle dynamics of the employer. Theoretical models of selection effects at the firm level (Jovanovic, 1982) point to major adjustments in younger firms and, as better quality firms survive, the job reallocation rates are likely to fall. This be-

(7) There should be articulation between legislation to protect workers and unemployment legislation. In the analysis of Centeno and Novo (2007) relating to the extension of unemployment benefit in July 1999, this becomes clear. The authors conclude that extending the benefit, measured by the non-distortionary income effect, is greater for those with higher income prior to unemployment.

(8) This section uses the annual date of the *QP*.

Chart 10

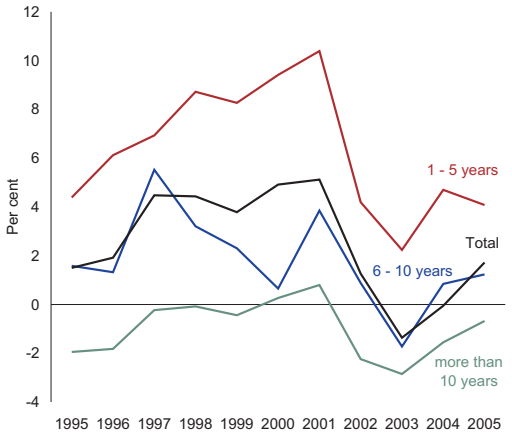
ANNUAL JOB CREATION AND DESTRUCTION BY AGE OF FIRM, 1995-2005



Sources: *SILATEE* (1995-2005). Authors' calculations.

Chart 11

RATE OF NET JOB CREATION BY FIRM AGE BRACKET, 1995-2005



Sources: *SILATEE* (1995-2005). Authors' calculations.

haviour is quite clear in the findings for the Portuguese economy. In average terms, during the 1995-2005 period, job reallocation is in inversely related to the age of the firm (Chart 10). Even excluding the entry year, the process of job creation is considerably higher than job destruction in the early stage.

There is clearly a decreasing trend, smoother on the job destruction side, as firms continue operations. The positive job dynamism lasts until the company has been in the market for 15 years, although the rate slows down.

This pattern of growth over the life cycle is in line with the findings of Jovanovic (1982) on the selection effects of companies. Firms tend to grow in the initial stages since they usually start undersized. At this stage, many firms disappear (as a result of the selection process) and those that survive reach a steady size. Later, the destruction rate tends to be greater than the creation rate, as firms with out-of-date technology drop out of the market.

An analysis of the whole period (1995-2005) in terms of net job creation per age of firm (Chart 11) shows a similar pattern to the total employment dynamics already analysed. As can be seen in the previous chart, the differences in behaviour between the first two age brackets stems from the larger job creation of younger firms, since there is no notable difference between the two brackets in terms of job destruction.

This behaviour is consistent with international evidence (Davis and Haltiwanger (1999).

7. INTERNATIONAL COMPARISONS

In the international field, the figures for job creation and destruction are similar in the vast majority of developed countries, with sectoral analysis also showing no discrepancy.

During the last US recession in 2001 and 2002, the average quarterly job creation rate stood at 7.5 per cent, with the job destruction rate slightly higher (Davis, Faberman and Haltiwanger, 2006). It was during this period that Portugal showed the first signs of a shift in the economic cycle. Job creation figures

stood at slightly more than 6 per cent and job destruction marginally below (Chart 12). The difference in rates between the two countries was therefore to the order of 1 p.p..

As previously noted, the average rates for job creation and destruction in Portugal for 2001 to 2007 were 5.3 and 5.1 per cent respectively, *i.e.*, 1.9 p.p. lower than in the US This difference is overstated, however, since the two economies were not at exactly the same point in the economic cycle and the data for Portugal relate to a less expansive stage than in the US If the figures are corrected for the economic cycle, the job creation and destruction rates will move closer, since the creation rate tends to rise in periods of economic expansion.

An international comparison of the quarterly creation and destruction rates is limited by the scarcity of data available for other countries. However, there are more details available in annual terms and some of the examples of rates are shown in Table 11.[9] Higher rates, as might be expected, are seen in New Zealand, Denmark and the United Kingdom, with most countries standing at around 12 to 13 per cent. The rates in Portugal, therefore, are not very different from most other countries.

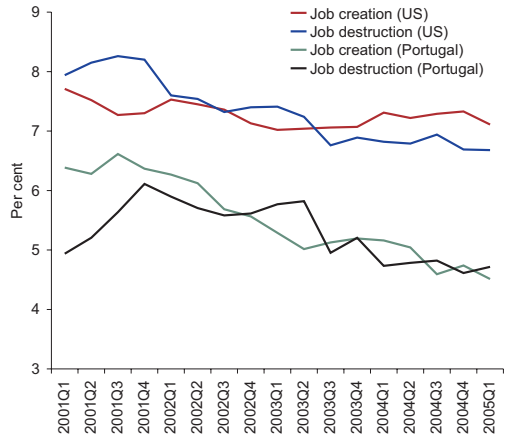
In sectoral terms, the figures for Portugal are similar to other economies, both in quarterly and in annual terms. For example, for the 1990 to 2003 period, the North American economy shows average quarterly job creation rates in manufacturing at 4.9 per cent, with job destruction at 5.3 per cent (Davis, Faberman and Haltiwanger, 2005). In a more recent period in Portugal, these rates are 3.3 and 4.1 per cent for the same sector but the creation rate is more acutely affected by the economic cycle. In the service sector, the creation and destruction rates in the US stand at around 6.5 per cent, while the figure for Portugal is 5.4 per cent for creation and 4.8 per cent for destruction. The biggest difference is found in the construction sector, where the rates for Portugal are 6 p.p. below the US.

The figures for the United Kingdom, over a period more closely comparable with Portugal (1997 to 2005), stand at 13.5 per cent for job destruction in manufacturing and 14.8 per cent in services, with the respective figures for job creation standing at 11 and 16.4 per cent (Hijzen, Upward and Wright, 2007). The averages for Portugal are 11.2 and 11.9 for annual rates of job destruction in manufacturing

Chart 12

QUARTERLY JOB CREATION AND DESTRUCTION RATES

Portugal and the US, 2001-2005



Sources: *BDRSS* (2001-2007). Authors' calculations; Davis *et al*. (2006).

(9) Detailed extrapolations cannot be made, since there are differences in terms of source, and the periods and sectors do not always coincide.

Table 11

AVERAGE ANNUAL JOB CREATION AND DESTRUCTION AS A PERCENTAGE OF TOTAL EMPLOYMENT

	Canada	Denmark	Finland	France	Germany	Italy	New Zealand	Sweden	UK	US	Portugal	Portugal
	1983-1991	1983-1989	1986-1991	1991-1996	1983-1990	1984-1992	1987-1992	1985-1992	1998-2005	1984-1991	2001-2006	1995-2005
											BDRSS	*QP*
Job creation	14.5	16.0	10.4	10.2	9.0	12.3	15.7	14.5	15.2	13.0	13.3	14.0
New firms	3.2	6.1	3.9	4.0	2.5	3.9	7.4	6.5	5.4	8.4	4.6	5.6
Expansion	11.2	9.9	6.5	6.2	6.5	8.4	8.3	8.0	9.8	4.6	8.7	8.4
Job destruction	11.9	13.8	12.0	10.3	7.5	11.1	19.8	14.6	14.5	10.4	11.8	11.4
Closures	3.1	5.0	3.4	3.7	1.9	3.8	8.5	5.0	7.3	7.3	4.7	4.4
Contractions	8.8	8.8	8.7	6.6	5.6	7.3	11.3	9.6	7.2	3.1	7.1	7.0
Net job variation	2.6	2.2	-1.6	-0.1	1.5	1.3	-4.1	-0.1	0.7	2.6	1.6	2.6
Net entrants	0.2	1.1	0.5	0.3	0.5	0.2	-1.1	1.5	-1.9	1.1	4.0	1.2
Net expansion	2.4	1.1	-2.1	-0.4	0.9	1.1	-3.0	-1.6	2.6	1.5	1.6	1.4
Job turnover	26.3	29.8	22.4	20.5	16.5	23.4	35.5	29.1	29.7	23.4	25.1	25.4
Employment in the baseline period ('000s)	7 034	1 447	1 308	12 778	1 635	8 381	828	2 306	18 154	85 824	2 969	2 455
Unemployment rate (%)*	9.5	7.5	3.4	11.3	7.6	11.1	7.5	2.5	5.2	6.3	5.8	6.2

Source: OECD (1994); France, R. Duhautois, *op*. Ci; United Kingdom, Hijzen *et al*, *op. cit*.; * Labour Force Statistics, OECD.
Note: Net entrants = New firms - Closures. Net expansion = Expansions - Contractions
Data's description
Canada: Small Business and Special Surveys Divisions, based on tax information from all employers at the firm level. Underestimates employment in small workplaces.
Denmark: Integrated database for Labour Market Research – excludes the public sector. Longitudinal file of individuals and establishments.
Finland: Enterprise data supplemented by annual establishment surveys.Firms must have operated 6 months and have a minimum turnover of 45000FMK in 1991.
France: Register of establishments excluding public sector but coverage uneven because major enterprises excluded.
Germany: Collected by Social Insurance Scheme notification procedure. Excludes those < 15 hours/week or employed short periods or with wage bellow a set minimum.
Italy: Uses firm level social security contribution data. Excludes public sector firms. Delays in processing data affect counts, particularly for small firms.
New Zealand: Business Demography Database at the level of the activity unit which approximates an establishment. Part-timers = half a full-time position.
Sweden: From Database Statistics on Regional Employment longitudinally for individuals and establishments.
UK: Dun and Bradstreet for firms. Coverage incomplete for small firms - 1985-1987 excludes firms with less than 5 employees. Problem of delays in processing data.
US: Establishment and Employment Microdata file and the Establishment and Longitudinal Microdata file. Covers all domestic business establishments with > 1 employee.
Portugal – *IISS*: Firm level administrative data.
Portugal – *QP*: Firm level data from Ministry's data, *Quadros de Pessoal*.

and services and 8.5 and 15.1 in job creation. In both cases, the figures for Portugal are slightly lower.[10]

In terms of international comparisons, it is also clear that firm closures are slightly higher than in other countries in relative terms. For France, for example, as reported in Duhautois (2002), the proportion of new firms in the job creation figures stands at around 35 per cent, with 37 per cent for closures. This may be due to the rigidity of existing legislation, which makes it difficult for firms to adjust more smoothly their productive capacity to market conditions. Closures are a last resort, used more frequently than in other economies. Albæk and Sorensen (1998), give similar figures for manufacturing in Denmark.

8. CONCLUSIONS

This article analyses job creation and destruction in firms operating in Portugal. This process forms the basis for adjusting the size of the work force to market conditions and is crucial for an efficient functioning of the labour market. If firms are hampered in terms of competitive adjustment, the economy may suffer serious consequences in efficiency and productivity.

