Banco de Portugal
EUROSYSTEM

Economic Bulletin | *Winter 2009*

Volume 15, Number 4

Available at
www.bportugal.pt
Publications

BANCO DE PORTUGAL

Edition

Economics and Research Department

Av. Almirante Reis, 71-6th

1150-012 Lisboa

www.bportugal.pt

Distribution

Administrative Services Department

Documentation, Editing and Museum Division

Editing and Publishing Unit

Av. Almirante Reis, 71-2nd

1150-012 Lisboa

Printing

DPI Cromotipo – Oficina de Artes Gráficas, Lda.

Lisbon, 2009

Number of copies

150

ISSN 0872-9786

Legal Deposit no. 241773/06

CONTENTS

CONTENTS

Economic Policy and Situation

Outlook for the Portuguese Economy: 2009-2011 9

Articles

Monetary Policy Expectations and Boom-Bust Cycles in the Housing Market 39

Price Adjustment Lags: Evidence from Firm-Level Data 51

The Redistributive Effects of VAT in Portugal 71

Data Revisions: The Case of Portuguese Exports and Imports 87

Chronology of Major Financial Policy Measures

January to December 2009 I

ECONOMIC POLICY AND SITUATION

Outlook for the Portuguese Economy: 2009-2011

OUTLOOK FOR THE PORTUGUESE ECONOMY: 2009-2011[1]

1. INTRODUCTION

The outlook for the Portuguese economy over the projection horizon is marked by the gradual and moderate recovery of global activity, after the recent unprecedented recession which intensified at the end of 2008. In this context, the timely adoption of monetary and fiscal stimulus measures and policies aimed to support the financial system – in some cases in a coordinated way – was decisive to reduce volatility and the risk-aversion levels of economic agents, and contributed to limiting the contraction in economic activity, preventing a spiral of systemic effects potentially unfavourable for the global economy, and creating the conditions for a gradual recovery as of the second half of 2009. For 2010 and 2011 a high uncertainty and downward risks for the global economic activity remains. These risks are due to both the possible impact on demand of the unavoidable reversal of stimulus measures implemented by the authorities, and to the possible effects of the financial crisis on the equilibrium level of economic activity and on the economies' potential output growth dynamics.

A small open economy fully integrated in economic and financial terms like the Portuguese one tends to be strongly affected by these developments, wherefore prospects for economic growth in the 2009-2011 period should be interpreted in the light of this international framework. Moreover, the Portuguese economy has shown a number of structural fragilities, which have limited its potential growth

Table 1.1

PROJECTIONS OF BANCO DE PORTUGAL 2009-2011

Rate of change, per cent

	Weights 2008	EB winter 2009			EB autumn 2009	EB summer 2009	
		2009(p)	2010(p)	2011(p)	2009(p)	2009(p)	2010(p)
Gross domestic product	100.0	-2.7	0.7	1.4	-2.7	-3.5	-0.6
Private consumption	66.5	-0.9	1.0	1.6	-0.9	-1.8	-0.6
Public consumption	20.7	2.0	0.7	1.1	2.1	1.0	0.7
Gross fixed capital formation	21.7	-11.7	-3.4	0.9	-13.1	-14.3	-3.8
Domestic demand	109.6	-2.9	0.3	1.4	-3.0	-4.5	-0.7
Exports	33.0	-12.5	1.7	3.2	-13.1	-17.7	-0.9
Imports	42.5	-10.8	0.3	2.7	-11.7	-17.1	-1.2
Contribution to GDP growth (in p.p.)							
Net exports		0.5	0.4	-0.1	0.6	1.4	0.2
Domestic demand		-3.2	0.3	1.5	-3.3	-4.9	-0.7
of which: change in inventories		-0.5	0.1	0.0	-0.3	-0.8	0.2
Current+capital account (% of GDP)		-8.2	-9.8	-11.3	-8.6	-8.3	-9.6
Trade balance (% of GDP)		-6.5	-6.8	-7.0	-6.7	-6.5	-6.6
HICP		-0.9	0.7	1.6	-0.9	-0.5	1.3

Source: Banco de Portugal.
Notes: (p) - projected. The central projections for each aggregate are shown (considered to be its most likely value, depending on the range 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 projections may be different from the probability of observing a value above the central projections.

(1) This section is based on data available up to mid-December. The assumptions underlying the international framework are based on figures up to 11 December 2009.

over the last decade, in a context of increased competition in international markets and growing integration of emerging market economies with a similar export pattern. Such fragilities are reflected on a limited growth of total factor productivity, which can hardly be disconnected to the low qualification level of the labour force. Furthermore, a low contribution of labour input to growth is likely to occur, as a result of the increasing structural unemployment, which will tend to persist in a context of weak buoyancy of demand and low labour market mobility, also conditioned by the human capital level. These fragilities, in parallel with the challenges posed by the new international financial framework stemming from the financial crisis, will tend to limit economic activity growth in the medium term. Against this background, Gross Domestic Product (GDP) is expected to increase by 0.7 per cent in 2010 and 1.4 per cent in 2011, after contracting by 2.7 per cent in 2009.

Underlying the present projection for economic activity in 2010 and 2011, on the supply side, is an increase in total factor productivity, after the fall observed in 2009. This trend reflects the usual contribution of cyclical factors during economic upturns, namely a reversion on the rate of installed capacity utilisation, as well as a more intensive use of labour force. On the demand side, the economic downturn in 2009 reflected, in addition to the continued markedly negative behaviour of investment and exports, a significant contraction of private consumption, in particular in the durables component. These developments of demand reflected, on the one hand, the significant tightening of financing conditions, which materialised in tightened credit standards applicable to new loans and an increase in risk premiums, against a background of rising default in some credit segments more exposed to cyclical conditions, notwithstanding the decline in money market interest rates. On the other hand, it reflected increased tension in financial markets, which has largely contributed to the collapse of international trade and to a sharp deterioration of economic agents' confidence. Growth of economic activity projected for 2010 and the expected acceleration for 2011 reflect a broadly based recovery of private demand components, in a context where external demand for Portuguese goods and services seems to have resumed an upward trend as of the second half of 2009. The development of domestic demand in 2010 and 2011 will likely continue to be affected by the deterioration of labour market conditions, by some persisting structural weakness, and by the uncertainty surrounding the resumption of the fiscal consolidation process.

Turning to inflation, the Harmonised Index of Consumer Prices (HICP) declined by 0.9 per cent in 2009, after an increase of 2.7 per cent in 2008. The inflation rate is expected to resume positive figures in 2010 (0.7 per cent), rising to 1.6 per cent in 2011. The cut in consumer prices in 2009 is therefore forecast to be temporary, which is confirmed by indicators of inflation expectations that point to positive, albeit low levels in 2010. Against a background of contracting global demand, the fall in prices in 2009 was strongly influenced by the sharp decline in the import deflator, reflecting, in particular, the cut in oil and non-energy commodity prices. Moreover, the relatively high growth of unit labour costs in the private sector may also have been accommodated by the significant narrowing of profit margins, due to the contracting demand in the domestic market. In a context of economic recovery at both the global and national level, the increase in consumer prices in 2010 and 2011 reflects an increase in oil prices, a rise in the import deflator of non-energy goods and a moderate increase in unit labour costs, which will tend to allow for some recovery of profit margins. This projection for the inflation rate in Portugal implies that the price growth differential *vis-à-vis* the euro area will continue to be negative in 2010, albeit to a smaller magnitude than in 2009.

The net borrowing requirements for the Portuguese economy, as measured by the combined current and capital account deficit as a percentage of GDP, declined from 10.5 per cent of GDP in 2008 to 8.2 per cent in 2009, especially reflecting favourable developments in terms of trade, which were more apparent than developments exclusively due to the significant decline in oil prices. Over the projection horizon, however, external borrowing requirements are projected to rise again to 9.8 and 11.3 per cent

of GDP in 2010 and 2011 respectively. These developments reflect in particular a slight deterioration of the goods and services account deficit and a sharp widening of the income account deficit, as a result of a further deterioration of the international investment position and a gradual interest rate increase as of mid-2009.

The current projection does not imply a revision of economic activity growth in 2009 *vis-à-vis* the figures published in the Autumn Economic Bulletin of 2009, although it shows a slight revision in the expenditure composition. Compared with the Summer Economic Bulletin of 2009, this projection implies a significant upward revision of the GDP growth rate in 2009 (+0.8 percentage points (pp.)). This revision reflects higher-than-expected growth in most components of overall demand, in parallel with a revision of imports in the same direction, which implies a substantially higher-than-forecast contribution of domestic demand (+1.6 pp.) and a lower-than-expected contribution of external trade in net terms (-0.9 pp.). The present projection for economic activity in 2010 implies an upward revision of +1.3 pp., which is due not only to the dynamic effects associated with higher-than-anticipated growth for the second half of 2009, but also to prospects of more favourable developments of global financing conditions, as well as demand conditions, in a context of gradual decline in the agents' risk-aversion level. These factors will likely contribute to higher-than-anticipated growth of both private domestic demand and exports. The current projection for inflation points to a downward revision of approximately 0.5 pp. in 2009 and 2010, chiefly reflecting a higher-than-projected fall in the import deflator of non-energy goods.

2. ASSUMPTIONS UNDERLYING THE PROJECTION EXERCISE

The current projections are based on a set of assumptions regarding the developments in the international environment of the Portuguese economy. These assumptions reflect data available up to mid-December 2009 and rely on technical hypotheses on the future developments of interest rates, exchange rates and commodity prices, as well as the performance of global economy, particularly in the euro area, and its implications for the external demand of Portuguese goods and services.

As of the second half of 2009 the situation in international financial markets eased gradually and risk *premia* declined steadily, though remaining at a level higher than the ones registered before the outbreak of the financial crisis. The current projection incorporates the maintenance of this trend of progressive normalisation of financing conditions in 2010 and 2011 and a regularisation of international trade flows, in a context of recovering world economic activity. Although these developments imply a gradual return of growth rates to levels close to those observed prior to the recent financial crisis in both economic activity and international trade flows, they imply a fall in the level of those variables, which will prevail over the projection horizon.

The current projections point to negligible revisions, when compared with those underlying the macroeconomic projections for 2009 included in the autumn 2009 issue of the Economic Bulletin. In turn, when compared with the assumptions underlying the projection published in the summer 2009 issue of the Economic Bulletin, the current external framework of the Portuguese economy includes a more favourable appraisal of external demand, reflecting a faster-than-anticipated recovery of world economic activity (Table 2.1). Moreover, the monetary stimulus and liquidity management measures implemented by a number of central banks and, in particular, by the European Central Bank, have contributed to a decline in interbank money market risk *premia*, implying a higher-than-expected decline of short-term interest rates in 2009. As regards commodity prices in US dollars, in particular of oil, futures markets implicit expectations point to an upward revision, consistent with the update of the outlook for global economic activity. The appreciation of the euro exchange rate since then, however, has contributed to mitigate the revision of commodity prices in euro terms.

Table 2.1

ASSUMPTIONS UNDERLYING THE PROJECTION EXERCISE

		EB winter 2009			EB autumn 2009	EB summer 2009	
		2009	2010	2011	2009	2009	2010
External demand	yoy	-13.0	1.9	3.2	-13.4	-13.0	-0.5
Interest rate							
Short term	%	1.2	1.2	2.2	1.3	1.4	1.8
Long term	%	4.2	4.0	4.4	4.2	4.5	5.0
Exchange rate (+ = appreciation)							
euro effective exchange rate	yoy	0.8	2.2	0.0	0.2	0.1	0.6
Euro-dollar	aav	1.40	1.49	1.49	1.38	1.36	1.40
Oil price							
in dollars	aav	62.2	80.5	86.3	62.4	61.9	76.3
in euros	aav	44.2	53.9	57.8	45.0	45.2	54.7

Sources: BCE, Bloomberg, Thomson Reuters and Banco de Portugal calculations.
Notes: (p) - projected. yoy - year-on-year rate of change, % - per cent, aav - annual average value.

2.1. Interest rates and exchange rates

The assumptions on short-term interest rate developments are based on expectations regarding the trend of the three-month EURIBOR implied in futures contracts. Financial market participants anticipate that, after the strong fall in the first quarter of 2009 and further more moderate declines up to the end of 2009, this rate will increase gradually until the end of the projection horizon, albeit to levels clearly below the annual averages observed in 2008. Therefore, in annual average terms, the three-month EURIBOR is expected to remain at 1.2 per cent in 2010, and to increase to 2.2 per cent in 2011. Against this background, it is worth mentioning that the development of the short-term interest rates is affected by both expectations regarding the ECB intervention rates and the developments of risk *premia* implied by the money market, measured by the interest rate differential between collateralised and non-collateralised operations. This differential rose sharply in mid-2007 with the outbreak of the financial crisis and also significantly in 2008, but has reversed steadily in the course of 2009 (Chart 2.1.1). The profile of future developments of the interest rates included in the present projection implicitly assumes a slight reduction of the interbank money market risk premium in early 2010, followed by a small rise in the second half of the year, in a context of reversal of an important package of monetary stimulus measures implemented in 2009. Against the background of a gradual easing of the financial markets, this differential will likely stabilise after early 2011, albeit at levels clearly above those prevailing before the outbreak of the financial crisis.