Job creation and destruction rates in Portugal are little different from other developed economies, with a cyclical pattern and decreasing rates that are both common to such economies. However, as in other developed economies, the numbers shown for job reallocation understate the turnover of workers who go through the same job. In other words, when creating a job, the firm will typically experiment (by hiring and laying off) more than one worker. So the net creation of one job implies the creation of many jobs with existing functions eliminated at the same time. An assessment of this issue should be made in future research.

The overall evidence collected, in the context of the existing protection for those on no fixed term contracts, leads to a strong polarization in the Portuguese labour market, with the requirement to adjust falling on one (small but growing) part of the market. The loss of well-being related to this polarization is considerable and it translates into a great feeling of insecurity when compared to employment in other western countries, where there is greater job protection (Postel-Vinay and Saint-Martin, 2004 and OECD, 2006). Given the low flexibility that exists in such countries, the insecurity stems from the long duration of unemployment and the inefficient co-existence of various forms of labour contracts, accentuating the asymmetry in the turnover rates between workers with different types of contract.

The existing model of job protection is unable to counter the Schumpeterian process of creative destruction and with the challenges of an ever more integrated economy, the most adequate response to the growing polarization and dynamism of the labour market is the creation of a model based on protecting the worker rather than, as at present, one based on protecting the job.

(10) The UK figures include construction in services, so the figures for Portugal have been recomputed to take this into account.

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MIMO - A MONTHLY INFLATION MODEL*

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1. INTRODUCTION

This note presents a monthly inflation model for the Portuguese economy that was named *MIMO*. The main objective behind the construction of *MIMO* was to develop a framework that could be used, simultaneously, for analysis and projection of monthly inflation rates. This goal was achieved by means of a simple framework that relies on a partial equilibrium approach and operates operates according to rather naïve price-setting theoretical mechanisms, in which several impacts have been left out. For instance, second-round effects associated with movements in macroeconomic fundamentals are fully absent and this may be of the utmost importance if the projections are for longer horizons. *MIMO* should thus be seen as an additional tool behind any comprehensive analysis of inflation dynamics or any fully-fledge inflation projection exercise, where second-round effects have to be considered.

The inflation models that have been published rely on several mechanisms on how final consumer prices are set. *MIMO* relies on a bottom-up approach, which implies that the overall inflation rate is obtained as the aggregation of its components, namely unprocessed food, processed food, non-energy industrial goods, energy goods and services prices.[1]

Each component contains two major groups of items: goods or services whose prices are market determined; and goods or services whose prices are to a large extent influenced by government or national regulators decisions (for instance, tobacco or electricity prices). In the former case, each subcomponent is modeled through an equation with an error-correction mechanism that depends on macroeconomic determinants; in the later case, the remaining items are taken as exogenous, which implies that macroeconomic determinants have no impact on their price dynamics. Furthermore, the two major groups of products of each component are assumed to evolve solely according to their own price dynamics. For example, marked-determined prices of processed food items have no effect on any price that is basically determined by regulations or on any other inflation component.

All equations used in the projection and analysis of inflation are based on monthly data. Since the main macroeconomic fundamentals with an important impact on inflation (in particular wages, output, employment and imports deflator) are only available on a quarterly basis, these data are initially disaggregated into a monthly frequency. This higher frequency has some advantages in the context of a inflation projection exercise, allowing for instance to properly incorporate all monthly data that is being disclosed and to easily trace back the contribution of each macroeconomic determinant; that would not be possible in a lower frequency model (for instance in a quarterly or annual model).

* The analyses, opinions and findings of this article represent the views of the authors, they are not necessarily those of the Banco de Portugal.

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(1) Among the different types of models used for inflation forecasting see for example, Moser, Rumler and Scharler (2004),Vlaar and den Reijer (2004), Bandt, Michaux, Bruneau and Flageollet (2007) and Adolfson, Laséen, Lindé and Villani (2007). For a discussion on using a bottom-up approach, as opposed to a top-down approach, see Espasa and Albacete (2007).

This note is structured as follows: Section two presents the general framework of *MIMO*; Section three presents the price-setting theoretical framework behind those prices that are market determined; Section four reports the estimated equations and clarifies the forecasting procedure for those prices which are not market-based; Section five reports the impact of permanent shocks on the main forcing variables of the model, namely unit labour costs and non-energy goods import prices, and also the impact of a temporary innovation in the equation residuals, which corresponds to the way the model deals with a monthly projection error. In Section six, the overall inflation rate registered during 1998-2007 is decomposed and analyzed using *MIMO*. Finally, Section 7 presents the main conclusions as well as some directions for further research.

2. AN OVERVIEW OF *MIMO*

MIMO relies on a bottom-up approach in which the inflation rate is derived from its components, namely unprocessed food (UF), processed food (PF), non-energy industrial goods (NEIG), energy goods (NRG) and services (SRV). These components are in line with the definitions embodied in the Harmonized Index of Consumer Prices (HICP).[2] The *MIMO* database reads HICP data from January 1996 onwards and uses the most disaggregated dataset that is publicly available (namelly, the 2 digit Classification of Individual Consumption According to Purpose (COICOP) disaggregation). Inflation developments are mainly driven by domestic production costs and by prices of imported goods, which implies that all equations represent the adjustment of domestic consumer prices to the evolution of these macroeconomic fundamentals. However, one must take into account that there is a number of consumer prices that cannot be considered as market prices. In *MIMO*, these prices are treated separately. To deal with this setup, each HICP component was split according to the following taxonomy:

Marked-based prices: Includes all goods or services prices that are largely determined by a market based price-setting mechanism that ultimately results from supply and demand interactions;

"Administered" and "Quasi-administered" prices: Includes all goods or services prices that cannot be considered market-based prices. An item is classified as Administered (ADM) if its price is to a large extent determined by government or national regulators decisions, such as electricity prices; an item is classified as quasi-administered (QADM) if its price does not fully comply with the above definition, but is still significantly influenced by exogenous decisions so that it would be erroneous to classify it as a market-based price, such as tobacco prices.

Each ADM and QADM is taken separately in the projection and analysis of inflation. They are fully exogenous for the pure model-based projection, meaning that macroeconomic fundamentals do not help explain and have no impact on their evolution. This refinement is crucial since all equations are assumed to describe the price-setting mechanism of market agents operating in the production and retail trade of goods and services, according to their cost minimization problem. If one includes prices of goods and services that are largely set by exogenous procedures, this may blunder the functional forms of the economic relationships and create potentially spurious results.

Besides HICP data, the *MIMO* database includes domestic production costs and import prices of the Portuguese economy, nominal exchange rates and oil and non-oil commodity prices. Regarding energy items, the database retrieves information from DGEG - Direcção Geral de Energia e Geologia.[3]

(2) The definitions of each component may be found in European Commission (Eurostat) (2001) and in metainformation disclosed on the internet by the Eurostat.

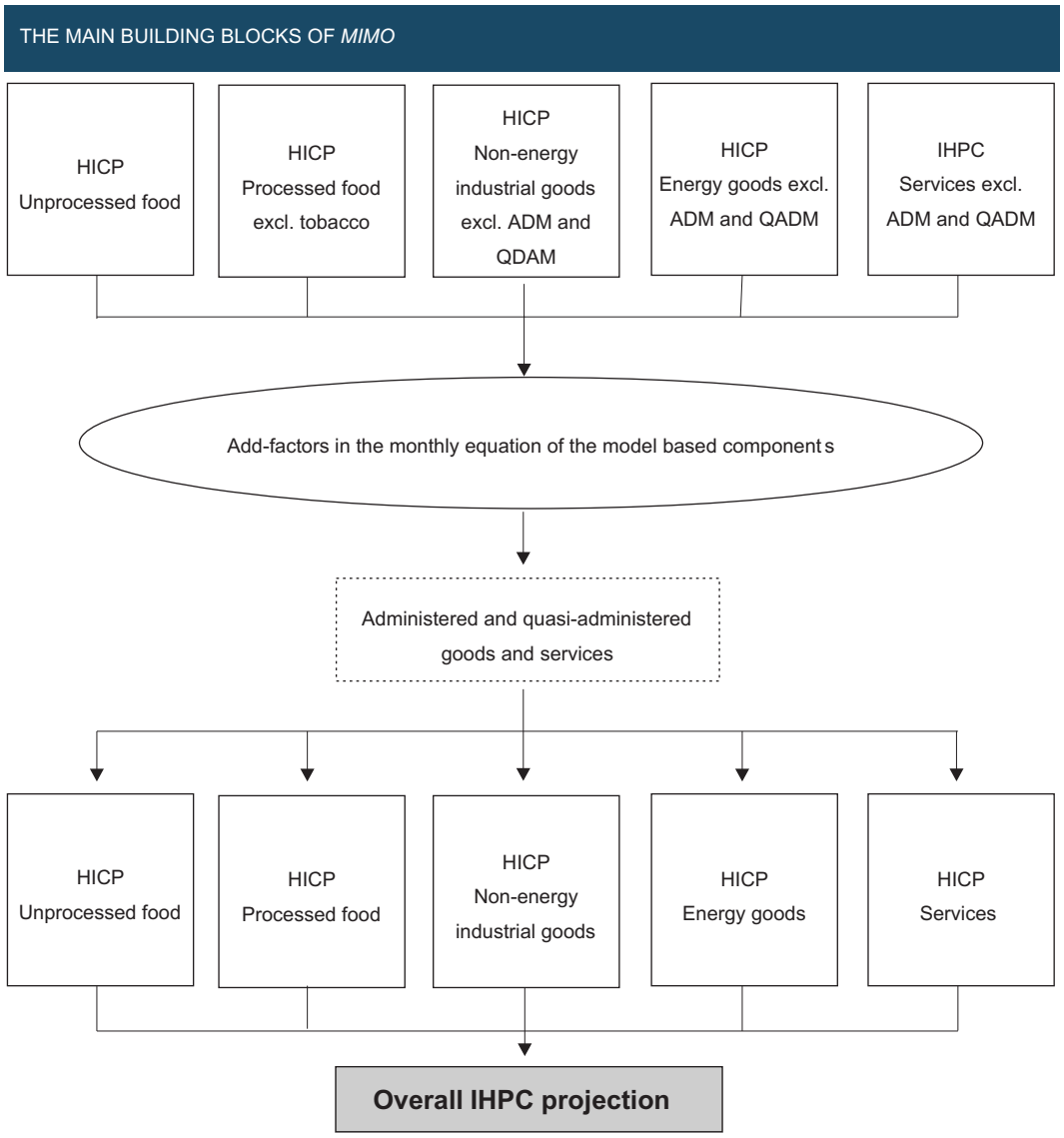
(3) Further information may be found at www.dgge.pt

Given that some of these time series are only available at a quarterly frequency, they have to be disaggregated into a monthly frequency.[4]

The projection process scheme is presented in Chart 1. It is assumed from the outset that no indirect effects exist and thus there is no interaction between prices of each component. To ensure that the automatic equations outcome is not unreasonable, special account should be taken of the evolution of the equation residuals, in particular their recent behaviour, and of the evolution of the error-correction term. In particular, if there is a persistent deviation from the long-run solution in the recent past, one should interpret this feature and act accordingly.

Therefore, judgemental elements - the "Add-factors in the monthly equations of the model based components" - always play some role in an inflation projection exercises. Any model is only able to reflect

Chart 1



(4) The method that is used for the monthly disaggregation of quarterly data is the cubic spline available in the PC-TROLL software. Further information may be found at http://www.hendyplan.com/trolloverview.htm

the information contained in the forcing variables. However, there are always pieces of information that cannot be reflected in the initial database. Typical examples may be, for instance, the announcement in 2000 that the 2004 Football European Championship would take place in Portugal. In this case, one should expect a sizeable impact in accommodation services prices. However, this information was not present in the forcing variables, since it was only to be expected an increase in profit margins in view of the unusual favourable demand conditions. Since this temporary enlargement of profit margins could have been anticipated from the outset, one should add-factor the services equation appropriately. Another typical example is an anticipated announcement of indirect tax changes. Finally, another situation where judgement plays a role is when the equation outcome is not reasonable because consumer prices are substantially apart from its long-run equilibrium values and therefore inflation is being totally driven by the error-correction term. Whenever the reversion of the profit margin to its historical mean is not likely, one must include a judgmental element in the equation by means of an adjustment throughout the projection horizon, in order to avoid unreasonable projections.

Once we have a reasonable projection coming from the monthly equations of the model for all subcomponents, we simply add the exogenous projections of ADM and QADM prices.

3. A VERY SIMPLE PRICE-SETTING PROBLEM

MIMO relies on a partial equilibrium approach that operates according to rather naïve price-setting theoretical mechanisms, in which several impacts have been left out, namely those that could only be captured in a general equilibrium model. All feedback from consumer prices to other macroeconomic variables is totally absent. In particular, inflation is projected and analysed as if wages, employment and output were fully exogenous and clearly, the longer the projections horizons, the more important becomes the likely impact of second-round effects. The model should thus be seen as an additional tool behind any comprehensive analysis of inflation dynamics or any fully-fledged inflation projection exercise, where second-round effects have to be considered.

MIMO assumes that the retailer of consumption items operates in a monopolistic competition environment where the presence of indirect taxes affects the final prices paid by the consumers. The cost minimisation problem of the retailer is given by the following setup:

$$\min_{Y_t^H, Y_t^F} P_t^H \cdot Y_t^H + P_t^F \cdot Y_t^F \tag{1}$$

$$Y_t = A\left(Y_t^H\right)^{\alpha}\left(Y_t^F\right)^{1-\alpha} \tag{2}$$

P_t^H and P_t^F are the price of home (H) and foreign (F) intermediate inputs, respectively, used in the production of the final consumer good or service (Y_t). Assuming perfect competition in the inputs market, P_t^H and P_t^F are taken as given by the retailer. Y_t^H and Y_t^F are the quantities of home and foreign intermediate inputs required to produce the amount of the final consumer good or service (set exogenously). For simplicity, assume also that A is just a scaling factor.[5]

The optimal demand of Y_t^H and Y_t^F can be recovered from first order conditions:

(5) A more general framework would require that *A* measures productivity in the production of the final consumer good or service and that *A* could evolve in time according to some law of motion. The study of the cost minimization problem of the firm, or the profit maximization, may by found in several textbooks, including, for instance, Tirole (1988).

$$Y_t^H = \alpha\left(\frac{P_t^H}{MC_t}\right)^{-1} Y_t \tag{3}$$

$$Y_t^F = (1-\alpha)\left(\frac{P_t^F}{MC_t}\right)^{-1} Y_t \tag{4}$$

where MC_t is the Lagrage multiplier that stands for marginal cost of the final consumption good or service under consideration. Under perfect competition, the final price paid by consumers, P_t, is simply equal to the marginal cost, i.e. $P_t = MC_t$. In a context of monopolistic competition and indirect taxation on final consumer goods and services, P_t must be expressed as a mark-up over marginal costs. Replacing (3) and (4) in (2) we can work out the following condition for the marginal cost:

$$MC_t = \frac{1}{A}\frac{\left(P_t^H\right)^{\alpha}\cdot\left(P_t^F\right)^{1-\alpha}}{\alpha^{\alpha}\cdot(1-\alpha)^{1-\alpha}} \tag{5}$$

Assuming that τ_t is the indirect tax rate and Ω_t is the pre-tax mark-up over marginal costs, has the following expression under monopolistic competition:

$$P_t = (1+\tau_t)\cdot(1+\Omega_t)\cdot MC_t = (1+\tau_t)\cdot(1+\Omega_t)\cdot\frac{\left(P_t^H\right)^{\alpha}\cdot\left(P_t^F\right)^{1-\alpha}}{A\cdot\alpha^{\alpha}\cdot(1-\alpha)^{1-\alpha}} \tag{6}$$

The price equation (6) is used in *MIMO* as the long-run yardstick of the HICP subcomponents price equations. Taking logs on (6), we get:[6]

$$p_t \approx \tau_t + \Omega_t - a - \ln\alpha - (1-\alpha)\ln(1-\alpha) + \alpha\cdot p_t^H + (1-\alpha)\cdot p_t^F \approx \mathbb{C} + \alpha\cdot p_t^H + (1-\alpha)\cdot p_t^F + \varepsilon_t \tag{7}$$

where

$$\tau_t + \Omega_t - a - \alpha\ln\alpha - (1-\alpha)\ln(1-\alpha) \equiv \mathbb{C} + \varepsilon_t \tag{8}$$

and

$$\mathbb{C} = \bar{\tau} + \bar{\Omega} - a - \alpha\ln\alpha - (1-\alpha)\ln(1-\alpha) \tag{9}$$

$$\varepsilon_t = \varepsilon_t^{\tau} + \varepsilon_t^{\Omega} \tag{10}$$

Note that $\bar{\tau}$ and $\bar{\Omega}$ are not time-dependent and simply represent the steady-state levels of indirect taxes and markups, respectively. Conversely, ε_t evolves in time, which can be caused by two alternative structural shocks: indirect taxation (ε_t^{τ}) or mark-up shocks (ε_t^{Ω}). Since indirect tax shocks can be easily identified due to the fact that changes in the tax system are known, then we can identify mark-up shocks, provided that measurement errors in marginal cost determinants are negligible.

In short, the following equation can be estimated by OLS, relying on the superconsistency of this estimator in the context of cointegrated time series presented in Engel and Granger (1987):

(6) Lowercase characters represent the logarithms of the variables represented by the corresponding uppercase characters.

$$p_t = \mathbb{C} + \alpha \cdot p_t^H + (1-\alpha) \cdot p_t^F + \varepsilon_t \qquad (11)$$

In *MIMO*, the above equilibrium relationship is embedded in an error-correction term equation with the following specification:

$$\Delta p_t = \mathbb{S}_t + \mathbb{A}(\mathbb{L})\Delta p_{t-1} + \mathbb{B}(\mathbb{L})\Delta p_t^H + \mathbb{C}(\mathbb{L})\Delta p_t^F - \lambda\left(p_{t-1} - \mathbb{C} - \alpha \cdot p_{t-1}^H - (1-\alpha) \cdot p_{t-1}^F\right) + u_t \qquad (12)$$

where $\mathbb{S}_t$ are seasonal centered dummy variables that account for eventual seasonality in profit margins and $\mathbb{A}(\mathbb{L})$, $\mathbb{B}(\mathbb{L})$ and $\mathbb{C}(\mathbb{L})$ are lag polynomials and $\mathbb{L}$ is the lag operator. This specification can be estimated using OLS, provided that there exists a cointegration vector $[\mathbb{C} \ \alpha]$ that renders the error correction term $\left[p_t - \mathbb{C} - \alpha \cdot p_t^H - (1-\alpha) \cdot p_t^F\right]$ stationary.

One should also highlight that the above error correction mechanism can also be rationalized against a background where the representative firm solves an intertemporal profit maximization problem, where prices are subject to quadratic adjustments costs and inflation expectations are adaptive and based on the past behaviour of domestic and foreign intermediate goods inflation.[7] In practice, the short-run dynamics captures the fluctuation of profit margins, stemming from the gradual adjustment of prices to shocks in the marginal costs, imposed by the significant costs of an abrupt shift in prices, under the assumption of an unchanged tax rate. Note that the theoretical framework does not consider the existence of indirect effects between consumer prices of different groups of items.

The empirical implementation of (12) requires that one must choose appropriate price indicators both for domestic and foreign intermediate inputs, i.e. P_t^H and P_t^F, respectively. In the case of P_t^F, non-energy goods import prices seem a natural choice. The P_t^H is usually captured by the value-added deflator at basic prices or by unit labour costs. The current equations use unit labour costs of the private sector given that its behaviour seems less prone to eventual measurement errors and clearly accountable in terms of compensation per employee and productivity developments. The choice between value-added deflator and unit labour costs is not relevant if mark-ups over prices of domestic intermediate inputs evolve broadly in line with the mark-ups over the prices of consumer goods retailer; or, alternatively, domestic intermediate inputs are produced in perfect competition and the value-added deflator is a constant mark-up over unit labour costs. The main implication from using unit labour costs instead of the value-added deflator is that one is not able to identify changes in retailers' profit margins. Once unit labour costs are used, profit margins include not only the retailer margin but also intermediate goods producers' margin unless we assume that intermediate goods are produced in perfect competition, in which case the these producers' profit margin is zero.

4. THE FRAMEWORK OF *MIMO*

Following the nomenclature introduced in Section 2, the framework of *MIMO* is made of two blocks. The first block deals with the market-based prices and is presented in Section 4.1, which include UF, PF, NEIG and SRV items, and Section 4.2, which only includes energy items. As already mentioned, this model-based block does not include ADM or QADM prices, which will be presented in Section 4.3 and contains no indirect effects from developments in ADM or QADM inflation or any interaction between the HICP subcomponents.

(7) The profit maximization problem, where prices are subject to quadratic adjustments costs, has been used in recent general equilibrium models. See, for example, Smets and Wouters (2003).

4.1. HICP excluding energy

The equations of the non-energy items of the HICP have the form presented in (12). A general-to-specific modelling approach was followed and all variables that were not statistically significant were simply excluded from the final specification. A summary of the final results is reported in Table 1. All variables are in logs, Δp_{t-i} represents the first difference of p with lag i, and p = {UF,PF,NEIG,SERV}. Recall from (12) that $\mathbb{C}$ is the constant in the error-correction term, λ is the coefficient associated with the error-correction term and that α_1 measures the importance of domestically generated inflation pressures, which implies that $(1-\alpha_1)$ is linked to the importance of external inflation pressures. All equations use unit labour costs (ULC) of the private sector as P^H and import deflator of non-energy goods (PMX) as P^F.