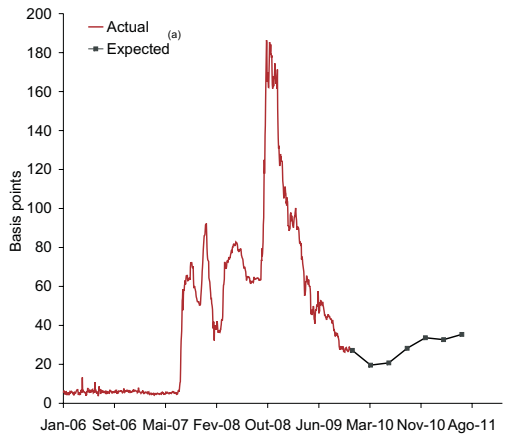
The profile underlying the present projections regarding developments in bank lending rates reflects the cost of financing of banks in wholesale markets and risk *premia* charged by banks on households and non-financial corporations using bank loans. Thus, the present projection considers that bank spreads will continue to decline over the projection horizon, although to levels above those recorded in the period immediately before the outbreak of the financial crisis.

According to implicit ten-year government bond yield data, benchmark long-term interest rates are expected to decline, in annual average terms, from 4.2 per cent in 2009 to 4 per cent in 2010. In 2011, these rates will likely increase to 4.4 per cent, which is close to the 2008 figure.

Finally, exchange rate developments rely on the technical assumption of unchanged rates at the average levels prevailing in mid-December 2009, implying an annual average appreciation of the euro ef-

Chart 2.1.1

SPREAD BETWEEN EURIBOR AND THREE-MONTH EONIA SWAPS



Sources: Bloomberg, Thomson Reuters and Banco de Portugal calculations.
Note: (a) Spread between the three-month EURIBOR implicit in futures contracts and the average expected EONIA rate (derived from the EONIA swap index) for the corresponding period.

fective exchange rate of 0.8 per cent in 2009 and 2.2 per cent in 2010, after an appreciation of 4.8 per cent in 2008 (5.1 per cent depreciation against the US dollar in 2009, followed by a 7 per cent appreciation in 2010).

2.2. International prices

After reaching an average monthly value of USD 134 per barrel in July 2008, the price of oil declined sharply in the second half of the year, particularly in the last quarter, standing at a monthly average figure of USD 42 per barrel in December. In 2009, the oil price resumed an upward trend, to stand close to USD 62 per barrel. According to expectations implied by the futures markets, oil price is likely to maintain an upward trend until the end of the projection horizon, reaching figures close to USD 87 per barrel. In annual average terms, this pattern implies a reduction of oil prices from USD 98 per barrel in 2008 to approximately USD 62 in 2009, followed by an increase to around USD 80 per barrel in 2010 and to USD 86 in 2011. Along with the assumptions already mentioned with regard to the euro/USD exchange rate, these developments are projected to imply an annual average price of €44 per barrel in 2009 (€66 in 2008), €54 in 2010 and €58 in 2011.

As regards non-energy commodity prices, available data point to an increase in food commodity prices of approximately 27 per cent in 2008, while the prices of other non-energy commodities increased by around 3 per cent. Available data on the development of these prices, implied by futures markets, points to a fall of around 12 per cent in food commodity prices and of 27 per cent in other non-energy commodities in 2009, reflecting the impact on prices of the sharp reduction in demand expectations. Prices of non-energy commodities are expected to increase further by 25 per cent in 2010 and by 4 per cent in 2011, in the context of the expected recovery in global demand and hence in demand for commodities.

2.3. International environment and external demand

In the context of a gradual unwinding of the international financial crisis, the December 2009 Eurosystem projections, published in the Monthly Bulletin of the European Central Bank, and based on data available until 20 November 2009, suggest that economic activity growth in the euro area has turned positive in the third quarter of 2009, for the first time since early 2008. In annual average terms, after growing 0.5 per cent in 2008, GDP in the euro area contracted between 3.9 and 4.1 per cent in 2009, and is expected to grow in a range between 0.1 and 1.5 per cent in 2010 and between 0.2 and 2.2 in 2011. These more favourable developments of activity reflected, at a first stage, the role played by a range of interlinked factors, among which stress is laid on the implementation of fiscal stimulus packages, restoring of average inventories levels after the destocking observed in the recent past, and international trade growth. Over the horizon, the lagged effects of monetary policy measures and the significant efforts towards a smoother functioning of the financial system have also contributed to the gradual recovery of economic activity. However, it should be pointed out that the available projections point to a pace of growth significantly slower than before the recession, due to the need to restructure the balance sheets in different sectors, which translates namely into weak growth of private consumption against a background in which prospects also indicate a low level of job creation.

Projections for consumer price developments, prepared within the same projection exercise, point to a significant reduction in euro area inflation in 2009, as measured by the annual average rate of change in the HICP, which stood at -0.4 per cent in the third quarter, but is expected to have resumed positive figures in the fourth quarter. These developments were strongly associated with base effects related to past falls in commodity prices. In this context, the annual average inflation rate, which stood at 0.3 per cent in 2009, is projected to lie in the range from 0.9 to 1.7 per cent in 2010 and from 0.8 to 2.0 per cent in 2011. The developments estimated for 2010 and 2011 reflect, on the one hand, an increase in commodity prices and in the prices of manufactured goods over the projection exercise and, on the other hand, a moderate recovery of profit margins, in a context of wage moderation and increased productivity associated with the gradual recovery of economic activity.

The external environment of the current projection implies a fall in external demand for Portuguese goods and services of around 13 per cent in 2009, after an expansion of 0.4 per cent in 2008. This strong contraction in exports is a totally atypical situation.[2] The current projection for the international environment indicates a gradual recovery of international trade and external demand for Portuguese goods and services after the third quarter of 2009, in a context of easing international financial market tensions, recovery of the confidence levels of economic agents and gradual increase in demand and world economic activity. These developments indicate that the external demand indicator relevant for Portugal is expected to grow by 1.9 per cent in 2010 and 3.2 per cent in 2011.

2.4. Assumptions underlying public finances and administered prices

As regards public finance projections, and as usual within the scope of the Eurosystem projection exercise, only the fiscal policy measures that have been legally approved or specified in adequate detail and with high probability of legislative approval were included. Therefore, the present projections are conditioned by the fact that the State Budget for 2010 and the update of the Stability Programme will only be published after the cut-off date of this Bulletin. As regards the fiscal stimulus measures imple-

(2) Since the start of the 1980s, in annual average terms, this indicator declined only in 1993 (-1.8 per cent). For the period prior to 1980, no data are available for the calculation of this indicator.

mented in December 2008, it was assumed they would be discontinued during the projection horizon. This assumption has affected, in particular, the public investment profile, which, in real terms, is projected to decline in 2010 and 2011. Public consumption, in turn, is forecast to decelerate sharply in 2010, in real terms, to 0.7 per cent, followed by a slight acceleration in 2011. These developments imply a stabilisation of the number of civil servants, and a significant deceleration *vis-à-vis* 2009 of intermediate consumption and social benefits in kind.

As regards public transfers from the European Union, the profile assumed in the projection horizon is affected by the assumption that the stimulus measures implemented in the context of the economic crisis will be discontinued, as an important share of those measures benefited from community financial assistance.

As to administered prices, the present projection incorporates public information, in particular on the update of actual rents and the rise in electricity prices in 2010. Other prices for which no data is available as yet are assumed to increase in line with the average growth recorded in the recent past.

3. SUPPLY

3.1. Output and sectoral developments

The current projection points to a 2.7 per cent contraction in economic activity in 2009, followed by a return to positive values, of 0.7 per cent in 2010 and 1.4 per cent in 2011 (Chart 3.1.1) (see "Section 4 *Demand*"). These developments are marked by the performance of private sector economic activity, as public sector GDP is likely to contract substantially less than private sector GDP in 2009 and to grow by marginally positive values in 2010 and 2011.[3]

In 2009 the growth differential between Portugal and the euro stood at 1.3 per cent, interrupting the negative differential observed since 2003 (Chart 3.1.2). Over the projection horizon, the differential is expected to be marginally negative in 2010 (-0.1 per cent) and somewhat positive in 2011 (0.2 per cent).[4]

At the sectoral level, the current projection comprises heterogeneous developments, with particularly sharp falls in the most sensitive sectors to cyclical fluctuations (construction and manufacturing). Following a substantial contraction in manufacturing in 2009, growth rates are projected to return to positive values in 2010 and 2011, amid a gradual recovery of world economic activity. This projection reflects the profile of both domestic and external demand for Portuguese goods and services.

Activity in the construction sector is expected to contract over the projection horizon, albeit at a gradually slower pace. This evolution is associated with systematic drops in corporate and residential investment. In 2009 these were partially offset by public investment developments, reflecting a set of fiscal stimulus measures.

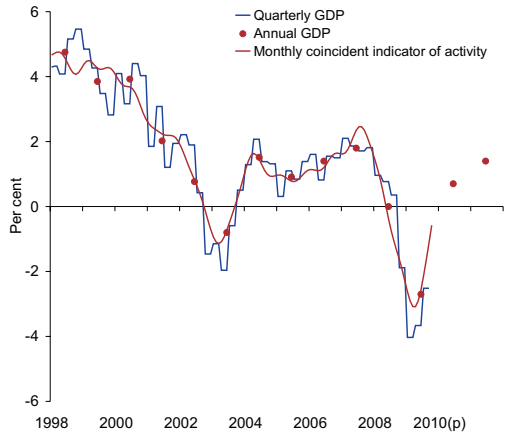
With regard to the services sector, following a slight contraction in 2009, a gradual recovery is expected over the projection horizon, reflecting developments in household consumption expenditure and tourism exports. Tourism exports are projected to grow substantially in 2011, after a sharp contraction in 2009, due to a deterioration in economic activity in advanced economies and, particularly, in the countries of origin of the majority of tourists visiting Portugal.

(3) Public sector output corresponds to general government expenditure on primary factors intended for the supply of public goods and services, particularly staff costs and fixed capital consumption. Private sector output is obtained as the difference between total output and public sector output, thus including general government intermediate consumption expenditure on goods and services produced by the private sector.

(4) Euro area figures correspond to the midpoints of projection ranges published in the December issue of the ECB *Monthly Bulletin*.

Chart 3.1.1

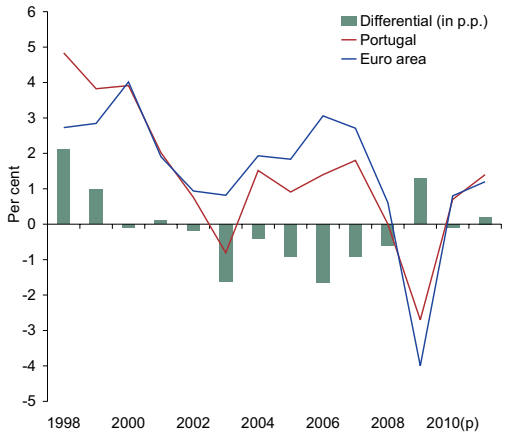
ECONOMIC ACTIVITY
Year-on-year rate of change



Sources: *INE* and Banco de Portugal.
Note: (p) - projected.

Chart 3.1.2

GDP IN PORTUGAL AND IN THE EURO AREA
Annual rate of change



Sources: ECB, Eurostat, *INE* and Banco de Portugal calculations.
Notes: (p) - projected. Euro area figures correspond to the midpoints of projection ranges published in the December issue of the ECB *Monthly Bulletin*.

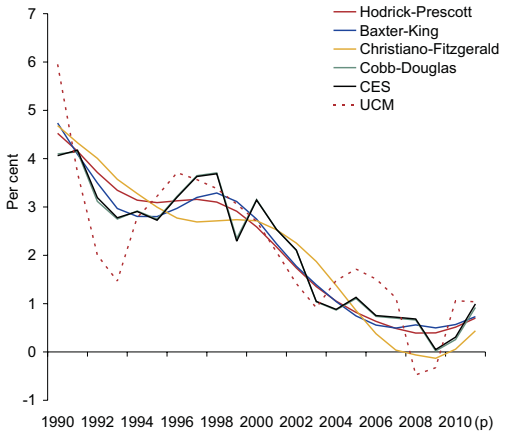
The analysis of potential output and the output gap in the current juncture is particularly difficult and is surrounded by considerable uncertainty, given that it is not yet possible to determine the effects of the economic and financial crisis on the equilibrium level of activity. This crisis may have persistent negative effects on both the level and growth rate of economy activity, in particular due to an increased obsolescence of installed capital, with an impact on long-term productivity. Moreover, the crisis may imply lower capital accumulation and rising structural unemployment, with effects on input accumulation. Finally, methods used to calculate potential output and the output gap are generally very sensitive to GDP values at the end of the estimation period. This is particularly relevant in the current climate of high uncertainty surrounding economic activity developments in the near future.

Difficulties associated with the rigorous quantitative evaluation of potential output and the output gap suggest the usefulness of various estimation methods.[5] Overall, the methods considered point to a slowdown in potential output in 2009, while a slight acceleration is projected for 2010 and 2011 (Chart 3.1.3). In turn, the output gap is likely to stand in negative territory over the projection horizon, although considerable uncertainty persists regarding its level and trajectory, as shown by the marked dispersion in results obtained with the different methods (Chart 3.1.4).

(5) These methods correspond to the Hodrick-Prescott, Baxter-King and Christiano-Fitzgerald statistical filters and the Cobb-Douglas and Constant Elasticity of Substitution (CES) production functions presented in V. Almeida and R. Félix (2006), "Computing potential output and the output gap for the Portuguese economy", Banco de Portugal, *Economic Bulletin*-Autumn. The Unobserved Components Model (UCM) method is presented in Centeno, M. , J. Maria and A. Novo (2009), "Unemployment: Supply, demand, and institutions", *The Portuguese Economy in the Context of Economic, Financial and Monetary Integration,* Economics and Research Department, Banco de Portugal.