The results presented in Table 1 reveal that, in the long run, the model-based block of *MIMO* attaches a lower importance to ULC developments in the case of UF, PF and NEIG, than in the case of SRV. The former group attaches a weight between 48 and 59 per cent to ULC developments, whereas in the case of services' prices this figure increases to 77 per cent. Given that the services items include a larger percentage of non-tradables, in comparison with the goods' aggregates, the results are consistent with the traditional view that services are more sheltered from developments in international prices and more correlated with domestic inflation pressures than the goods' component.[8] The λ coefficients, which measure the degree of adjustment towards the long-run equilibrium, range between 0.06 and 0.12, which corresponds to an average adjustment period to permanent shocks of between 8 and 16 months.

Table 1

COEFFICIENTS OF ALL EQUATIONS

	p_t			
	Unprocessed food (UF)	**Processed food (PF)**	**Non-energy indust. goods (NEIG)**	**Services (SERV)**
Weights on overall HICP (per cent)	11.3	8.4	27.9	25.9
$\mathbb{C}$	4.92	5.00	5.00	3.63
$-\lambda$	0.12	0.06	0.06	0.08
α_1	0.48	0.59	0.55	0.77
Δy_{t-1}		0.25	0.08	0.12
Δy_{t-3}	0.16			
Δulc_{t-1}			0.07	
$\mathbb{S}_t$				
Jan	0.61	0.25	-3.27	-0.10
Feb	-0.26	0.01	-0.31	0.65
Mar	-0.44	0.11	3.66	0.10
Apr	0.29	0.02	-0.01	0.29
May	0.31	0.06	-0.01	0.04
Jun	0.03	-0.08	-0.33	0.12
Jul	0.16	-0.09	-1.37	-0.03
Aug	0.45	-0.08	-1.43	-0.01
Sep	-1.18	0.01	2.46	-0.03
Oct	-0.52	0.00	0.60	-0.34
Nov	-0.16	0.10	-0.01	-0.34
Dec	0.70	-0.31	-0.01	-0.34

(8) In the case of services prices, a deterministic time trend was also found to be statistically significant. In part, this trend is capturing domestic costs of producing this basket that are not accounted for by the ULC indicator that is being used, which is an aggregate of the whole private sector.

In the short-run, and besides the effects of lagged variables, the model-based block of *MIMO* is highly influenced by seasonal effects. This result was to be expected. Recall from (12) that the seasonal effects are included in $\mathbb{S}_t$. The HICP is clearly subject to a severe seasonal profile and primarily due to the sales and promotions season that affects NEIG prices. Notwithstanding, seasonality is also evident in unprocessed food prices mainly due to the fact that some fruits and vegetables supply is clearly seasonal and this is reflected in their prices. To account for the seasonality of the HICP, one obvious option could have been to remove it from the raw data using a standard seasonal adjustment procedure. However, this may not be straightforward or even desirable since Portugal has seen several seasonal regimes over the last years, not only due to changing behaviors of economic agents but also due to methodological changes in the computation of the HICP. In addition, it is well known that one should not neglect that most seasonal filters may remove more than seasonality, as pointed out in Thomas and Wallis (1971). The procedure that was followed was based on using centered dummy variables during the estimation process. Throughout the estimation period, the relevant structural breaks in the seasonal pattern were taken into account.[9]

4.2. Energy

The only energy item that is not considered ADM or QADM, and which is therefore subject to an estimation procedure is designated ''Fuels and Lubricants for personal transport equipment''. This item accounts for 5 per cent of the overall HICP and 55 per cent of the total energy component. The projections of Fuels and Lubricants prices involve two stages. The first stage consists in decomposing this item into a tax-related fraction, which is affected by taxes on oil products and Value Added Tax (VAT) rates; and a fraction that excludes taxes. The most relevant petroleum products under projection are the prices of ''Euro-super 95'' and of ''Gas oil''. This refinement is highly relevant since the only faction of energy item of the HICP that is subject to a modelling procedure is for Fuels and Lubricants prices excluding taxes. These equations project the evolution of gas oil and gasoline as a function of recent developments in oil prices in euros, considering a degree of transmission that amounts to about 80 per cent of the change in oil prices. This incomplete transmission from oil prices to fuel prices excluding taxes might reflect the fact that imported oil and other costs indexed to oil price account for 80 per cent of the refining and distribution costs and profit margins. It is assumed that the remaining costs are frozen throughout the projection horizon.[10] Therefore, given that there is no error-correction term in the equations, all shocks, either permanent or temporary, have a permanent effect on the price level, are they oil price shocks or unanticipated shocks to refining margins. This matter will be analysed further in Section 5.

The tax-related fraction of the Fuels and Lubricants item is treated separately and represents a second stage of the projection processed of this item. In particular, changes in specific taxes on oil products and VAT rates are assumed to evolve according to fiscal policy measures already approved in legal terms or specified in sufficient detail. If no information is available, the level of all taxes is maintained unchanged throughout any relevant projection horizon.

(9) The structural break in NEIG prices as from January 2006 onwards, due to methodological changes, was analyzed in the Spring 2007 Economic Bulletin of Banco de Portugal (See ''Box 2. Methodological changes in the computation of the HICP''). Table 1 only presents the seasonal pattern that is in effect for projection purposes and established from the available data as from January 2006 onwards. As new data is disclosed, the revaluation of this seasonal pattern should be insured.

(10) More information on these prices is available on http://ec.europa.eu/energy/oil/bulletin/index_en.htm. The full impact of oil prices on the overall inflation rate is however not limited to its impact on these petroleum products prices. Gas prices, which are also included in the energy component, but are ADM items, also follow oil price developments (See Section 4.3).

Finally, it should be noted that, by assumption, changes in energy prices, for instance due to oil price shocks, do not produce indirect effects in other HICP components or second-round effects through their impact on other variables (for instance, on wages).

4.3. Administered and quasi-administered prices

ADM and QADM prices represent around 20 per cent of the overall HICP. The definition of the ADM items, which correspond to around 15 per cent of the overall HICP, requires that the price of these goods and services is directly set or significantly influenced by the government or defined by national regulators. For instance, prices of public transports and electricity prices are two typical examples.

The QADM basket, which corresponds to about 5 per cent of the overall HICP, defines situations where although there is not a formal compliance with the ADM items criteria, an inspection of its price dynamics reveals that, apparently, they are not market-determined and thus should not be included in the list of items that can be subject to a model-based projection. A clear example is tobacco prices, which accounts for around 2 per cent of HICP.

Both ADM and QADM are fully exogenous in *MIMO*. For projection purposes, they are treated in the same manner and in accordance to all available information (for instance, the State Budget or the Stability and Growth Programme). In the absence of any information, which is usually the case for longer forecast horizons, these prices are assumed to evolve in line with an average of the most recent period for which there is available information. Gas prices are, in this context, a special case. In *MIMO*, the price dynamics of gas prices are assumed to evolve in line with the average rates of change of oil prices in euro terms, over a period of about 12-months.

5. THE IMPACT OF SHOCKS IN *MIMO*

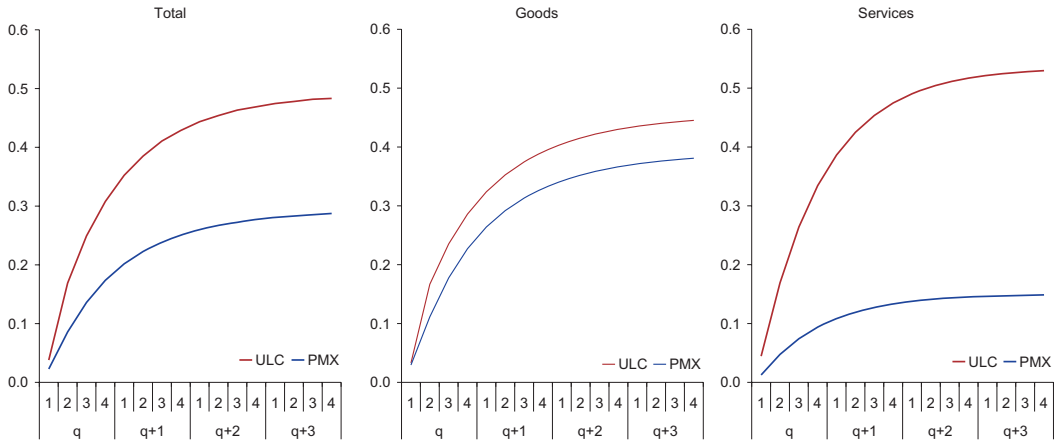
The properties and price dynamics built in *MIMO* can be summarised by its response to shocks. This Section reports the impacts on inflation of permanent shocks on its forcing variables and also the impacts due to unanticipated temporary innovations in inflation. The shocks were performed on one particular month and on the block of *MIMO* presented in Sections 4.1 and 4.2. In order to simplify the results interpretation, the reported impacts refer to overall services, overall goods and overall HICP in quarterly terms.

Regarding the effects on HICP stemming from a permanent increase in the long-run determinants of inflation, the results are presented on Chart 2. This figure shows the response of the consumer price levels to a 1 per cent permanent shock on unit labour costs and on non-energy goods import prices. After two years, the unit labour cost shock increases the overall HICP level by 0.43 per cent, while the effect of the import price shock amounts to almost 0.25 per cent, i.e., values relatively close to their respective long-term impacts (which amount to 0.5 and 0.3 per cent, respectively). This implies that, after two years, there has been an almost complete pass-through of home and foreign input prices to consumer prices.

The timing of the pass-trough is also similar across shocks and components. For both simulation exercises, around 60 per cent of the effect on the price levels takes place until the end of the first year after the shock; this increases to almost 90 per cent by the end of the following year. On quarterly terms, the largest impact takes place on the quarter immediately after the shock. The impact in terms of inflation rate also reaches a peak at this horizon, as the gradual adjustment takes place through the error-correction term (see Section 4.1). This time length is consistent with the view that the perception of the

Chart 2

IMPACT ON THE HICP OF 1% PERMANENT INCREASE IN ULC AND PMX



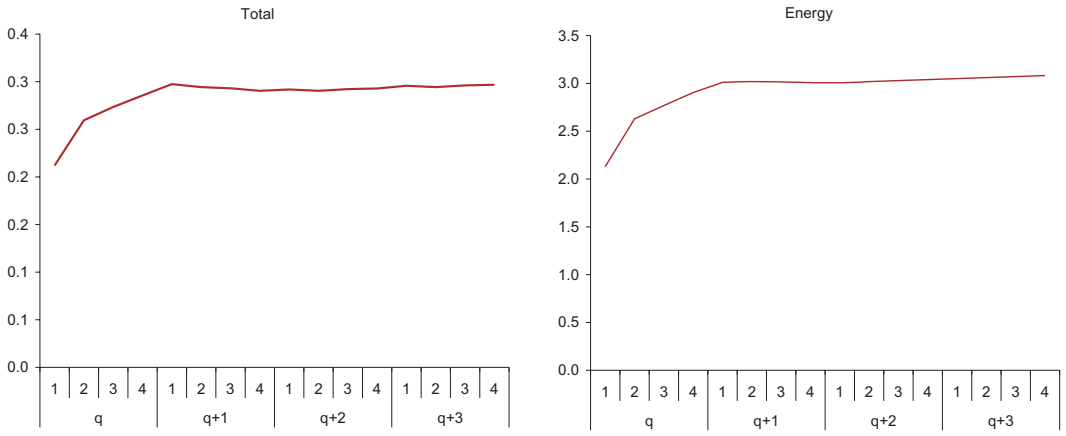
shock by the firms and the corresponding change in prices occurs with some lag, due to operating conditions that include the possible presence of nominal rigidities.