Chart 3.1.3

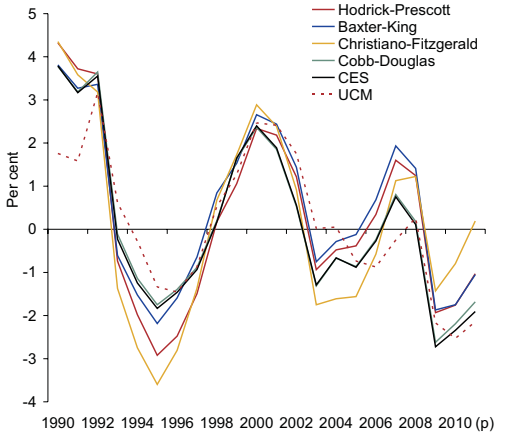
POTENTIAL OUTPUT GROWTH
Annual rate of change



Sources: *INE* and Banco de Portugal.
Note: (p) - projected.

Chart 3.1.4

OUTPUT GAP
Deviation from potential output level



Sources: *INE* and Banco de Portugal.
Note: (p) - projected.

3.2. Employment

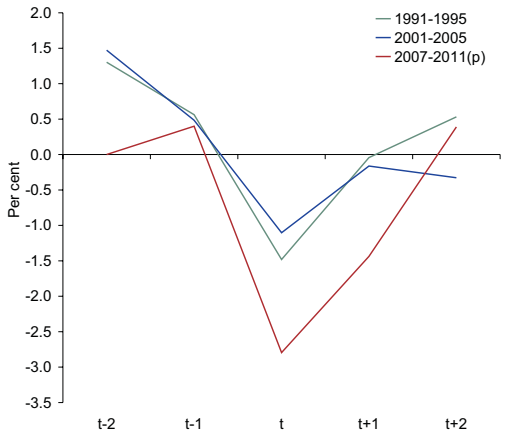
Developments in employment will be marked by the strong contraction in economic activity in 2009, which will tend to impact on the demand for labour in 2010, reflecting the usual lag between the output and employment cycles. Therefore, following a 2.8 per cent contraction in 2009, employment is projected to contract by 1.3 per cent in 2010 and to grow by 0.4 per cent in 2011. Projected developments indicate that net job destruction will be much higher during the 2007-2011 recessive period than in the previous two recessive episodes (Chart 3.2.1). In sectoral terms, projected developments in employment are marked by the behaviour of the private component, over the entire projection horizon, against a background of expected stabilisation in public sector employment, in line with the already mentioned methodological assumptions (see "Section 2 *Assumptions underlying the projection exercise*").

Underlying developments in employment and economic activity in 2009 is the stagnation in apparent labour productivity, measured as output per worker, which will return to positive growth rates in 2010 and 2011. A comparison with previous recessive episodes indicates that the recovery of apparent labour productivity in 2010 will be stronger than recorded during the year following activity contraction in previous recessive periods. This reflects the contribution of cyclical factors during economic recovery stages, more specifically a reversal of capacity utilisation and the return to a more intensive use of labour inputs (Chart 3.2.2). However, the partial unwinding of these factors in 2011 is likely to lead to a slowdown in apparent productivity, which should return to figures closer to its underlying trend growth.

With regard to labour supply, the participation rate declined in 2009 and is projected to decline in 2010, but some reversal is projected for 2011. These developments are likely to partly reflect some discouragement in terms of labour market participation. Developments in the activity rate together with low working age population growth – in line with its recent behaviour and in a context of population ageing – imply a contraction in labour force in 2009 and 2010 and a rate of change of around 0.6 per cent in 2011, in contrast with average growth of around 1 per cent over the past decade.

Chart 3.2.1

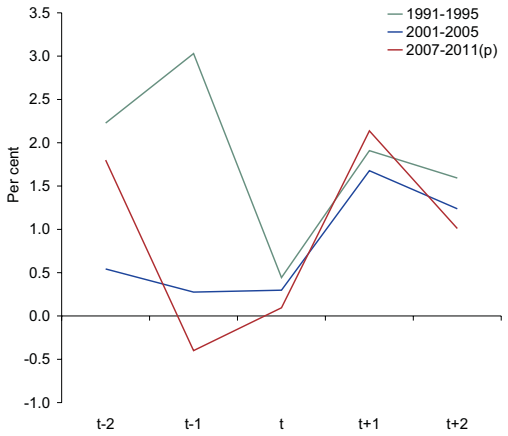
EMPLOYMENT
Comparison between recessive periods
Annual rate of change



Sources: *INE* and Banco de Portugal.
Note: (p) - projected.

Chart 3.2.2

APPARENT LABOUR PRODUCTIVITY
Comparison between recessive periods
Annual rate of change



Sources: *INE* and Banco de Portugal.
Note: (p) - projected.

3.3. Economic growth factors

Growth factors in the Portuguese economy may be analysed from a supply perspective through a growth accounting exercise, namely resorting to the Cobb-Douglas production function, which breaks GDP growth into contributions from the accumulation of inputs (labour and capital) and total productivity.[6] Although useful to understand aggregate supply developments, this exercise presents some limitations. In particular, factor productivity is obtained residually, and therefore is not only an efficiency measure but also the result of variables not explicitly included in the growth accounting exercise (e.g. the quality of inputs or the degree of capacity utilisation).

Over the projection horizon, developments in the labour factor have the most unfavourable impact on economic activity growth, with a markedly negative contribution both in 2009 and 2010 (-1.8 and -1.0 p.p. respectively) and a marginally positive contribution in 2011. The contribution of the capital stock to economic activity growth should be virtually nil over the projection horizon (Chart 3.3.1). These developments reflect the contraction in investment recorded in 2008 and projected for 2009 and 2010.

With regard to total factor productivity, following a 1.1 per cent contraction in 2009, a fast reversal is expected to ensue, with this component being the largest contributor to economic activity growth in 2010 and 2011 (1.6 and 1.1 pp.) respectively. Such developments are likely to be strongly influenced by cyclical factors. In 2009, negative developments in productivity should be partly related to a sharp decline in the utilisation rate of the capital stock (Chart 3.3.2) (which is very sensitive to cyclical economic fluctuations) as well as to labour hoarding.[7] In 2010 and 2011, the recovery of economic activity will tend to eliminate these temporary factors, allowing for an upturn of total factor productivity.

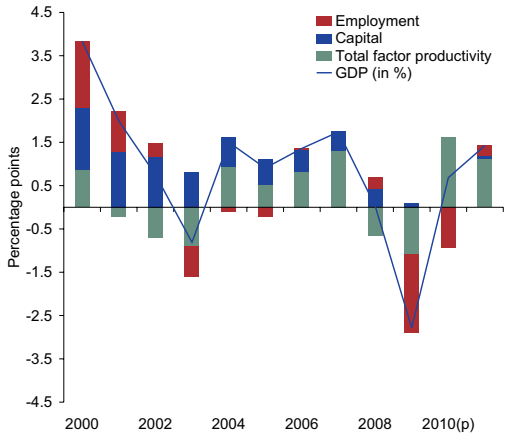
(6) For a discussion of this methodology, see Almeida, V. and R. Félix (2006), "Computing potential output and the output gap for the Portuguese economy", Banco de Portugal, *Economic Bulletin*-Autumn.

(7) The retention of workers under these circumstances may result either from the difficulty of adjustment of employment for legal reasons, or from the strategy of some firms to avoid the destruction of specific human capital, i.e. incur in unrecoverable costs resulting from the transmission of job and firm-specific skills.

Chart 3.3.1

GROWTH ACCOUNTING - 2005-2011

Contribution to the annual rate of change

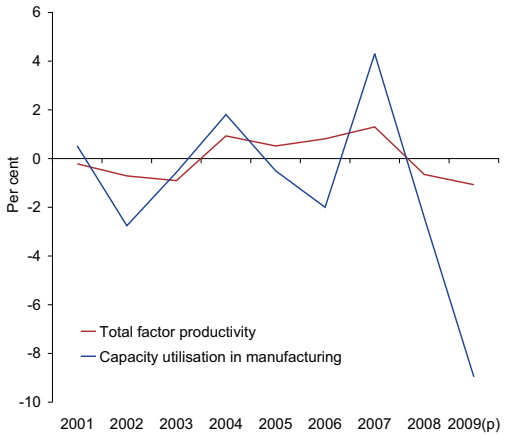


Sources: *INE* and Banco de Portugal.
Note: (p) - projected.

Chart 3.3.2

TOTAL FACTOR PRODUCTIVITY AND CAPACITY UTILISATION IN MANUFACTURING INDUSTRY

Annual rate of change



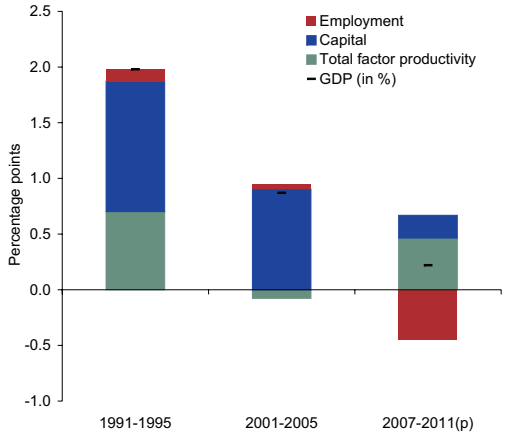
Sources: European Commission, *INE* and Banco de Portugal.
Note: (p) - projected.

By comparing the 2007-2011 period with the two previous recessionary periods in Portugal (1991-1995 and 2001-2005), some conclusions may be drawn regarding GDP developments and the contribution of inputs and total factor productivity to economic growth (Chart 3.3.3). Average GDP growth in the 2001-2005 period was substantially lower than in the 1991-1995 period (0.9 per cent, compared to 2.0 per cent), and a further decrease is projected in the most recent period (0.2 per cent), an indicator of the unprecedented nature of the current recessive phase. While lower output growth in 2001-2005 was mainly due to a marked decline in the contribution of total factor productivity, lower

Chart 3.3.3

COMPARISON OF GROWTH ACCOUNTING - 1991-1995, 2001-2005 AND 2007-2011

Contribution to the average rate of change



Sources: *INE* and Banco de Portugal.
Note: (p) - projected.

growth projected for 2007-2011 reflects a smaller contribution from inputs, particularly the capital stock. Capital stock developments may reflect the amortisation of important investment flows during the 90s, as well as a poor investment performance over the current recessive period. With regard to the labour factor, projected developments should be mainly associated with weaker private sector employment growth, in a context where structural unemployment is higher than in previous recessive episodes. Finally, developments in total factor productivity indicate that, following abnormally low growth between 2002 and 2006, in 2007-2011 average growth will return to a level closer to its historical average.

4. DEMAND

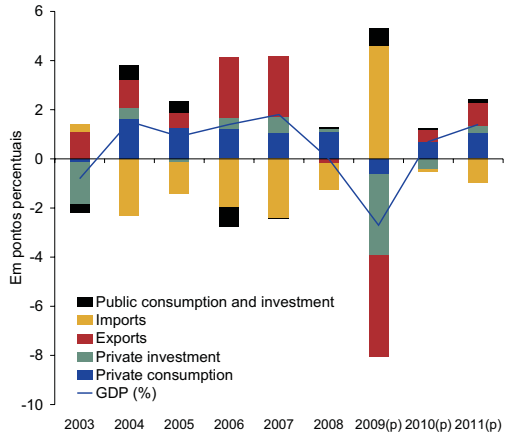
Economic activity in Portugal recorded a very significant drop in the last quarter of 2008, which extended to the first quarter of 2009. GDP has thus recorded a negative rate of change of 2.7 per cent in 2009, the most marked of recent decades. Regarding the composition of demand, this sharp drop stemmed mainly from exports and investment (both recorded a decline close to 12 per cent), reflecting the marked deterioration in demand prospects.

The assumptions underlying the current projection include a recovery of world demand and economic activity in 2010 and 2011, including in the euro area, albeit moderate (see "Section 2 *Assumptions underlying the projection exercise*"). Against this background, the current projection points to a slight recovery in economic activity (0.7 per cent in 2010), led by exports and private consumption (Chart 4.1). Among other factors, these developments are driven by the increase in external demand for Portuguese goods and services, the improvement in the expectations of economic agents regarding developments in their income and wealth, as well as the maintenance of interest rates at a low level. Economic recovery is expected to continue in 2011, with an estimated growth of 1.4 per cent, due to positive contributions from all domestic demand components and a virtually nil contribution from net exports.