Although the timing of pass-trough is similar across components, the level of the impact on goods and services prices differs for each of the shocks, as the response of services prices to an increase in unit labour costs is stronger than in the case of the goods component, due to the larger share of non-tradables in services, which increases the importance of domestic costs in the final price. The opposite happens in the case of the import price shock, which has a larger impact on goods' prices. Chart 2 also shows the way how the HICP level evolves to its expected long-run effect.

Regarding oil price shocks, Chart 3 reports the impact of a permanent 10 per cent increase in this commodity price on consumer price levels. *MIMO* considers only direct effects and, furthermore, oil price movements affect, exclusively, pre-tax fuel and lubricant prices and gas prices. Note also that oil materials and costs indexed to oil are assumed to represent 80 per cent of the overall costs of the refining

Chart 3

IMPACT ON THE HICP OF A 10% PERMANENT INCREASE IN OIL PRICES



and distribution firms. Almost 90 per cent of the full pass-through takes place on the quarter in which the shock occurs. Over time, the impact of shock takes place through lagged effects due to the assumed price setting mechanism of gas prices described in Section 4. At the end of the second year after the shock, the impact amounts to an increase of 3 per cent on energy prices and of 0.3 per cent in headline HICP, which is the full long-term impact of the shock. Electricity and solid fuels prices, which account for about 30 per cent of the energy component, are assumed to be fully exogenous.

In the case of monthly inflation forecasts, the impact of unanticipated innovations in inflation is particularly important. During inflation projection exercises, for instance, new monthly data may be released and this incoming information must be reflected in updated projections. This shock was only implemented on the non-energy components of *MIMO*.

The outcome of a 1 per cent shock on the price level of all goods excluding energy in a particular month is depicted in Chart 4; the outcome for services is depicted in Figure Chart 5. The results show that a

Chart 4

RESPONSE OF THE HICP TO A SHOCK ON GOODS PRICES

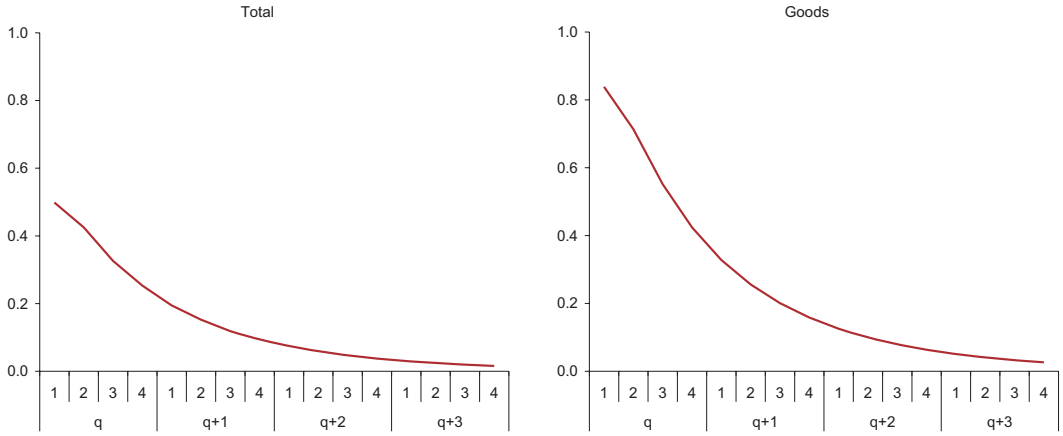
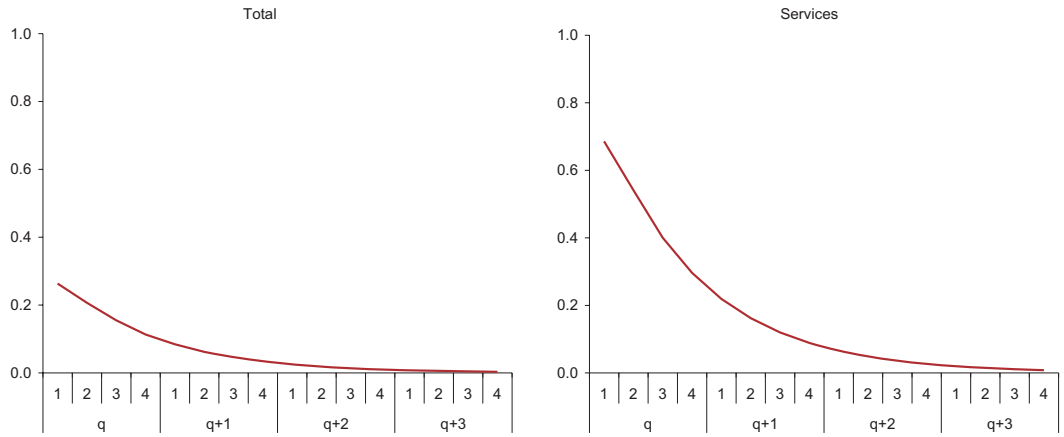


Chart 5

RESPONSE OF THE HICP TO A SHOCK ON SERVICES PRICES



temporary shock fades away monotonically and gradually over time. At the end of the second year following the shock, its impact is almost nil, following a similar pattern across components.

6. INFLATION USING ANALYSIS *MIMO*

One of the main objectives behind the construction of *MIMO* was to develop a framework that could be used for the analysis of the monthly inflation rate. This section decomposes the overall inflation rate over the period 1998-2007 into the main driving forces included in *MIMO*. There are several conclusions that can be drawn from this exercise, although the partial equilibrium nature of the model calls for some caution in the analysis. Among the most severe drawbacks of this approach is the impossibility to trace back the importance of a given structural shock. For instance, suppose that one wants to analyze the full impact of an increase in oil prices. Besides affecting energy prices and therefore the overall inflation rate, the oil price increase may also create inflation expectations that translate into wage pressures and higher unit labour costs. This second-round effect, that would surely feedback into the overall inflation rate, is fully absent. In this case, the full impact of higher oil prices would be underestimated and part of the increase in the inflation would be attributed in *MIMO* to higher unit labour costs.

In this section, the monthly inflation rate is decomposed into the contributions associated to:

i. Non-energy goods import prices (PMX);

ii. Unit labour costs in the private sector (ULC);

III. Energy prices (NRG);

iv. Administered and quasi-administered goods prices excluding energy components (ADM and QADM);

v. Other factors (it includes indirect tax changes, changes in profit margins and all measurement errors) (OTH).

In order to compute the contribution of PMX and ULC to the overall HICP inflation, we use the impulse response functions presented in Section 5. The contribution of the forcing variable $X \in \{ULC, PMX, NRG, ADM, QADM\}$ for period *t* inflation, C_t^X, can be computed as:

$$C_t^X = \begin{cases} \sum_{j=0}^{J} \Phi_j^X X_{t-j} & for \quad X = ULC, PMX \\ \omega^X \cdot X_t & for \quad X = NRG, ADM \,\&\, QADM \end{cases}$$

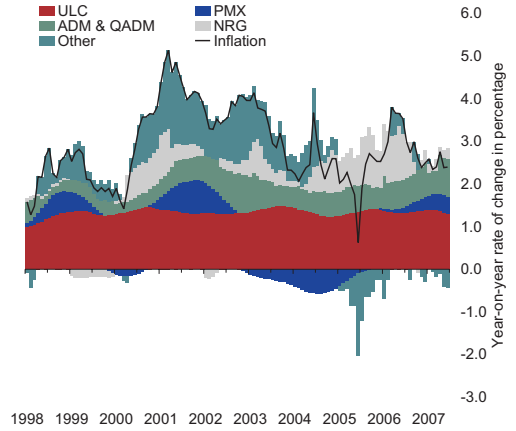
where X_{t-j} is the change of the forcing variable in period *t-j* and Φ_j is the impact on overall HICP inflation *j* periods after a 1per cent shock in variable ULC or PMX in period *t-j*. In the remaining cases, note that ω^X is just the weight of the component *X* in the overall HICP.

Between January 1998 and June 2007, the inflation rate in the Portuguese economy stood, on average, around 2.9 per cent (Chart 6). According to the results obtained from the above-mentioned decomposition procedure, the inflation rate has been largely supported by the steady growth in ULC, which contributed on average 1.4 percentage points (p.p.) per year. It should be mentioned that the evolution of ULC during this period may have been conditioned by second round effects that are not being identified, as previously mentioned.

The inflation of ADM and QADM prices excluding energy goods accounts for 0.5 p.p. while energy items contributed 0.4 p.p.. PMX contributed with a meagre 0.1 p.p. The remaining 0.5 p.p. are likely to

Chart 6

OVERALL HICP INFLATION BREAKDOWN USING MIMO



Source: Eurostat and authors calculations.

reflect the increase in VAT standard rate from 17 to 21per cent and the widening of profit margins in this period.

The use of ULC as the price indicators for the domestic intermediate input allows that its evolution may be decomposed into the evolution of compensation per employee and productivity. During the period under analysis, the contribution of ULC reflects basically the strong growth in compensation per employee, which has outpaced labour productivity growth and created inflationary pressures on the domestic side. In addition, the steady contribution of ADM and QADM prices, in particular after 2001, reflects a number of fiscal measures on the revenue side, namely the sizeable increase in tobacco taxes and a rise in the co-payments of consumers for some services that are publicly provided or subsidised (for instance, education, hospital services and pharmaceutical products, public transport prices, water supply and sewage services).

The intra-annual profile of the inflation rate is mainly determined by the evolution of energy prices, non-energy goods import prices and the residual component. In the case of the energy goods contribution, its evolution was shaped both by the evolution of oil prices, that recorded a very substantial increase in this period, and by the increase in taxes on fuels. The accumulated impact of these effects is evident in Figure 6 after 2001. Before this year, fuel prices were fully administered and the impacts of oil price changes were absorbed in profit margins of oil refining companies.

Concerning non-energy goods import prices, they exhibited a very low average growth in this period, since the positive growth rates recorded until 2002 were followed by a sustained decline in these prices from 2003 until 2006, which is likely to have been influenced by the increased competition in international goods markets from new trading partners with low unit production costs, namely Eastern European countries and Far Eastern countries with a particular emphasis on China. The period of stronger decline in these prices coincided with the last stage of the implementation of the Multi-Fibre Agreement that determined the opening EU borders to clothes and textile imports from China.

The residual component is likely to reflect the contribution of VAT changes and profit margins growth, apart from measurement errors. In the beginning of this period, private consumption exhibited growth rates well above those of GDP, which might be an indication that demand side pressures were mount-

ing and that profit margins would tend to widen. This might have contributed to the evolution of the residual component in the period 2000-2003. Thereafter, the VAT standard rate increased from 17 to 19 per cent in June 2003, before increasing to 21 per cent in July 2005. Taking into account the weight of all items in the consumer basket that are subject to the standard VAT rate, the estimated direct impact of an increase of 2 pp on the level of the overall HICP stands at around 0.7 per cent in both cases. This rise in the VAT standard rate may contribute to explain the evolution of the residual component during the 2003 recession. In addition, the impact of the 2004 European Football Championship must be highlighted, as it is sharply reflected in the evolution of profit margins in 2004 and 2005. This impact blunders the evidence on the impact of the VAT standard rate increase in 2005.

7. CONCLUSIONS

This article presents *MIMO*, a monthly inflation projection model for the Portuguese economy that relies on a bottom-up approach. *MIMO* also allows for the decomposition of inflation according to the contribution of each one of its main driving forces.

However, one must highlight that *MIMO* is subject to a number of caveats. The main caveat is that *MIMO* is a partial equilibrium model where unit labour costs and import prices are treated as exogenous, when in fact labour costs are likely to reflect the recent evolution of consumer prices.

In addition, *MIMO* relies on the assumption that there are no spillovers among HICP components and that administered or quasi-administered prices do not affect market-based prices. These assumptions might reveal too stringent, in particular in what concerns the orthogonality of other HICP components with respect to energy goods prices and in what concerns the exogeneity of wages at longer projection horizons. These caveats suggest that the results presented in this article, in particular the decomposition of the inflation rate into several contributions, should be taken cautiously. Moreover, the use of *MIMO* in the production of monthly inflation forecasts for longer horizons must be supplemented by other instruments that might help in circumventing the partial equilibrium features.

In view of the caveats of *MIMO*, a number of improvements and refinements can be implemented. A deeper understanding of the propagation mechanisms of innovations in each HICP component to other components would be a clear improvement, allowing for a richer and more accurate projection model. This might be particularly important in the case of energy prices, since indirect effects on other components are likely to be non-negligible. Moreover, one can also exploit disaggregated information on commodity prices and industrial production price indices to evaluate if these time series contain information that is not yet reflected in the information set that is being used, therefore leading to more accurate forecasts and to a deeper understanding of the transmission channels of commodity price shocks. Finally, a regular reassessment of the seasonal patterns according to the most up-to-date information should be ensured.

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CHRONOLOGY OF MAJOR FINANCIAL MEASURES

January to December 2007

January

- **4 January (Notice of Banco de Portugal No 1/2007, Official Gazette No 5, Series I)**

  Introduces changes in Notice of Banco de Portugal No 1/93, of 8 June 1993, extending to 31 December 2007 the transitional regimes therein envisaged relating to the application of the solvency ratio.

- **10 January (Circular Letter of Banco de Portugal No 2/2007/DET)**

  Following complaints by the public regarding some credit institutions' practice of refusing to carry out cash exchange operations, makes known that credit institutions must perform over-the-counter cash exchange operations, including to non-clients, within reasonable amounts.

- **17 January (Instruction of Banco de Portugal No 1/2007, distributed with Circular Letter No 4/2007/DSB.**

  Establishes that the BPnet system shall be used for the supply of information by entities subject to the supervision of Banco de Portugal. This Instruction shall enter into force on 31 May 2007.

- **19 January (Instruction of Banco de Portugal No 2/2007, distributed with Circular Letter No 9/2007/DSB.**

  Provides for the supply of data on credit portfolio developments.

- **22 January (Decree-Law No 18/2007, Ministry of Economy and Innovation, Official Gazette No 15, Series I)**

  Establishes the value-date of any credit and debit entries in deposit demand accounts and transfers in euro, and the respective effect on the date on which funds become available for the beneficiary. This decree-law shall enter into force on 15 March 2007. At the end of the first year of validity of this decree-law, Banco de Portugal shall prepare and publish a progress report on the impact of its application.

February

- **2 February (Notice of Banco de Portugal No 2/2007, Official Gazette No 28, Series I)**

  Amends Notice of Banco de Portugal No 11/2005 of 13 July, governing the general terms and conditions for the opening of bank deposit accounts.

- **6 February (Notice of Banco de Portugal No 3/2007, Official Gazette No 30, Series I)**

  Harmonizes the procedures to be adopted by credit institutions regarding the compliance with the legal provisions governing the availability of funds and the value date of movements in demand deposit accounts, namely, the delivery of funds for deposit and certification, referred to in Decree-Law No 18/2007 of 22 January. This Notice shall enter into force on 15 March 2007.

- **8 February (Notice of Banco de Portugal No 2/2007, Official Gazette No 28, Series I)**

  Introduces changes in Notice of Banco de Portugal No 11/2005, of 21 July, relating to the general terms and conditions governing the opening of demand deposit accounts. This Notice shall enter into force on the 90th day following its publication.

- **12 February (Notice of Banco de Portugal No 3/2007, Official Gazette No 30, Series I)**

  Provides clarification on banking operations outside the scope of Decree-Law No 18/2007, of 22 January and lays down the treatment to be given to funds delivered for deposit without the immediate certification of deposited amounts. This Notice shall enter into force on 15 March 2007.

- **20 February (Decree-Law No 39/2007, Official Gazette No 36, Series I)**

Introduces a third amendment to Law No 5/98 of 31 January 1998, which approves the Organic Law of the Banco de Portugal. Clarifies a number of issues regarding the term of office of the members of the Board of Directors of the Banco de Portugal, in line with the revision of the Public Manager Statute (*Estatuto do Gestor Público*).

March

- **7 March (Decree-Law No 51/2007 of the Economy and Innovation Ministry of 7 March, Official Gazette No 47, Series I)**

Regulates the business activities of credit institutions and ensures the transparency of information provided by them when credit agreements are concluded for the purchase, construction and improvement of permanent or secondary residential property or residential leased property, as well as for the acquisition of land for the construction of owner-occupied housing. The commission to be charged on the total or partial repayment of the loan shall be applied on the principal to be repaid and shall not exceed 0.5% in floating rate contracts, and 2% in fixed rate contracts. The criteria used in the calculation of interest - 365-day count convention - are also harmonised. At the end of the first year after entry into force of this Decree-Law, the Banco de Portugal shall prepare and disclose a report assessing the impact of its implementation. This Decree-Law shall enter into force on the 30th day after its publication.

- **15 March (Instruction of the Banco de Portugal No 3/2007)**

Amends Instruction No 26/2005 on prevention of the use of the financial system for the purpose of money laundering and terrorist financing (Official Bulletin No 3/2007).

April

- **3 April (Decree-Law No 103/2007, Ministry of Finance and Public Administration, Official Gazette No 66, Series I)**

Transposes into Portuguese law Directive No 2006/49/EC of the European Parliament and of the Council of 14 June 2006 on the capital adequacy of investment firms and credit institutions.

- **3 April (Decree-Law No 104/2007, Ministry of Finance and Public Administration, Official Gazette No 66, Series I)**

Introduces the ninth amendment in the Legal Framework of Credit Institutions and Financial Companies (*Regime Geral das Instituições de Crédito e Sociedades Financeiras*) and transposes into Portuguese law Directive No 2006/48/EC of the European Parliament and of the Council of 14 June 2006 relating to the taking up and pursuit of the business of credit institutions.

- **18 April (Notice of Banco de Portugal No 4/2007, Official Gazette No 82, Series II)**

Following the publication of Decree-Law No 104/2007 of 3 April, which transposed into Portuguese law Directive 2006/48/EC of the European Parliament and of the Council of 14 June, amends Notice No 12/92, which lays down the main rules on the composition of the own funds of credit institutions and financial companies, for the purposes of calculating prudential ratios and limits.

- **18 April (Notice of Banco de Portugal No 5/2007, Official Gazette No 82, Series II)**

Following the publication of Decree-Law No 104/2007 and Decree-Law No 103/2007 both of 3 April, which transposed into Portuguese law respectively Directive 2006/48/EC of the European Parliament and of the Council of 14 June and Directive 2006/49/EC of the European Parliament and of the Council of 14 June, regulates the calculation of the amount of own funds requirements of credit institutions and investment firms to cover credit risk.

- **18 April (Notice of Banco de Portugal No 6/2007, Official Gazette No 82, Series II)**

  Following the publication of Decree-Law No 104/2007 and Decree-Law No 103/2007 both of 3 April, which transposed into Portuguese law respectively Directive 2006/48/EC of the European Parliament and of the Council of 14 June and Directive 2006/49/EC of the European Parliament and of the Council of 14 June, sets out the limits to the concentration of risks of credit institutions and financial companies, having their head office in Portugal – referred to in Article 6 (1) (a) to (g) and (j) of the Legal Framework of Credit Institutions and Financial Companies, approved by Decree-Law No 298/92 of 31 December 1992 – and of the branches set up in Portugal of credit institutions having their head office in non-European Union countries.

- **18 April (Notice of Banco de Portugal No 7/2007, Official Gazette No 82, Series II)**

  Following the publication of Decree-Law No 104/2007 of 3 April, which transposed into Portuguese law Directive 2006/48/EC of the European Parliament and of the Council of 14 June, sets out the methodologies for the calculation of the amount of own funds requirements of credit institutions and investment firms to cover credit risk in securitisation transactions.

- **18 April (Notice of Banco de Portugal No 8/2007, Official Gazette No 82, Series II)**

  Pursuant to Article 8 (1) (a) and (b) of Decree-Law No 103/2007 of 3 April, which transposed into Portuguese law Directive 2006/49/EC of the European Parliament and of the Council of 14 June, lays down the procedures to be adopted in the calculation of the amount of own funds requirements to cover market risk.

- **18 April (Notice of Banco de Portugal No 9/2007, Official Gazette No 82, Series II)**

  Pursuant to Article 7 (1) (d) of Decree-Law No 104/2007 of 3 April, which transposed into Portuguese law Directive 2006/48/EC of the European Parliament and of the Council of 14 June, lays down the procedures to be adopted in the calculation of the amount of own funds requirements to cover operational risk.

- **18 April (Notice of Banco de Portugal No 10/2007, Official Gazette No 82, Series II)**

  Following the transposition of Directive 2006/48/EC and Directive 2006/49/EC both of the European Parliament and of the Council of 14 June, sets out a reference framework for the disclosure of information by credit institutions and investment firms on risks and respective assessment methods.