Chart 4.1

BREAKDOWN OF GDP GROWTH

Contribution to the annual rate of change



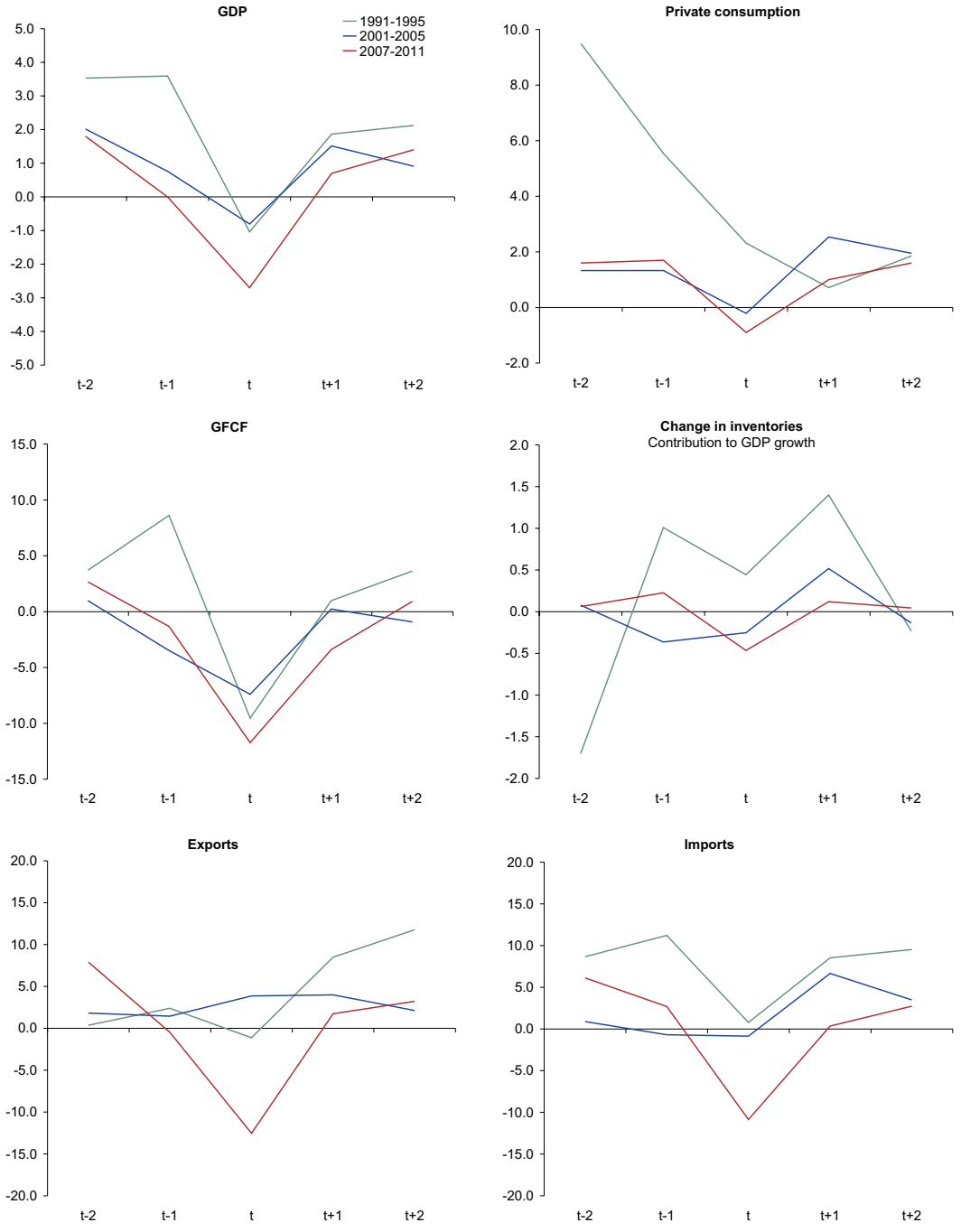
Sources: *INE* and Banco de Portugal.
Note: (p) - projected.

Comparing this recession with previous ones, it is possible to highlight the unprecedented size and nature of the present situation, and to draw some conclusions on the most relevant characteristics of the Portuguese economy over recent years (Chart 4.2). In the past 20 years, the Portuguese economy recorded two other recessive episodes, none of which with a GDP contraction of similar magnitude. It

Chart 4.2

DEVELOPMENTS IN GDP AND EXPENDITURE COMPONENTS IN RECESSION PERIODS

Annual rate of change, per cent



Sources: *INE* and Banco de Portugal.
Note: (p) - projected.

should be mentioned, however, that, unlike previous recessive episodes, the current one occurs against the backdrop of a deep international financial crisis, accompanied by a contraction in global economic activity. According to the projections for developments in final demandcomponents, this recession comprises unprecedented drops in gross fixed capital formation (GFCF) and exports, mirroring the effects of the financial and economic crisis on investment decisions and demand expectations in the context of the collapse of international trade at the end of 2008. Over the past few years, investment developments have limited the growth potential of the economy and the path of exports has reflected the difficulties of the export sector when faced with new international competitors with low unit labour costs. In 2009, private consumption dropped more markedly than in the troughs observed in previous recessive episodes. In contrast to previous recessions, the current recession was accompanied by a sharp deterioration in labour market conditions, which is projected to continue over the projection horizon (see "Subsection 3.2 *Employment*"). This situation is expected to result in a reversal of the downward path observed in the household savings rate over the past few years, namely due to precautionary savings, against a background of a high level of household indebtedness and less favourable financing conditions than in previous recessive episodes.

4.1. Private consumption

Private consumption contracted by 0.9 per cent in 2009, following a growth rate slightly above 1.5 per cent in the two previous years. The fall in consumption occurred in a context of a rise in real disposable income, determined to a large extent by an increase in transfers to households and compensation of employees, despite the strong reduction in employment (Chart 4.1.1). Mention should also be made to the positive impact on disposable income from the strong decline in banking interest rates in the course of 2009, considering the net borrowing position of households in terms of interest-bearing assets and liabilities.

In an environment of high uncertainty, the tightening of credit standards for bank loans is estimated to have also led to the postponement of household consumption expenditures, notwithstanding a sharp drop in interest rates over the course of 2009. In fact, the tightening of financing restrictions in international markets, compared to conditions prevailing before the outbreak of the financial market turbulence, is estimated to have limited banks' ability to adjust the debt servicing of households to their payment capacity. In addition, the materialization of credit risks also gave rise to tighter credit standards by banks.

Developments in private consumption in 2009 resulted from the combination of weak growth in the consumption of non-durable goods and a very marked fall in the consumption of durable goods, reflecting the strong sensitivity of this component to the business cycle, particularly given the sharp increase in the unemployment rate and persistent tensions in international financial markets (Chart 4.1.2). Nevertheless, private consumption recovered throughout the year, in particular the consumption of durable goods, likely due to a deduction in financial market tensions, as well as the associated fall of uncertainty and recovery in consumer confidence (Chart 4.1.3).

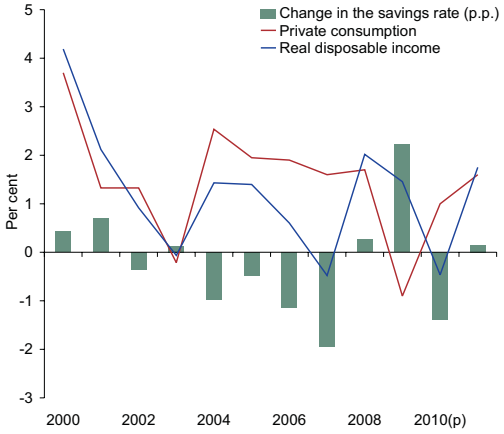
In 2009, the decrease in private consumption is less marked than that of GDP, in line with the usually smoother developments in consumption (Chart 4.1.4). In addition, private consumption growth is expected to be similar to the euro area, taking as reference the midpoint of the projection ranges published in the (Chart 4.1.5).

The households saving rate increased significantly in 2009, adding to the slight rise of 2008 and interrupting the downward trend recorded since 2002. Developments in the household saving rate are estimated to have reflected precautionary savings due to the high uncertainty associated with the

Chart 4.1.1

CONSUMPTION, DISPOSABLE INCOME AND SAVINGS RATE

Annual rate of change

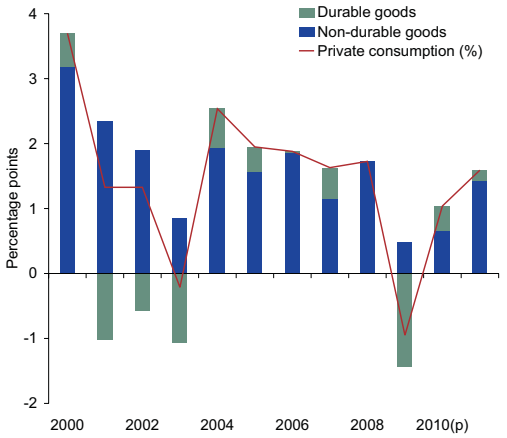


Sources: *INE* and Banco de Portugal.
Notes: (p) - projected. The savings rate is calculated as a percentage of disposable income.

Chart 4.1.2

BREAKDOWN OF PRIVATE CONSUMPTION

Contribution to the rate of change



Sources: *INE* and Banco de Portugal.
Note: (p) - projected.

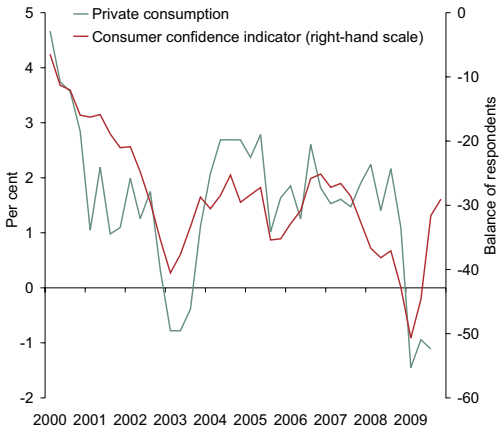
magnitude and duration of the financial crisis and its interaction with economic activity, particularly regarding wealth and income developments.

For 2010 and 2011, the current projection implies private consumption growth of 1 and 1.6 per cent, respectively. These developments represent an acceleration in private consumption, in particular in the durable goods component, which typically shows a pro-cyclical and highly volatile behaviour. Notwithstanding the limitations imposed by an unfavourable labour market situation and the gradual increase in interest rates over the projection horizon, consumption is likely to grow above disposable income, which implies a reduction in the households saving rate to levels closer to those prevailing in 2008.

Chart 4.1.3

PRIVATE CONSUMPTION AND CONSUMER CONFIDENCE

Annual rate of change

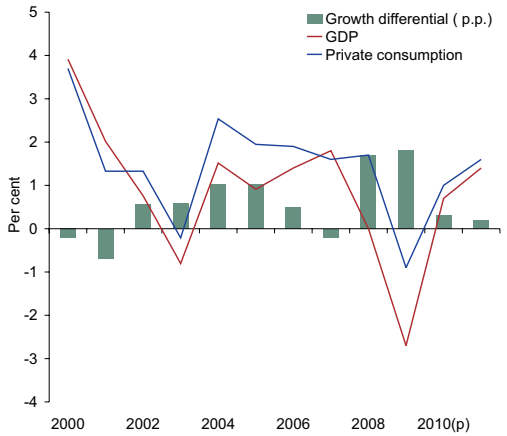


Sources: European Commission, *INE* and Banco de Portugal.
Note: The level for the fourth quarter of 2009 is based on the assumption that monthly indicators will remain unchanged at the level of the latest figure available (November).

Chart 4.1.4

PRIVATE CONSUMPTION AND GDP

Annual rate of change

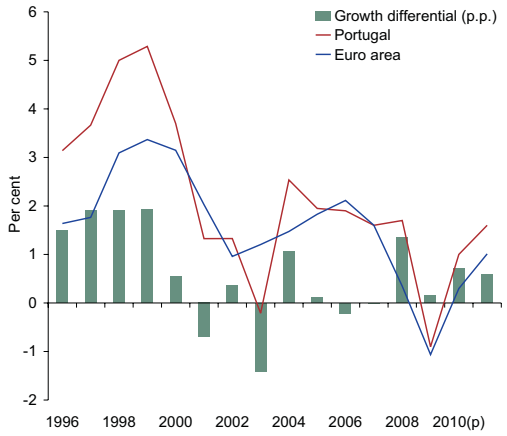


Sources: *INE* and Banco de Portugal.
Note: (p) - projected.

Chart 4.1.5

PRIVATE CONSUMPTION IN PORTUGAL AND IN THE EURO AREA

Annual rate of change



Sources: ECB, Eurostat, *INE* and Banco de Portugal calculations.
Notes: (p) - projected. Euro area figures correspond to the midpoint of the projection ranges published in the December issue of the ECB *Monthly Bulletin*.

Real disposable income is expected to decrease in 2010 and to accelerate in 2011, in line with the profile projected for the compensation of employees. It should also be noted that, although a gradual normalization of financing conditions is assumed over the projection horizon, credit standards are expected to remain tighter than in the period preceding the onset of the financial crisis, namely owing to risk reassessment and the associated tightening of credit standards.

In 2010 and 2011, private consumption growth is in line with expected GDP developments, in contrast to the past few years, when, in general, positive differentials were recorded. The current projection also points to higher private consumption growth in Portugal than that projected for the euro area, as was the case in previous years, and contrasting with the typically negative differential recorded in GDP since the beginning of the decade.

4.2. Investment

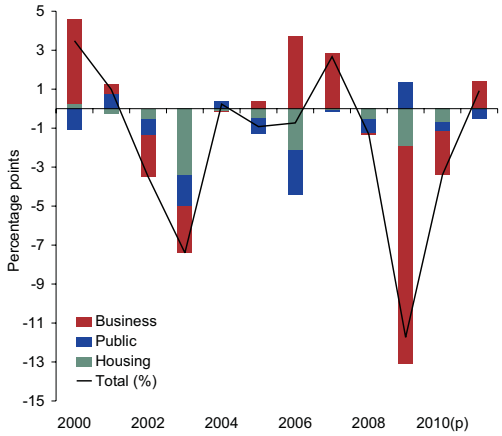
GFCF projections point to a drop of around 12 per cent in 2009, after a reduction of 1.3 per cent in 2008 (Chart 4.2.1). The sharp decline in the GFCF in 2009 is likely to have been associated with the marked deterioration in the expectations of economic agents regarding the levels of demand both in the domestic market and in Portugal's export markets. This has occurred in an international environment dominated by a strong contraction in world demand, unusually high uncertainty levels and the associated increase in credit risk *premia*. Negative expectations regarding future levels of demand and the sharp drop in international trade flows are likely to have also implied a significant reduction in the level of inventories, similarly to what happened in other European countries, which resulted in an unusually negative contribution from this component to GDP growth and in a sharper fall in investment.