- **27 April (Commission Decision 2007/327/EC, OJ L 122)**

  Commission Decision on the clearance of the accounts of the paying agencies of Member States concerning expenditure financed by the European Agricultural Guidance and Guarantee Fund (EAGGF), Guarantee Section, for the 2006 financial year (notified under document number C(2007) 1901).

- **30 April (Executive Order No 499/2007 of the Presidency of the Council of Ministers, of the Ministry of Finance and Public Administration and of the Ministry of Justice, Official Gazette No 83, Series I)**

  In accordance with the provisions set out in Article 4 (1), Article 6 (2) and Article 9 (1) and (2) of Decree-Law No 8/2007 of 17 January, lays down the rules on the reporting of simplified corporate data by electronic means. In parallel, this Executive Order regulates the way how the Ministry of Finance and Public Administration makes available the information to be sent to the Ministry of Justice, *Instituto Nacional de Estatística* (National Statistical Institute), and Banco de Portugal.

- **30 April (Instruction of Banco de Portugal No 9/2007, BNBP No 5/2007)**

  Lays down that the External Credit Assessment Institutions' (ECAIs) credit assessment may be used for the determination of the risk-weighted exposure amounts and securitisation positions.

- **30 April (Instruction of Banco de Portugal No 10/2007, BNBP No 5/2007)**

  For the purposes of calculating risk-weighted exposure amounts, indicates the recognised External Credit Assessment Institutions (ECAIs), and determines with which credit quality step each credit assessment shall be associated (mapping).

- **30 April (Instruction of Banco de Portugal No 11/2007, BNBP No 5/2007)**

  Indicates the specific items of information that institutions shall communicate to the Banco de Portugal for the purposes of compiling the application for authorisation to use the Internal Ratings Based Approach (IRB) (credit risk), the Standardised Approach and the Advanced Measurement Approach (AMA) (operational risk).

- **30 April (Instruction of Banco de Portugal No 12/2007, BNBP No 5/2007)**

  Sets out the procedures to be adopted (methodologies) in the internal validation process of rating systems.

- **30 April (Instruction of Banco de Portugal No 13/2007, BNBP No 5/2007)**

  Regulates the involvement and implicit support in securitisation transactions. Revokes Instruction No 1/2005, published in the Official Bulletin No 3 of 15 March 2005, which however shall remain in force until 31 December 2007, as regards the institutions exercising the discretion laid down in Article 33 (1) of Decree-Law No 104/2007 of 3 April.

- **30 April (Instruction of Banco de Portugal No 14/2007, BNBP No 5/2007)**

  Sets out the indices and correlated currency pairs and recognises the eligible investment firms, stock exchanges and clearing houses for the purposes of capital adequacy. Revokes Instruction No 23/97, published in BNBP No 4 of 15 April 1997, which however shall remain in force until 31 December 2007, as regards the institutions exercising the discretion laid down in Article 23 (1) of Decree-Law No 103/2007 of 3 April, or in Article 33 (1) of Decree-Law No 104/2007 of 3 April.

- **30 April (Instruction of Banco de Portugal No 15/2007, BNBP No 5/2007)**

  Lays down that institutions shall have an assessment process to ensure that the internal capital is adequate to cover risks and that it remains proportionate to the risk profile. This Instruction shall enter into force on 1 January 2008 as regards the institutions exercising the discretion laid down in Article 17 (5), Article 26 (4), or in Article 33 (1), all of Decree-Law No 104/2007 of 3 April.

- **30 April (Instruction of Banco de Portugal No 17/2007, BNBP No 5/2007)**

  Defines risk concentration and sets out the different types of risk monitoring by institutions.

- **30 April (Instruction of Banco de Portugal No 18/2007, BNBP No 5/2007**

  Defines the legal framework for the carrying out of stress tests and for the adoption of corrective measures. This Instruction shall enter into force on 1 January 2008, as regards the institutions covered by the derogations foreseen in Articles 33 and 34 of Decree-Law No 104/2007 of 3 April and in Article 23 of Decree-Law No 103/2007 of 3 April.

May

- **8 May (Decree-Law No 171/2007 of the Ministry of Economy and Innovation, Official Gazette No 88, Series I)**

  Lays down the rules governing interest rate rounding when applied to credit and financing contracts signed by credit institutions and financial corporations not covered by the provisions laid down in Decree-Law No 240/2006 of 22 December. This Decree-Law shall apply to credit and financing contracts signed after its entry into force,

as well as current contracts, regardless of the borrowed amount and the purpose of the loan. With regard to current contracts, this Decree-Law shall apply as from the date of interest rate refixing, for rounding purposes, which should immediately follow its entry into force. This Decree-Law shall enter into force on the 30th day following its publication.

- **9 May (Decree-Law No 180/2007 of the Ministry of Finance and Public Administration, Official Gazette No 89, Series I)**

Amends Decree-Law No 12/2006 of 20 January, regulating the setting up and operation of pension funds and managing entities of pension funds.

- **10 May (Decree-Law No 184/2007 of the Ministry of Finance and Public Administration, Official Gazette No 90, Series I)**

Regulates the recycling of euro coins by all professional cash handlers, transposing into Portuguese law Commission Recommendation of 27 May 2005 concerning authentication of euro coins and handling of euro coins unfit for circulation. This Decree-Law shall apply to credit institutions and other cash handlers, namely cash-in-transit companies. Such entities shall submit information on their recycling activity to Banco de Portugal, according to the schedule defined by the bank.

- **11 May Decree-Law No 188/2007 of the Ministry of Finance and Public Administration, Official Gazette No 91, Series I**

Harmonises the rules regarding the publication of accounting data of entities subject to the supervision of Banco de Portugal and *Instituto de Seguros de Portugal* (Portuguese Insurance Institute).

- **14 May (Decree-Law No 191/2007 of the Ministry of Finance and Public Administration, Official Gazette No 92, Series I)**

Authorises the issue and sale by *Imprensa Nacional – Casa da Moeda* (the Portuguese Mint) of two silver coins on the European Year of Equal Opportunities for All and the 100th Anniversary of the World Scouting, with a face value of €5, and sets their issue ceilings at €537,500 and €800,000 respectively.

- **15 May (Instruction of Banco de Portugal No 19/2007, BNBP 5/2007)**

Lays down the rules and conditions to be complied with by credit institutions and individuals regarding the deposit and exchange of banknotes damaged by anti-theft devices.

- **15 May (Instruction of Banco de Portugal No 20/2007, BNBP 6/2007)**

Establishes the places, timetables, rules and conditions according to which euro banknotes may be deposited and withdrawn at Banco de Portugal.

- **15 May (Decree-Law No 195/2007 of the Ministry of Finance and Public Administration, Official Gazette No 93, Series I)**

Regulates the recycling of euro coins by all professional cash handlers, as set forth in Council Regulation (EC) No 1338/2001 of 28 July laying down measures necessary for the protection of the euro against counterfeiting, and the sorting of unfit notes. This Decree-Law shall apply to credit institutions and other cash handlers, namely cash-in-transit companies. Recycling activity shall only be carried out after a contract has been signed with Banco de Portugal.

- **17 May (Notice of Banco de Portugal No 11/2007, Official Gazette No 99, Series II)**

Amends Notice No 6/2003, which lays down the terms and conditions of the publication of accounts of institutions subject to the supervision of Banco de Portugal. This Notice shall enter into force on the date of its publication, and applies to the publication of annual accounts for the 2006 fiscal year.

- **18 May (Notice of Banco de Portugal No 12/2007, Official Gazette No 101, Series II)**

  Determines that credit institutions shall allow individuals making credit transfers through ATMs to see the name of the bank account owner or the bank account number prior to the confirmation of the transfers. This Notice shall enter into force 120 days following its publication.

- **21 May (Circular Letter No 19/2007/DPG)**

  Requests credit institutions to submit to Banco de Portugal information on the impact of the implementation of Decree-Law No 18/2007 of 22 January, which regulates issues relating to the value date of overnight deposits and transfers made in Portugal and the corresponding deadline for the provision of funds to the beneficiary.

- **23 May (Circular Letter No 41/07/DSBDR)**

  Expresses Banco de Portugal's view on the interpretation of Article 8 of Decree-Law No 51/2007 of 7 March, with regard to expenses or fees charged by institutions for the earlier repayment of housing loans or the transfer of such loans to another institution.

- **28 May (Notice of Banco de Portugal No 13/2007, Official Gazette No 107, Series II)**

  Amends Notice No 3/2006, in order to render the internal control system more effective and efficient.

June

- **1 June (Commission Regulation (EC) No 610/2007, OJ L 141)**

  In the Annex to Regulation (EC) No 1725/2003, "International Financial Reporting Interpretations Committee's (IFRIC) Interpretation 10 Interim Financial Reporting and Impairment", is inserted as set out in the Annex to this Regulation. Each company shall apply IFRIC 10, as set out in the Annex to this Regulation, as from the commencement date of its 2007 financial year at the latest, except for companies with a November or December commencement date which shall apply IFRIC 10 as from the commencement date of the 2006 financial year at the latest. This Regulation shall enter into force on the 3rd day following its publication in the Official Journal of the European Union.

- **1 June 2007 (Commission Regulation (EC) No 611/2007, OJ L 141)**

  In the Annex to Regulation (EC) No 1725/2003, "International Financial Reporting Interpretations Committee's (IFRIC) Interpretation 11 Interim Financial Reporting and Impairment", is inserted as set out in the Annex to this Regulation. Each company shall apply IFRIC 11, as set out in the Annex to this Regulation, as from the commencement date of its 2008 financial year at the latest, except for companies with a January or February commencement date which shall apply IFRIC 11 as from the commencement date of the 2009 financial year at the latest. This Regulation shall enter into force on the 3rd day following its publication in the Official Journal of the European Union.

- **5 June (2006 Annual Report and Accounts Official Gazette No 108, Series II)**

  Publishes the 2006 Annual Report and Accounts of Banco de Portugal.

- **6 June (Circular Letter No18/2007/DET)**

  Makes known on the procedures to be observed when signing a contract with Banco de Portugal, resulting from the new legal framework of euro banknotes recycling laid down in Decree-Law No 195/2007 of 15 May. It defines the contract model, provides for migration plans adaptable to the relatively prolonged transition period

envisaged in that Decree-Law, and expresses the total availability by Banco de Portugal for the co-operation, training and clarification of any issues.

- **28 June (Circular Letter No 23/2007/DET)**

Provides information on the training courses on euro banknote expert knowledge and detection of counterfeit euro banknotes, which have been promoted by Banco de Portugal for the entities engaged in the recycling of euro banknotes, in accordance with the provisions laid down in Decree-Law No 195/2007 of 15 May. Annexes a questionnaire on the technological and functional needs required for the development of specific training contents (e-learning format).