Regarding the intra-annual profile, after an abrupt reduction in the first quarter of 2009, GFCF showed a profile of gradually smaller falls over the course of the year. Less unfavourable developments in the second half of the year have possibly benefited from the gradual fading away of financial market instability and the associated decrease in uncertainty levels. The latter was also reflected in gradually less

Chart 4.2.1

BREAKDOWN OF GFCF

Contribution to the annual rate of change



Sources: *INE* and Banco de Portugal.
Note: (p) - projected.

negative levels in most confidence indicators, namely regarding production expectations in the manufacturing industry (Chart 4.2.2). In turn, GFCF also benefited from a significant interest rate reduction throughout 2009, despite tighter credit standards.[8]

The current projection points to a contraction in GFCF of 3.4 per cent in 2010 and a slight recovery, to 0.9 per cent, in 2011. These developments mirror a gradual improvement in demand prospects in the domestic and the external markets, as a result of a normalisation of financing conditions in international markets and continued low interest rate levels. Nevertheless, the current projection points to gradually rising interest rates over the projection horizon, as well as continued tighter credit standards than those prevailing before the outbreak of the financial crisis. In addition, the projected GFCF developments imply a reduction in its weight in GDP over the projection horizon, similarly to what happened in the 2001-2006 period (Chart 4.2.3).

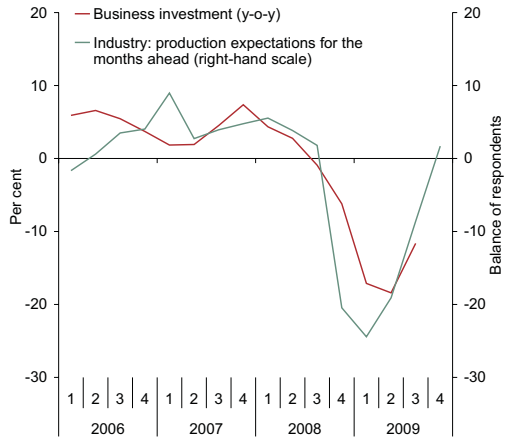
As regards GFCF sectoral developments, business investment is estimated to have decreased by around 15 per cent in 2009, decisively contributing to the reduction in the GFCF this year. According to information included in the July 2009 Investment Survey conducted by *Instituto Nacional de Estatística - INE* (Statistics Portugal), deteriorating demand prospects are likely to have played a major role in explaining business investment developments. In effect, there has been a clear increase in the number of firms reporting investment constraints compared to the 2008 survey, and, from among these, a marked increase in firms pointing to deteriorating sales prospects as the main limiting factor. In addition, there has also been an increase in the share of firms mentioning financing difficulties as a factor limiting investment, albeit to a much lesser extent.

The current projection also includes a fall of 3.1 per cent in business investment in 2010, followed by growth of 1.9 per cent in 2011, against a background where the ongoing stabilisation of the international macroeconomic and financial environment is likely to enable a gradual and moderate recovery in domestic and external demand. As a percentage of GDP, this type of investment, which should be

(8) GFCF developments during the third quarter of the year were particularly influenced by specific and temporary factors, such as the purchase of aeronautic equipment.

Chart 4.2.2

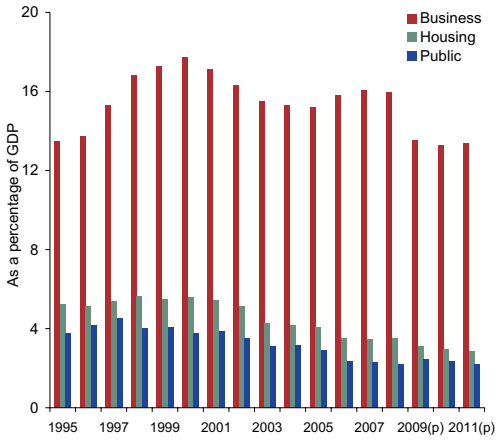
BUSINESS INVESTMENT AND INDUSTRIAL PRODUCTION EXPECTATIONS



Sources: European Commission and Banco de Portugal.
Note: The level for the fourth quarter of 2009 is based on the assumption that monthly indicators will remain unchanged at the level of the latest figure available (November).

Chart 4.2.3

BREAKDOWN OF GFCF BY INSTITUTIONAL SECTOR



Sources: *INE* and Banco de Portugal.
Note: (p) - projected.

strengthened in quality and quantity in order to ensure a sustained recovery of economic activity, is expected to stand at levels close to those recorded in the mid-1990s.

Residential investment is likely to have fallen by 12 per cent in 2009, following a contraction of 3.4 per cent in 2008. This GFCF component has shown a marked downward trend since the beginning of the decade, reaching about 50 per cent in cumulative terms. Residential investment has also been affected by the international financial crisis, given that a high percentage of this type of investment is financed with recourse to bank lending, against a background of tighter credit standards. In addition, recent developments in this component are also estimated to have been highly affected by unfavourable labour market conditions. The current projection comprises a drop of 4.1 per cent in 2010 and marginally positive growth in 2011. Developments in this GFCF component will continue to be limited by weak job creation and, as a consequence, by household income prospects, as well as dynamics linked to demographic factors.

Public investment is projected to have grown by 13.4 per cent in 2009 in real terms, a growth rate unparalleled over the past decade, which reflects the implementation of a set of fiscal stimulus measures aimed at sustaining the contraction in final demand and thus in economic activity. According to "Section 2 *Assumptions underlying the projection exercise*", public investment is expected to decrease by around 4 per cent in 2010 and 2011. It should be noted that these assumptions are conditioned by the fact that the State Budget for 2010 and the update of the Stability and Growth Programme will only be available after the cut-off date of this Bulletin.

4.3. External trade

In a context of a significant drop in world trade from the last quarter of 2008 onwards, particularly marked in the first quarter of 2009, the contraction in exports of goods and services significantly contributed to the recessive scenario which characterised Portuguese economic activity in 2009. In fact, after a decline of 0.5 per cent in real terms in 2008, the current projection points to an unprecedented

contraction in exports in 2009 (-12.5 per cent), resulting from a drop of a similar magnitude in the indicator of external demand for Portuguese goods and services (Chart 4.3.1).

The strong contraction in exports in 2009 is more marked fall in exports of goods (-14.2 per cent) than in other goods and services (-8.6 per cent) (Chart 4.3.2). In particular a strong contraction in exports of goods to Portugal's major trading partners was recorded since the decline in demand was stronger. As a result, exports of services regained their importance in exports as a whole, accounting for around 30 per cent of the overall exports in 2009 (Chart 4.3.3).

In 2010 and 2011, the indicator of external demand is projected to recorded further positive changes (see "Section 2 *Assumptions underlying the projection exercise*"), following the gradual normalisation of international financial market conditions and the reduction in uncertainty levels. In this context, the current projection points to growth in exports of goods and services of 1.7 and 3.2 per cent in 2010 e 2011, respectively. This trend is in line with expected developments in the external demand indicator, thus implying virtually nil change in the exports market share (Chart 4.3.1).

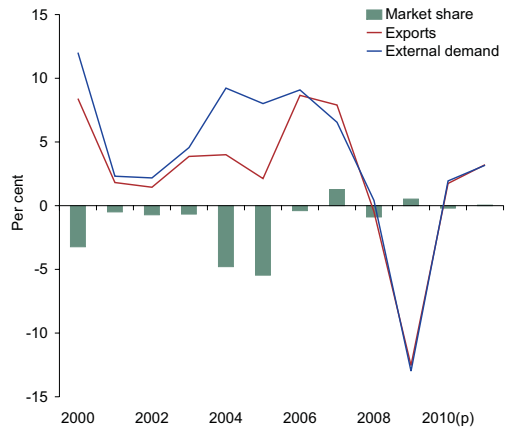
The pace of growth of exports of goods and services is expected to be moderate throughout 2010. This projection comprises a positive rate of change of exports of goods, while exports of services should continue to fall. The projected annual developments in exports of services are mainly determined by the markedly downward trend of the past year, given that a moderately upward trend is projected throughout 2010. In 2011, exports of goods and services are expected to accelerate, converging to average annual growth close to 3 per cent.

Regarding imports of goods and services, the current projection points to a significant contraction in 2009 (close to 11 per cent), in contrast to a positive change in the previous year (2.7 per cent). This decrease mainly derives from the marked contraction in final demand and comprises both imports of goods and services. Over the projection horizon, a gradual recovery is anticipated in imports of goods and services, in line with developments projected for weighted final demand(Chart 4.3.4). This trend is expected to result in virtually nil annual average import growth in 2010 and 2.7 per cent growth in 2011.

The marked fall in imports in 2009 was mainly determined by the strong contraction in demand components with higher import content: consumption of durable goods, business investment and exports of goods. At the same time, there was less inventory accumulation in 2009, a phenomenon which is gen-

Chart 4.3.1

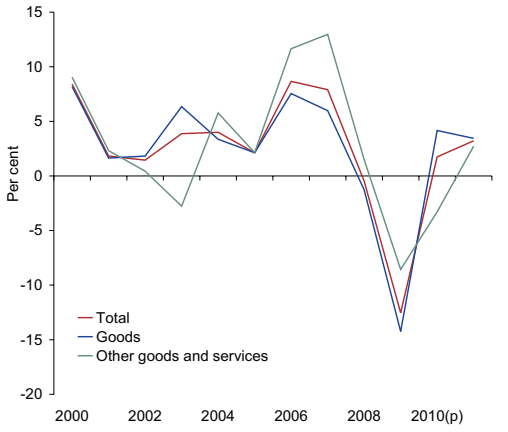
EXPORTS AND EXTERNAL DEMAND
Annual rate of change



Sources: ECB, *INE* and Banco de Portugal.
Note: (p) - projected.

Chart 4.3.2

EXPORTS
Annual rate of change

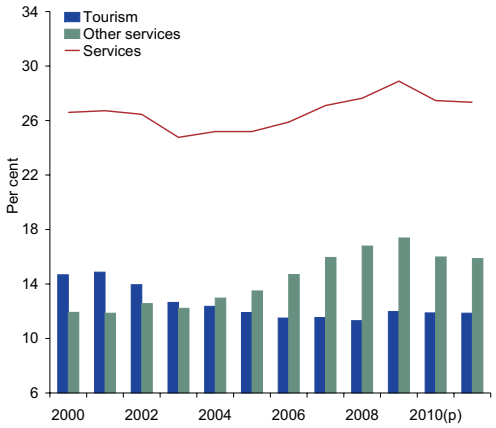


Sources: *INE* and Banco de Portugal.
Note: (p) - projected.

Chart 4.3.3

SHARE OF EXPORTS OF SERVICES IN OVERALL EXPORTS

Annual rate of change, on the basis of figures in real terms

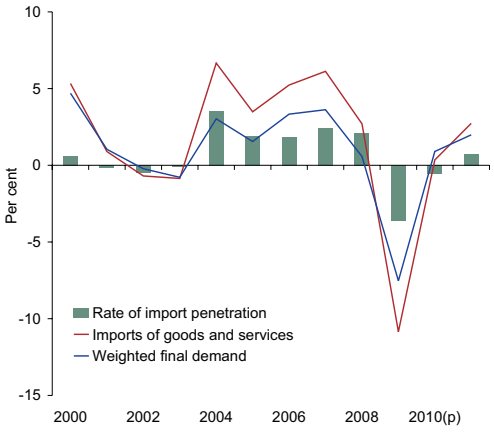


Source: Banco de Portugal.
Note: (p) - projected.

Chart 4.3.4

IMPORTS AND WEIGHTED OVERALL DEMAND

Annual rate of change



Sources: *INE* and Banco de Portugal.
Note: (p) - projected.

erally registered in years of marked downturn in demand. After the increase in import content over the past years, arising in part from the vertical integration of production on a global scale, there was less import penetration in 2009, as is usually the case in recessive periods of the economic cycles (Chart 4.3.4). The current projection foresees virtually nil average change of import penetration in the 2010-2011 period as a whole.

5. INFLATION

The current projection envisages a decline in consumer prices, as measured by HICP, of 0.9 per cent in 2009, while the resumption of positive growth rates is expected as from the beginning of 2010. In fact, the current projection indicates that the inflation rate will turn out to be 0.7 per cent in 2010 and 1.6 per cent in 2011 (Chart 5.1).

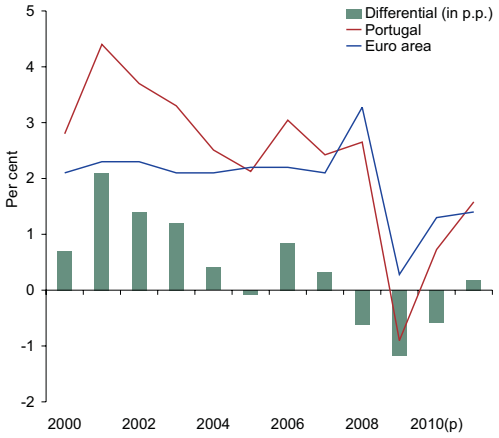
The decline in consumer prices in 2009 was unprecedented over the past three decades and reflected negative contributions from both the energy goods and the non-energy component, which fell 8 and 0.2 per cent respectively (Chart 5.2). These developments were associated with the large contraction in foreign and domestic demand, stemming from the recent economic and financial crisis. The fall in demand contributed to a considerable decline in commodity prices in international markets, both energy and non-energy. At the domestic level, contracting demand led to a substantial compression of profit margins, against a background of continued robust growth in unit labour costs, which portrayed a mismatch between buoyant wage developments and poor productivity increases.

In 2010, the inflation rate should return to positive levels (0.7 per cent), increasing to 1.6 per cent in 2011, against a background of recovery in global economic activity that should be reflected in price developments both abroad and in Portugal. At the international level, the recovery in economic activity is likely to induce an increase in demand for energy and non-energy commodities, leading to price hikes that will pass through to the Portuguese economy via developments in the non-energy imports deflator and oil prices. In the Portuguese economy, developments in economic activity should allow for a partial

Chart 5.1

HICP IN PORTUGAL AND IN THE EURO AREA

Annual rate of change

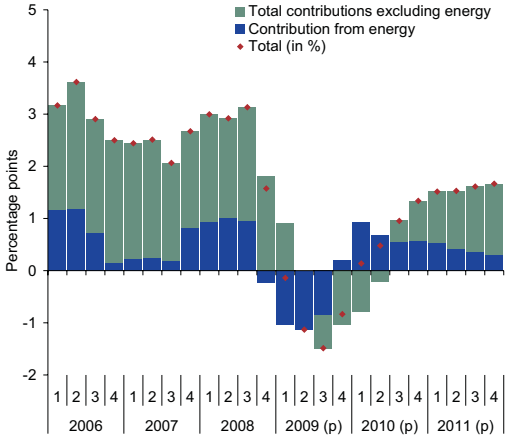


Sources: ECB, Eurostat, *INE* and Banco de Portugal calculations.
Notes: (p) - projected. Euro area figures correspond to the midpoints of projection ranges published in the December issue of the ECB Monthly Bulletin.

Chart 5.2

OVERALL HICP AND CONTRIBUTION FROM ENERGY AND NON-ENERGY GOODS

Year-on-year rate of change



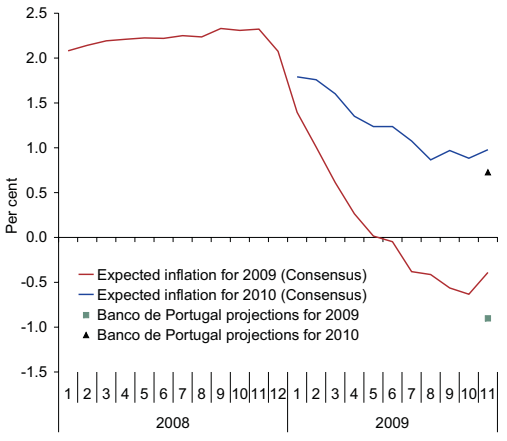
Sources: *INE* and Banco de Portugal calculations.
Note: (p) - projected.

recovery in profit margins in 2010, in a context of declining unit labour costs. This projected decrease stems the envisaged subdued wage growth, following the strong increase registered in 2009 and more favourable developments in productivity. In 2011 improvements in economic activity should lead to an increase in unit labour costs associated with larger wage growth than those projected for 2010.

Chart 5.3

DEVELOPMENTS IN INFLATION EXPECTATIONS FOR 2009 AND 2010 AND BANCO DE PORTUGAL PROJECTIONS FOR IHCP

Year-on-year rate of change



Sources: Consensus Economics and Banco de Portugal calculations.
Note: Monthly inflation expectations refer to the year as a whole.

Therefore, and in a context where inflation expectations of economic agents in 2010 remain anchored in positive territory (Chart 5.3), the decrease in consumer prices in 2009 should be regarded as a phenomenon of a temporary nature and not as a continued and sustained fall in prices.

The current projections imply that the inflation differential between Portugal and the euro area will remain negative in 2010, albeit lower than in 2008 and 2009.[9] These developments are widespread across all components of non-energy goods and contrast with the maintenance of a positive differential since the start of the euro area up to mid-2007. For 2011, the current projection envisages that this differential will be virtually nil.

6. CURRENT AND CAPITAL ACCOUNT

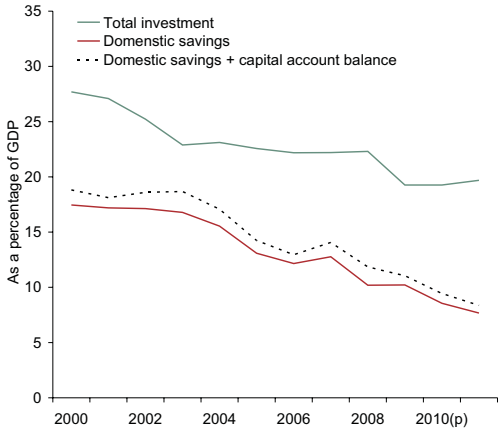
In the period following the 2003 recession, the Portuguese economy recorded a persistent and increasing imbalance between the domestic investment and domestic saving levels, thereby inducing an increase net external borrowing requirements of the Portuguese economy[10] (Chart 6.1). Against this background, net external borrowing requirements of the Portuguese economy, as measured by the combined current and capital account balance as a percentage of GDP, have remained at a high level for a protracted period. The current projections point to a temporary decline in the borrowing requirements from 10.5 per cent of GDP in 2008 to 8.2 per cent in 2009. In fact, net external borrowing requirements are likely to increase again throughout the projection horizon, to 9.8 and 11.3 per cent of GDP, respectively in 2010 and 2011 (Chart 6.2).

Amongst the factors contributing to the reduction in net external borrowing requirements in 2009 stand out the decline in oil prices and in interest rates. The first allowed for a substantial gain in terms of trade and consequently a significant narrowing of the energy account deficit (Chart 6.3), and the second induced a temporary inversion in the increasing profile of the income balance deficit through its effects on the debt service.

Chart 6.1

SAVINGS, INVESTMENT AND CAPITAL TRANSFERS

As a percentage of GDP

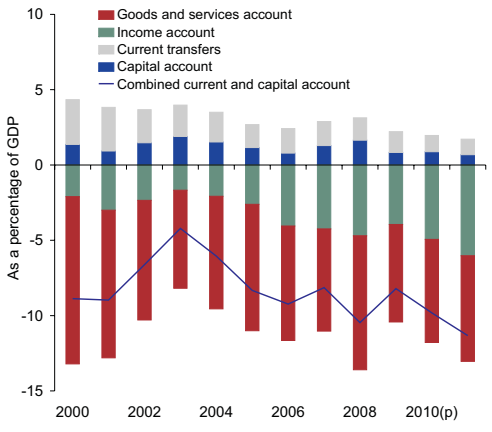


Source: Banco de Portugal.
Note: (p) - projected.

Chart 6.2

CURRENT AND CAPITAL ACCOUNT

As a percentage of GDP



Source: Banco de Portugal.
Note: (p) - projected.

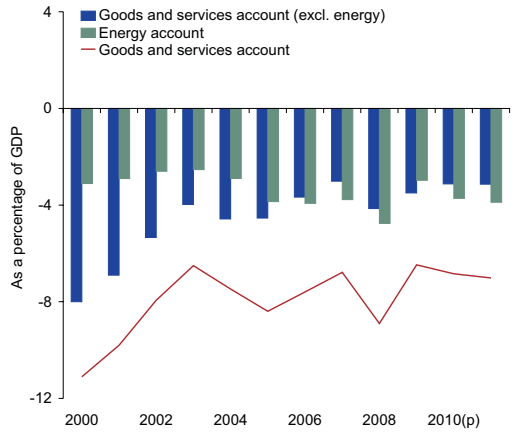
(9) Figures for the euro area correspond to the midpoints of the projection intervals published in the December issue of the ECB *Monthly Bulletin*.

(10) This gap between the levels of domestic investment and domestic saving has, however, been partially covered by the capital account surplus, as a result of capital transfers from abroad, mainly associated with the implementation of projects approved within the scope of the Community Support Frameworks.

Chart 6.3

GOODS AND SERVICES ACCOUNT AND ENERGY ACCOUNT

As a percentage of GDP



Source: Banco de Portugal.
Note: (p) - projected.

The reduction of net external borrowing requirements of the Portuguese economy in 2009 reflected the significant deterioration in general government borrowing requirements, in sharp contrast with an important reduction in the private sector's borrowing requirements. Both firms and households recorded a significant rise in the saving rate and a drop in investment. The large increase in general government borrowing requirements, in the context of a strong downturn in economic activity, mirrors both the functioning of automatic stabilisers and the discretionary fiscal stimulus measures for the economy in the meanwhile implemented by the authorities.

The current projection points to a further increase in the net external borrowing requirements in 2010 and 2011. This widening reflects, on the one hand, a slight deterioration in the goods and services account deficit and, on the other, a progressive increase in the income account deficit, stemming from the gradual and progressive rise in interest rates underlying the current projection (see "Section 2 *Assumptions underlying the projection exercise*") and the continuing deterioration of the international investment position of the Portuguese economy.

The large net external borrowing requirements observed throughout the past decade have resulted in a progressive deterioration in the international investment position of the Portuguese economy. The ensuing debt service has been absorbing progressively increasing resources, contributing directly to the widening of the income account deficit. This deficit, which accounted for around 2 per cent of GDP in 2000, reached around 4 per cent of GDP in 2009 and is likely to continue growing throughout the projection horizon, to stand at 6 per cent in 2011.

As mentioned, the goods and services account deficit is likely to rise somewhat over the projection horizon, which stems from the fact that the rise in average oil prices is being only partly offset by the reduction of the non-energy goods and services account deficit. Finally, in line with current assumptions for the profile of European Union transfers to Portugal (see "Section 2 *Assumptions underlying the projection exercise*"), the current projection envisages a slight decline in the combined surplus in the capital and current transfers accounts for 2010 and 2011.

7. UNCERTAINTY AND RISK ANALYSIS

The projections displayed in Table 1.1 correspond to the most likely figures for 2010 and 2011, conditional on the set of assumptions presented in "Section 2 *Assumptions underlying the projection exercise*". The possibilities of these assumptions not materialising or the eventual occurrence of additional shocks with direct effects on the current projection warrant a quantitative assessment of risks and uncertainty, which follows in this section.

7.1. Risk and uncertainty factors

The duration, magnitude and implications of the international economic and financial crisis represent, as a whole, a prime factor for the future behaviour of the Portuguese economy. The current projection envisages the maintenance of a gradual easing of financial market tensions throughout the projection horizon. This trend reflects inter alia the impact of discretionary fiscal stimulus measures and the functioning of automatic stabilisers, which as a whole contributed to the global deterioration in general government accounts.

The deterioration in general government accounts at a global level warrants an urgent implementation of clear fiscal consolidation strategies, so as to prevent the impact of the stimulus measures from severely jeopardising future economic growth, due to persistently high debt levels, which could give rise to unsustainable dynamics in the medium to long term. Hence, further fiscal consolidation efforts, not reflected in the assumptions underlying the current projections, mean possibly lower economic dynamics in the short term, namely in the euro area, implying downward risks to external demand for Portuguese goods and services over the projection horizon. These eventual consolidation efforts may affect the projections for 2010 and in special for 2011, following the progressive deterioration in the fiscal deficits in 2009, in the context of the marked contraction in overall economic activity.

With regard to the specific case of Portugal, the economic and financial crisis also implied a marked deterioration in the general government accounts as in the other euro area countries, with a large drop in revenue and an increase in expenditure.[11] The underlying assumptions regarding public finances for 2010 and 2011 follow the usual rule within the scope of the Eurosystem's projection exercise (see "Section 2 *Assumptions underlying the projection exercise*"). In a context of a gradual easing of international financial tensions, the need to ensure a path for the reduction of the fiscal imbalance and to restart an effective fiscal consolidation also implies downward risks to the evolution of the general government final consumption expenditure. Hence, downward risks for this variable were considered for 2011.

Finally, account was taken of downward risks as to domestic demand in Portugal in 2010 and 2011. With regard to households, there are still high levels of uncertainty surrounding their income and wealth levels, which may imply lower-than-projected growth of consumer spending and housing investment in both 2010 and 2011. In particular, the conditions prevailing in the labour market will tend to be marked by weak employment growth, which may imply a higher level of precautionary savings. Furthermore, household expenditure may also be particularly affected by both the adoption of tighter credit standards than those implied in the current projection and the persistence of higher risk *premia*,

(11) In this context, Portugal was included in the group of countries in an excessive deficit situation. In early December 2009 the ECOFIN Council adopted, within the scope of Article 126(6) of the Treaty of Lisbon (Article 104(6) of the Maastricht Treaty), decisions on the existence of excessive deficits in Austria, Belgium, the Czech Republic, Germany, Italy, the Netherlands, Portugal, Slovakia and Slovenia. France, Greece, Hungary, Ireland, Latvia, Lithuania, Malta, Poland, Romania, Spain and the United Kingdom were already in an excessive deficit situation.

arising from high household indebtedness level. Moreover, the behaviour of the Portuguese banks will always be conditioned by their financing conditions in international wholesale markets. These factors imply the continuance of downward risks to private consumption and residential investment.

As for corporations, account is also taken of the possibility of business investment expenditure falling short of the figure in the current projections. The uncertainty surrounding the sustainability of the economic recovery, in a context of low levels of the capacity utilisation rate, may give rise to increased doubts as to the future disposal of production, and may create expectations that a higher capacity utilisation rate will suffice to address possible increases in demand, thereby conditioning investment decisions over the projection horizon. In a context of eventual renewed tensions in international markets, this risk may also rise from increased difficulties in access to credit, stemming from the implementation of tighter credit standards than those considered in the current projections.

7.2. Quantification of risk factors

The effects of the above mentioned risks can be quantified by assigning subjective probabilities to its occurrence. The downward risks on external demand for Portuguese goods and services and on general government consumption will be assessed in terms of deviations from the underlying assumptions assumed, whereas specific risks to consumption and investment will be considered in terms of deviations from the projection included in Table 1.1.

With regard to risks stemming from the international background for the Portuguese economy, the following was considered: a 55 per cent probability in 2010 and a 60 per cent probability in 2011 that external demand will stand below the central projection (Table 7.2.1). In the case of general government consumption, this probability was 60 per cent in 2011. With regard to private consumption and investment, a probability of 55 per cent was assumed that such expenses would stand below the levels published in the projection, both in 2010 and 2011. As far as consumption is concerned, this quantification assumes lower-than-projected growth in the next two years, whereas for investment it assumes a larger fall in 2010 and a less marked recovery in 2011.