July

- **8 July (Law No 25/2007 of 18 July, Official Gazette No 137, Series 1)**

Authorises the Government to adjust the legal framework for breaches of regulations within the scope of the implementation of Directive 2004/39/EC of the European Parliament and of the Council of 21 April 2004, Commission Directive 2006/73/EC of 10 August 2006, Directive 2004/109/EC of the European Parliament and of the Council of 15 December 2004 and Commission Directive 2007/14/EC of 8 March 2007, to establish limits on the provision of investment advice in financial instruments and marketing of goods and services allocated to investment in tangible assets, and to adapt the legal framework for breaches of regulations to the specificities of this activity. The legal authorisations provided for in this law are valid for 180 days.

- **16 July (Instruction of Banco de Portugal No 21/2007, BNBP 7/2007)**

Revokes Instruction No 29/96, published in the BNBP No 1 of 17 June 1996, on compensatory interest.

- **16 July (Circular Letter No 41/2007/DSB)**

Discloses the understanding of Banco de Portugal regarding the interpretation of Article 8 of Decree-Law No 51/2007 of 7 March, i.e. no fees or commissions shall be charged in the advance repayment of housing loans or when housing credit is transferred from one institution to another, save for the costs borne before a third party, where duly documented.

August

- **1 August (Circular Letter No 63/07/DSBDR)**

Publishes the opinion of Banco de Portugal on credit substitution in securitisation operations, in the wake both of the recent publication of legislation and of developments in market conditions. It replaces Circular-Letter No 75/2003/DSB of 18 August.

- **2 August (Circular Letter of Banco de Portugal No 65/2007/DSBDR, Banking Supervision Department)**

Makes known that for the purposes of checking compliance with the reporting obligations regarding the annual accounts, branches of credit or other financial institutions having their head office in another European Union Member State shall only communicate to the Banking Supervision Department of Banco de Portugal that the institution to which they belong has made available on the respective website the registration of the said reporting, sending information about the date of request of the said registration and a print of the web page where the registration is publicised.

- **16 August (Instruction of Banco de Portugal No 23/2007, BNBP 8/2007)**

  Determines the prudential information, on an individual or on a consolidated basis, to be mandatorily supplied by credit institutions and some financial corporations. Revokes Instruction No 25/97 published in the BNBP No 5 of 15 May 97. Observations: Instruction published with Circular Letter No 62/2007/DSB of 30 July 2007.

October

- **15 October (Instruction of Banco de Portugal No 24/2007, BNBP 10/2007; entry into force on 1 January 2008)**

  Sets at 0.03% the contributory rate used to calculate the contributions of participating institutions to the Deposit Guarantee Fund in 2008.

- **15 October (Instruction of Banco de Portugal No 25/2007, BNBP 10/2007; entry into force on 1 January 2008)**

  Sets at 10% the limit for irrevocable payment commitments applicable to annual contributions in 2008.

- **22 October (Circular Letter of Banco de Portugal No 37/2007/DET, Treasury and Issue Department)**

  Lays down the terms and conditions regarding the exchange of banknotes denominated in Cyprus pounds and Maltese liri into banknotes and coins denominated in euro, taking into account the tasks of the national central banks of the Eurosystem within the scope of the Guideline of the European Central Bank of 24 July 2006 (ECB/2006/10) on the exchange of banknotes after the irrevocable fixing of exchange rates in connection with the introduction of the euro, with reference to the introduction of the euro in Cyprus and Malta on 1 January 2008.

- **30 October (Notice of Banco de Portugal No 14/2007, Official Gazette No 213, Series II)**

  Amends Notice of Banco de Portugal No 5/2007 of 27 April, which regulates, following the publication of Decree-Laws No 104/2007 and No 103/2007 both of 3 April, the calculation of own funds requirements of credit institutions and investment firms to cover credit risk. Adds two paragraphs to the list of multilateral development banks; exposures to these banks shall be assigned a 0% risk weight. This notice shall enter into force on the date of its publication.

- **31 October (Circular Letter No 93/07/DSB, Banco de Portugal, Banking Supervision Department)**

  Reiterates and supplements Banco de Portugal's view on the interpretation of the application of Article 8 of Decree-Law No 51/2007 of 7 March, transmitted through Circular Letter No 41/07/DSBDR of 23 May (debit of additional charges).

November

- **1 November (Decree-Law No 357-A/2007 of 31 October, Ministry of Finance and Public Administration, Official Gazette No 210, Series I)**

  Amends, in the use of the legislative authorisation granted by Law No 25/2007 of 18 July, the Legal Framework of Credit Institutions and Financial Companies, the Securities Market Code, the Company Law, the legal framework of dealers and brokers, the legal framework of real estate investment funds, the legal framework of collective investment undertakings, Decree-Law No 176/95 of 26 July 1995, Decree-Law No 94-B/98 of 17 April 1998, and Decree-Law No 12/2006 of 20 January, transposing into Portuguese law Directive 2004/39/EC of the European Parliament and of the Council of 21 April 2004 on markets in financial instruments and the respective implementing rules set forth in Commission Directive 2006/73/EC of 10 August as regards organisational requirements

and operating conditions for investment firms, as well as Directive 2004/109/EC of the European Parliament and of the Council of 15 December 2004 on the harmonisation of transparency requirements in relation to information about issuers whose securities are admitted to trading on a regulated market (Transparency Directive), and the respective implementing rules set forth in Commission Directive 2007/14/EC of 8 March. Provided the exceptions foreseen in this Decree-Law are safeguarded, it shall enter into force on 1 November 2007.

- **1 November (Decree-Law No 357-B/2007 of 31 October, Ministry of Finance and Public Administration, Official Gazette No 210, Series I)**

Lays down, in the use of the legislative authorisation granted by Law No 25/2007 of 18 July, the legal framework of companies whose exclusive purpose is the provision of investment advice services in financial instruments and the business of the reception and transmission of orders for the account of a third party, transposing in part into Portuguese law Directive 2004/39/EC of the European Parliament and of the Council of 21 April 2004 on markets in financial instruments. This Decree-Law shall enter into force on 1 November 2007.

- **1 November (Decree-Law No 357-C/2007 of 31 October, Ministry of Finance and Public Administration, Official Gazette No 210, Series I)**

Lays down, in the use of the legislative authorisation granted by Law No 25/2007 of 18 July, the legal framework of regulated market management companies, multilateral trading systems management companies, clearing house management companies or those acting as a central counterparty of settlement systems management companies and centralised system of securities management companies, transposing in part into Portuguese law Directive 2004/39/EC of the European Parliament and of the Council of 21 April 2004 on markets in financial instruments. This Decree-Law shall enter into force on 1 November 2007.

- **5 November (Regulation of the Securities Market Commission No 2/2007, Official Gazette No 237, Series II, of 10 December 2007)**

In accordance with the provisions laid down in paragraph 8 of Article 253, paragraph 8 of Article 315, paragraph 1 of Article 318, Article 319, and paragraph 1 of Article 369, all of them of the Securities Code, sets forth the legal framework applicable to financial intermediation activities. This Regulation shall enter into force on the 1st day following its publication.

- **5 November (Regulation of the Securities Market Commission No 4/2007, Official Gazette No 238, Series II, of 14 December 2007)**

In accordance with the provisions laid down in paragraph 3 of Article 10, paragraph 3 of Article 26, paragraph 5 of Article 32, paragraph 4 of Article 40 and Article 44, all of them of Decree-Law No 357-C/2007 of 31 October, and paragraph 1 of Article 369 of the Securities Code, approves the legal framework applicable to the management entities of regulated markets, multilateral trading systems, centralised transferable securities systems, clearing houses, central counterparties and securities settlement systems, regarding the registration, the duty to observe prudential regulations, the internal control system, and the reporting obligations to the Securities Market Commission and to the general public. This Regulation shall enter into force on the 1st day following its publication.

- **7 November (Circular Letter No 95/07/DSBDR, Banco de Portugal, Banking Supervision Department)**

Asks credit institutions and investment firms to present, on a self-assessment basis, the description, financial analysis and composition of the respective institution, disaggregated by business areas, with the identification of risks and control procedures associated with each area, in accordance with the guidelines of the Risk Assessment System, which has been submitted to consultation

through Circular Letter No 61/2007. This information shall be sent to Banco de Portugal by 14 January 2007.

- **8 November (Decree-Law No 375/2007 of 8 November, Ministry of Finance and Public Administration, Official Gazette No 215, Series I)**

  Regulates the risk capital investment activity through risk capital companies, risk capital funds or investors in risk capital. Revokes Decree-Law No 319/2002 of 28 December.

- **15 November (Instruction of Banco de Portugal No 26/2007, BNBP 11/2007, date of entry into force: 19 November 2007)**

  Amends Annex II to Instruction No 115/96, published in BNBP No 2 of 15 July 1996 (SPGT Regulation).

- **30 November (Circular Letter of Banco de Portugal No 105/2007/DSBDR, Banking Supervision Department)**

  In compliance with the provisions laid down in Notice of Banco de Portugal No 1/95, makes known the electronic address that must be used in the regular reporting of information (whose maps shall be sent in Excel format) to the Banco de Portugal.

December

- **12 December (Circular Letter of Banco de Portugal No 12/2007/DMR, Market and Reserve Management Department)**

  Makes known the conditions under which resident credit institutions in Portugal may participate in liquidity-providing operations denominated in US dollars guaranteed by collateral denominated in euro, following the currency arrangement signed between the European Central Bank and the Federal Reserve Bank of New York.

- **14 December (Instruction of Banco de Portugal No 31/2007, BNBP 1/2008, date of entry into force: 27 December 2007)**

  Amends Instruction No 51/98, published in Bulletin No 1/99 of 15 January 1999, which regulated the Interbank Money Market.

- **14 December (Instruction of Banco de Portugal No 32/2007, BNBP 1/2008, date of entry into force: 27 December 2007)**

  Amends Instruction No 47/98, published in Bulletin No 1/99, of 15 January 1999, which described the characteristics and regulated the Market Electronic Transfer System (*Sistema de Transferências Electrónicas de Mercado* - Siteme).

- **17 December (Instruction of Banco de Portugal No 27/2007, BNBP 12/2007, date of entry into force: 12 November 2007)**

  Regulates Decree-Law No 145/2006 of 31 July, with regard to the need to assess capital adequacy at conglomerate level.

- **17 December (Instruction of Banco de Portugal No 28/2007, BNBP 12/2007, date of entry into force: 12 November 2007)**

  Regulates Decree-Law No 145/2006 of 31 July, with regard to the concentration of risks, intra-group transactions, risk management processes and internal control mechanisms at conglomerate level.

- **17 December (Instruction of Banco de Portugal No 29/2007, BNBP 12/2007, date of entry into force: 19 November 2007)**

  Amends Instruction No 1/99, published in BNBP No 1 of 15 January 1999, which regulated the Intervention Operations Market (Mercado de Operações de Intervenção).

- **17 December (Instruction of Banco de Portugal No 30/2007, BNBP 12/2007, date of entry into force: 17 December 2007)**

Defines the terms and conditions under which information relating to the euro banknote recycling activity shall be reported to Banco de Portugal.