The effects of the subjective risks considered are quantified in Table 7.2.2. According to the methodology used, there is a 55 per cent and a 59 per cent probability that in 2010 and 2011, respectively, GDP growth will stand below the current projection.[12] The possibility of external demand falling short of the underlying assumptions indicates, in particular, a higher probability of less favourable developments in exports over the forecasting horizon. Risks to general government consumption in 2011 have a direct effect on the quantitative assessment of risks on overall economic activity. The possibility of consumption and investment falling short of the central projection reinforces such a risk and contributes to a higher than 50 per cent probability of GDP growth being below the current projection (Chart 7.2.1).

As to the inflation rate (Table 7.2.2 and Chart 7.2.2), the risks associated with the current projection are broadly balanced, and the probability of inflation standing below or above projected is virtually similar.

(12) The methodology used in this section, which replaces the former one, was published in M. Pinheiro and P. Esteves (2008)," On the Uncertainty and Risks of Macroeconomic Forecasts: Combining Judgements with Sample and Model Information", Banco de Portugal, *Working Paper* 21. The former methodology was published in A. Novo and M. Pinheiro(2003), "Uncertainty and Risk Analysis of Macroeconomic Forecasts", Banco de Portugal, *Working Paper* 19.

Table 7.2.1

SUBJECTIVE PROBABILITIES OF RISK FACTORS
Per cent

	2010	2011
Conditioning variables		
External demand	55	60
General gov. consumption	50	60
Endogenous variables		
Private consumption	55	55
GFCF	55	55

Source: Banco de Portugal.

Table 7.2.2

PROBABILITY OF AN OUTTURN BELOW THE PROJECTIONS
Per cent

	Weights 2008 (%)	2010	2011
Gross domestic product	100	55	59
Private consumption	67	55	58
GFCF	22	57	59
Exports	33	52	59
Imports	43	54	62
HICP		49	50

Source: Banco de Portugal.

Chart 7.2.1

GROSS DOMESTIC PRODUCT
Annual rate of change, per cent

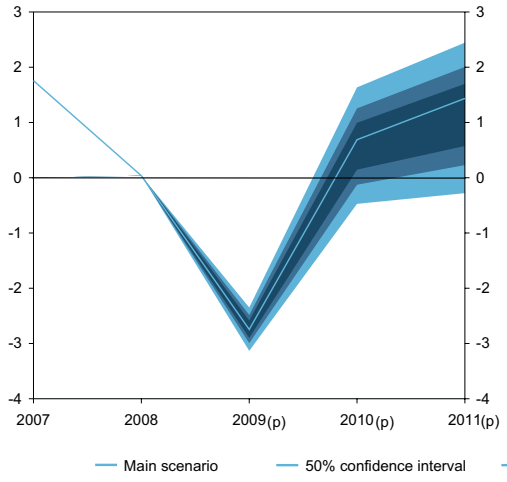
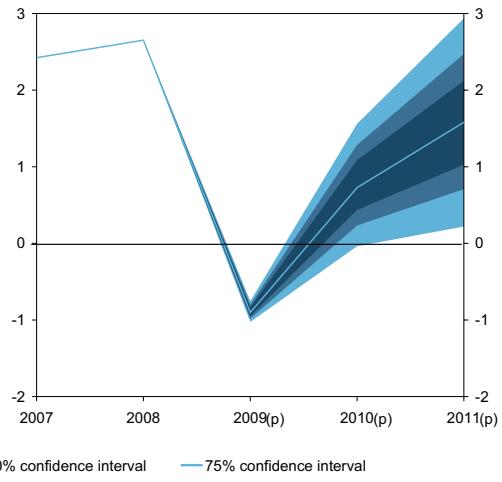


Chart 7.2.2

HARMONISED INDEX OF CONSUMER PRICES
Annual rate of change, per cent



Source: Banco de Portugal.
Note: (p) - projected.

8. CONCLUSION

The current projection for the Portuguese economy points to a recovery in economic activity, which is likely to grow at moderate pace throughout the projection horizon. This dynamics is expected to follow against the background of a progressive unwinding of the financial crisis in international markets over the projection horizon and a gradual reversal of the degree of risk aversion at a global level. These developments will pass through on to the Portuguese economy by both the recovery of external demand for Portuguese goods and services, and the improvement of financing conditions for Portuguese households and firms. These improved financing conditions stem *inter alia* from more favourable conditions in banks' access to wholesale financing markets, remaining however tighter than those prevailing in the period immediately before the outbreak of the financial crisis. Nevertheless, in the context of

the global economic and financial crisis, the Portuguese economy presented some robust features, in particular the absence of overvalued real estate market prices and the maintenance of a relatively favourable situation of the Portuguese banking system at the European level. Turning to inflation developments, in 2009 consumer prices fell in Portugal in annual average terms, reflecting demand conditions and maintaining a negative differential vis-à-vis the euro area average. The current projection envisages an increase in consumer prices from 2010 onwards, stemming from both the projected trend for import prices and some recovery in profit margins, in a context of wage moderation.

The economic recovery in Portugal faces, however, challenges that extend far beyond the conjunctural features associated with developments in financial markets and in economic activity at a global level. On the one hand, the international financial crisis may have had a negative impact on both the equilibrium level of world economic activity and the dynamics of potential output growth of the economies, which will inevitably condition demand growth prospects also in Portugal. On the other hand, throughout the last decade, the Portuguese economy has displayed a set of structural weaknesses, whose impact has been apparent in the progressive slowdown of trend output and in the interruption of the real convergence process to the average income levels recorded in the euro area. These structural weaknesses, resulting *inter alia* from a low level of labour qualification, labour and output market functioning and the judicial system, have been hampering investment with larger technological content, namely foreign direct investment, which in the past proved to be crucial in ensuring sustained growth of total factor productivity and potential output. Furthermore, the low level of human capital of working-age population limits their ability for requalification or to be relocated to sectors with brighter demand growth prospects, which will tend to translate into a greater persistence of the recent increase in structural unemployment, thereby limiting the contribution of the labour factor to output growth.

Against this background, it is of primary importance that the education and judicial systems are improved, and the recent labour legislation reforms fully implemented. Furthermore, it would be important to ensure a more effective regulation of the product market in order to increase the competition levels in the economy. Only by implementing reforms in these areas will it be possible to pave the way for a more efficient resource allocation, which seems to be an essential requirement to restore the international competitiveness of the Portuguese economy, promote the increase in productivity and the sustained job creation.

Moreover, the pursuit of a growth-oriented macroeconomic stability framework requires the presentation of a clear and credible fiscal consolidation strategy, in a medium-term perspective. Within this scope, it is relevant to rationalise public sector expenditures, to continue to increase the degree of efficiency of tax administration, as well as fully implement the rules established in the reform of the public system of social security so as to guarantee the sustainability of the fiscal situation.

Finally, the vigour of the economic recovery and job creation, in a small open economy fully integrated in economic and financial terms, is crucially dependent on its capacity to benefit from the upturn in world demand. In this context, it is vital that economic agents internalise the role of wage developments in the increase of the Portuguese economy's competitiveness and adopt a wage-setting behaviour consistent with productivity differentials *vis-à-vis* the main trading partners.

The current outlook for developments in the Portuguese economy remains surrounded with a high degree of uncertainty, with resilient downward risks to economic activity. These risks stem from the international environment *per se*, and from the uncertainty as to the possible resulting impact from their interaction with the structural weaknesses of the Portuguese economy. As regards the international environment, there is still a great deal of uncertainty surrounding the effects of the reversal of the monetary and fiscal stimulus measures adopted in 2008 and 2009 on economic activity over the projection horizon. Moreover, it is hard to put into perspective the impact of the financial crisis on the equilibrium level of economic activity and on potential output growth dynamics itself. Finally, the high indebtedness

level of the private sector, in a context of a substantial increase in public sector debt and low trend growth, may lead to less favourable financing conditions in international markets, translating into a rise in risk *premia*.

ARTICLES

Monetary Policy Expectations and Boom-Bust Cycles in the Housing Market

Price Adjustment Lags: Evidence from Firm-Level Data

The Redistributive Effects of VAT in Portugal

Data Revisions: The Case of Portuguese Exports and Imports

MONETARY POLICY EXPECTATIONS AND BOOM-BUST CYCLES IN THE HOUSING MARKET*

*Caterina Mendicino***

1. INTRODUCTION

Boom-bust cycles in asset prices and economic activity have been a central issue in policy and academic debates. Particular attention has been given to the behavior of housing prices and housing investment. In the following we document that over the last three decades housing prices boom-bust cycles in the US are characterized by cyclical dynamics in GDP, consumption, investment and housing investment. We also suggest a mechanism for modelling housing-market boom-bust cycles in accordance with the empirical pattern. Our explanation builds on a news shock mechanism, where public signals of future fundamentals cause business cycle fluctuations through changes in household expectations, and boom-bust cycles emerge when public signals are not realized *ex-post*.

This article relate to two recent strands of the business cycle literature: the first on expectation-driven cycles and the second on housing market fluctuations. Beautry and Portier (2004, 2006) first documented that stock prices movements anticipate future growth in total factor productivity and that such dynamics are accompanied by a macroeconomic boom. Since their seminal contribution, a growing strand of the business cycle literature investigated the role of changes in expectations or news about the future state of the economy as a source of business cycle fluctuations. Changes in expectations may be proved to be an important mechanism in creating business cycle fluctuations, if they generate pro-cyclical movements in consumption, hours and investment. In fact it is a well established empirical fact that consumption, hours and investment strongly commove with output at business cycle frequencies. However, as pointed out by Beautry and Portier (2004) the standard real business cycle framework is unable to explain expectation driven business-cycles. In fact, the wealth effect generated by expectations of higher productivity in the future leads consumption and labor to move in opposite directions. As a result, output and investment fall. Thus, standard models fail in generating macroeconomic booms driven by changes in expectations. Several authors investigate under which assumptions expectation-driven business cycles can arise in a simple neoclassical setting. Most of the papers propose alternative assumptions in preferences and/or production. Another limitation of the real business cycle framework is the inability to generate an increase in the price of capital together with the rise in consumption, hours and investment. Christiano, Ilut, Motto, and Rostagno (2007) document the importance of sticky wages and an inflation-targeting monetary policy to generate a contemporaneous boom-bust cycles in output and asset prices in response to news that do not realize.

* The opinions expressed in the article are those of the author and do not necessarily coincide with those of Banco de Portugal or the Eurosystem. Any errors and omissions are the sole responsibility of the author.

** Economics and Research Department, Banco de Portugal.

The literature related to housing price dynamics and financial frictions at the household level has expanded considerably in the last couple of years. Since Kiyotaki and Moore (1997), the use of models with collateral constraints and discount factor heterogeneity has been widely used in the business cycle literature. Building on such a framework, Iacoviello (2005) first documented the relevance of nominal debt contracts and collateral constraints tied to housing values in matching the positive response of spending to a housing price shock. He also replicated the sluggish response of real spending to an inflation shock. Campell and Hercowitz (2005) showed that collateralized household debt had a role in explaining the decline in the volatility of output, consumption, and hours worked. More recently, Iacoviello and Neri (2009) present an estimated model that is successful in explaining both the trends and short run fluctuations in real housing prices and investment over the last four decades in the US. According to their findings the volatility of housing investment and housing prices is explained between 15 and 20 percent by monetary factors.

We extend Iacoviello and Neri (2009) model by including expectations of future monetary policy developments. We show that changes in expectations about the future policy rate and the inflation target can generate boom-bust cycles in housing prices and aggregate quantities such as GDP, consumption, hours and investment.

The goal of this article is to provide insight into the role of monetary policy expectations in the formation of boom-bust cycles in the housing market. The article is a summary of the recent research of Lambertini, Mendicino and Punzi (2009). The article is organized as follows. Section 2 studies the cyclical behavior of housing prices and housing investment in the US during the last three decades. Section 3 describes the model. Section 4 investigates the occurrence of boom-bust cycles as a consequence of expectations on the future policy rate. Section 5 analyzes the effect of the degree of credit friction for the boom-bust cycle formation and section 6 concludes.

2. EMPIRICAL FACTS

In the following we investigate macroeconomic dynamics during periods of housing prices boom-bust cycles in the US. Chart 1 shows real house prices in the United States over the period 1965:1 to 2009:2.[1] Real house prices display a number of boom-bust episodes, namely periods of faster-than trend growth followed by periods characterized by falling prices. We identify four peaks in real house prices in the United States: 1973:3; 1979:4; 1989:2; 2006:2. The vertical lines in Chart 1 indicate the peak dates.[2] Interestingly, real house prices peaks are followed by recessions. The grey shaded areas in Chart 1 indicate recession dates according to the National Bureau of Economic Research.

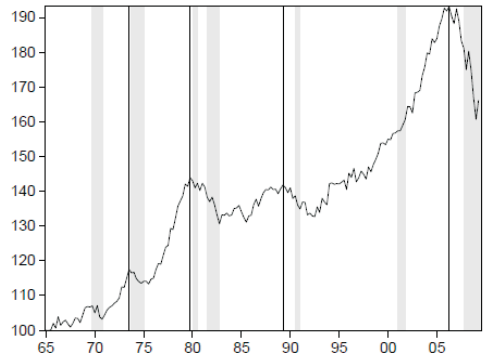
We are interested in characterizing the behavior of a number of macroeconomic variables during boom-bust episodes. We consider the following variables: real house prices; real GDP *per capita*; real private consumption; real private residential fixed investment; real private nonresidential fixed invest-

(1) Real house prices are the Census Bureau House Price Index, which measures the price of new one-family houses sold including the value of the land lot, divided by the implicit price deflator for the non-farm business sector.

(2) We define a peak as the centered maximum in real house prices in a twenty-one-quarters window, excluding end points.

Chart 1

REAL HOUSE PRICES, 1965:1 TO 2009:2, US



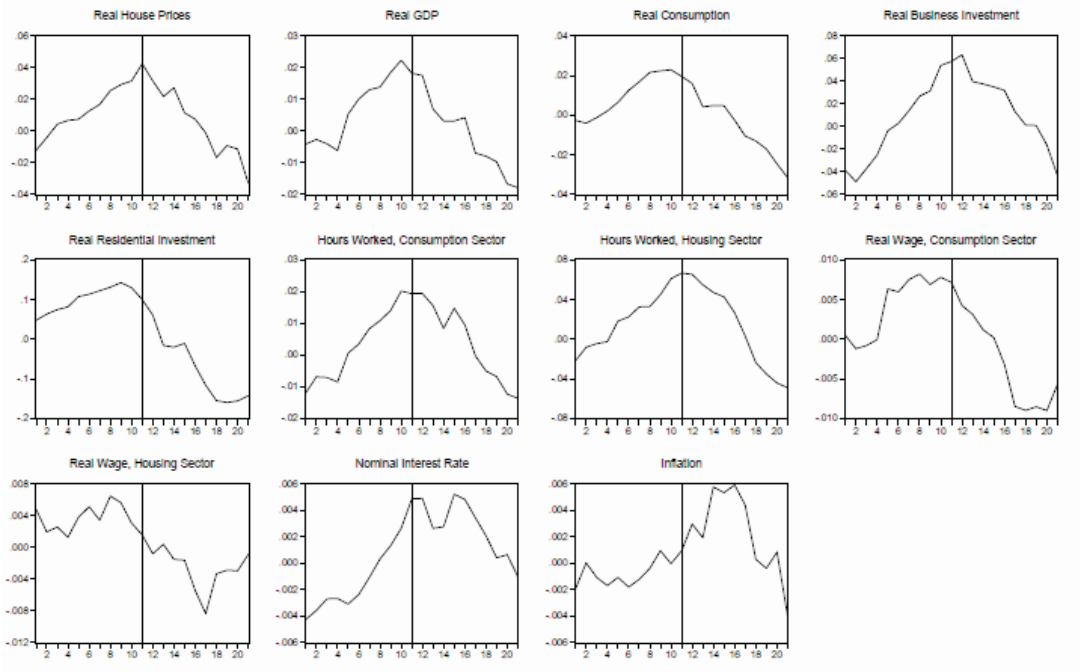
Source: Census Bureau.
Note: The vertical line indicates the 4 peaks.

ment; hours in the construction sector; hours in the consumption-good sector; the short-term interest rate, CPI inflation and real wages as deviation from the trend.

We consider the average behavior of these series over the four peak episodes. We transform the variables in deviations from the trend calculated with the Hodrick-Prescott filter. Then we calculate the average behavior over the 22-period window around the four housing-peak episodes. Chart 2 shows that

Chart 2

AVERAGE BEHAVIOR OF MAIN DETRENDED MACROECONOMIC VARIABLES AROUND HOUSE PRICES BOOM-BUST CYCLES



Sources: Federal Reserve Fund – Saint Louis (FRED2), Bureau of Labour Statistics (BLS) and Bureau Economics Analysis (BEA), Census Bureau.
Notes: The vertical axes measures deviations from the trend, while on the horizontal axes are quarters. The vertical line indicates the peak in housing prices.

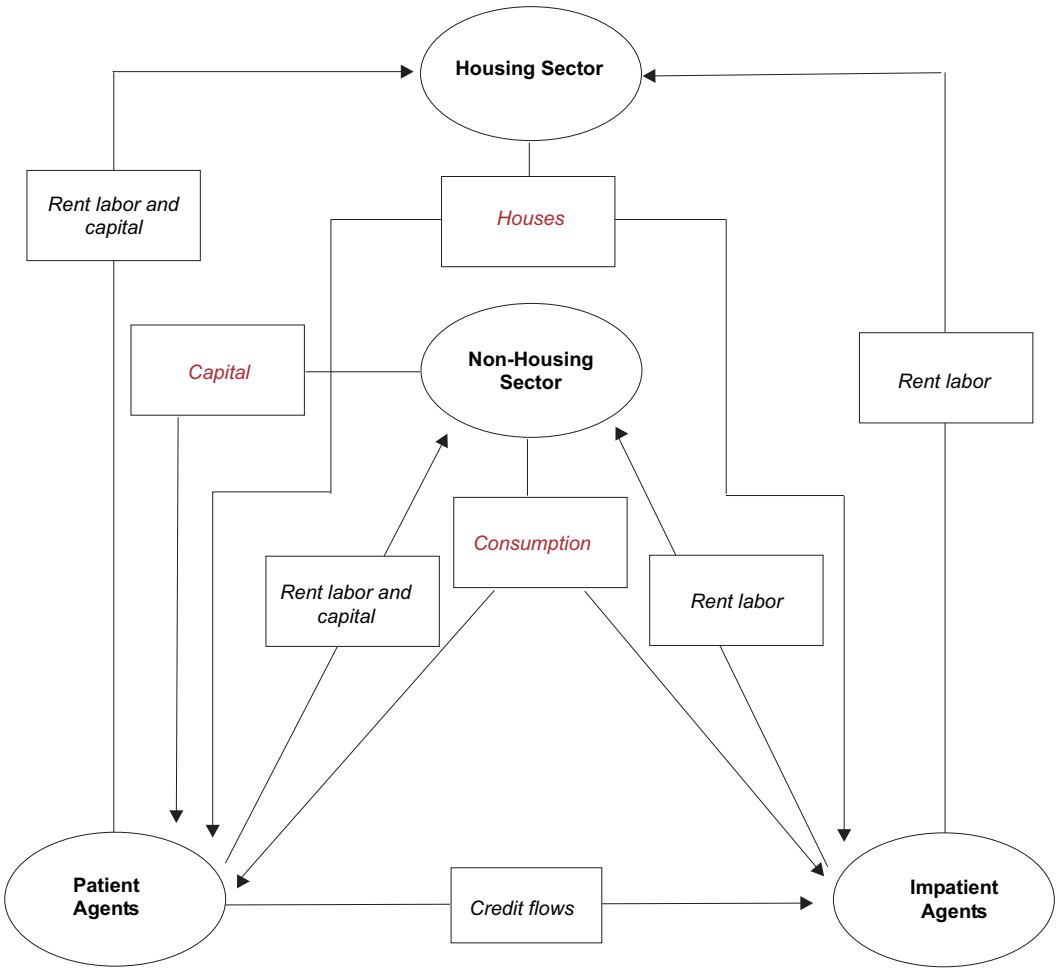
housing boom-bust episodes are accompanied by below- or above-trend behavior of some variables. In fact, real house prices, real GDP, private consumption and investment, both residential and nonresidential, fall below trend at the end of the bust phase. Moreover, real GDP, private consumption, real private residential and nonresidential fixed investment commove with real house prices in a bellshaped dynamics. For a more detailed analysis on this topic see Lambertini, Mendicino and Punzi (2009). Different hypothesis could be consistent with the empirical facts presented in this section. In the article we present one of the possible sources of boom-bust cycle formation.

3. THE MODEL

In this section we describe the model economy. We consider an economy populated by households, producers of final goods for consumption and investment purposes, a continuum of retailers and a central bank. The framework follows Iacoviello and Neri (2009). See Chart 3 for an illustration of the model.

Chart 3

MODEL ECONOMY



Households. The economy is populated by two types of households: the Saver and the Borrower. They both work in the production of consumption goods, $n_{c,t}^{'}$, and housing, $n_{h,t}^{'}$, consume, $c_t^{'}$, and accumulate housing, $h_t^{'}$. They differ in their discount factor, (β and $\beta^{'}$). Borrowers (denoted by ') feature a relatively lower subjective discount factor that in equilibrium generates an incentive to anticipate future consumption to the current period through borrowing. Hence, the *ex-ante* heterogeneity induces credit flows between the two types of agents. This modeling feature has been introduced in macro models by Kiyotaki and Moore (1997) and extended by Iacoviello (2005) to a business cycle framework with housing investment.

The **borrower** maximizes the utility function:

$$U_t = E_t \sum_{t=0}^{\infty} \beta^{'t} \left[ln\left(c_t^{'} - \varepsilon^{'} c_{t-1}^{'}\right) + j\, ln\left(h_t^{'}\right) - \frac{\tau}{1+\eta^{'}} \left\{ \left(n_{c,t}^{'}\right)^{1+\xi^{'}} + \left(n_{h,t}^{'}\right)^{1+\xi^{'}} \right\}^{\frac{1+\eta^{'}}{1+\xi^{'}}} \right]$$

subject to the budget constraint:

$$c_t^{'} + q_t \left[h_t^{'} - (1-\delta_h) h_{t-1}^{'}\right] - b_t^{'} \leq \frac{w_{c,t}^{'} n_{c,t}^{'}}{X_{wc,t}^{'}} + \frac{w_{h,t}^{'} n_{h,t}^{'}}{X_{wh,t}^{'}} - \frac{R_{t-1} b_{t-1}^{'}}{\pi_t}$$

We allow borrowers to collateralize the value of their homes.

$$b_t^{'} \leq m E_t \frac{q_{t+1} \pi_{t+1} h_t^{'}}{R_t}. \qquad (1)$$

Except for the gross nominal interest rate, R, all the variables are expressed in real terms; π_t is gross inflation (P_t / P_{t-1}), $w_{c,t}^{'}$ and $w_{h,t}^{'}$ are the wages paid in the two sectors of production, and q_t is the price of housing in real terms. Houses depreciate at rate δ_h and j determines the relative weight in utility on housing services. Limits on borrowing are introduced through the assumption that households cannot borrow more than a fraction of the next-period value of the housing stock. See equation 1. The fraction m, referred to as the equity requirement or loan-to-value ratio, should not exceed one and is treated as exogenous to the model. It can be interpreted as the creditor's overall judicial costs in case of debtor default and represents the economy's degree of access to the credit market. The borrowing constraint is consistent with standard lending criteria used in the mortgage and consumer loan markets.

The **Savers** choose how much to consume, to work and their house holding facing a similar problem. However, they also invest in capital and receive the profits of the firms.

Firms. Final good producing firms produce non-durable goods (Y) and new houses (IH). Both sectors face Cobb-Douglas production functions. The housing sector uses capital, k, land, l, and labor supplied by the savers, n and the borrowers, $n^{'}$, as inputs of production.

$$IH_t = \left(n_{h,t}^{\alpha} + n_{h,t}^{'1-\alpha} \right)^{1-\mu_h} \left(z_{h,t} k_{h,t-1} \right)^{\mu_h} k_b^{\mu_b} I_{t-1}^{\mu_I}.$$

The non-housing sector produces consumption and business capital using labor and capital.

$$Y_t = \left(n_{c,t}^{\alpha} + n_{c,t}^{'1-\alpha} \right)^{1-\mu_c} \left(z_{c,t} k_{c,t-1} \right)^{\mu_c}.$$

Firms pay the wages to households and repay back the rented capital to the Savers. Retailers, owned by the Savers, differentiate final goods and act in a competitive monopolistic market. Prices can be adjusted with probability $1-\theta_\pi$ every period, by following a Calvo-setting. Monopolistic competition occurs at the retail level, leading to the following forward-looking Philips curve:

$$ln\pi_t - \iota_\pi ln\pi_{t-1} = \beta\left(E_t ln\pi_{t+1} - \iota_\pi ln\pi_t \right) - \in_\pi ln\left(X_t / X \right)$$

where $\in_\pi = \dfrac{(1-\theta)(1-\beta\theta_\pi)}{\theta_\pi}$, and X_t represents the price markup.

Households set wages in a monopolistic way. Wages can be adjusted subject to a Calvo scheme with a given probability every period. Housing prices are assumed to be flexible.

Monetary Authority. We assume that the central bank follows a Taylor-type rule as estimated by Iacoviello and Neri (2009)

$$R_t = R_{t-1}^{r_R} \pi_t^{(1-r_R)r_\pi} \left(\frac{GDP_t}{GDP_{t-1}} \right)^{(1-r_R)r_y} rr^{(1-r_R)} \frac{u_{R,t}}{S_t} \tag{2}$$

where *rr* is the steady state real interest rate and $u_{R,t}$ is an *i.i.d*. monetary policy shock. The central bank's target is assumed to be time varying and subject to an AR(1) shock, S_t

$$S_t = (1-\rho_s) S_{t-1} + u_{s,t}. \tag{3}$$

GDP is defined as the sum of consumption and investment at constant prices. Thus

$$GDP_t = C_t + IK_t + qIH_t,$$

where q is real housing prices at the steady state.

4. MONETARY POLICY AND BOOM-BUST CYCLES IN THE HOUSING MARKET

In order to introduce expectations of future monetary policy developments we assume that the error term of the shocks is given by an unanticipated component, $\varepsilon_{z,t}$ and the anticipated change *n* quarters in advance, $\varepsilon_{z,t-n}$,

$$u_{z,t} = \varepsilon_{z,t} + \varepsilon_{z,t-n},$$

where $\varepsilon_{z,t}$ is a *i.i.d*.and $Z = \{R, s\}$. Thus, for instance, $\varepsilon_{R,t}$ represents a current shock to the policy rate. Instead $\varepsilon_{R,t-n}$ is the anticipation at time *t* of a change in the policy rate at time $t+n$.

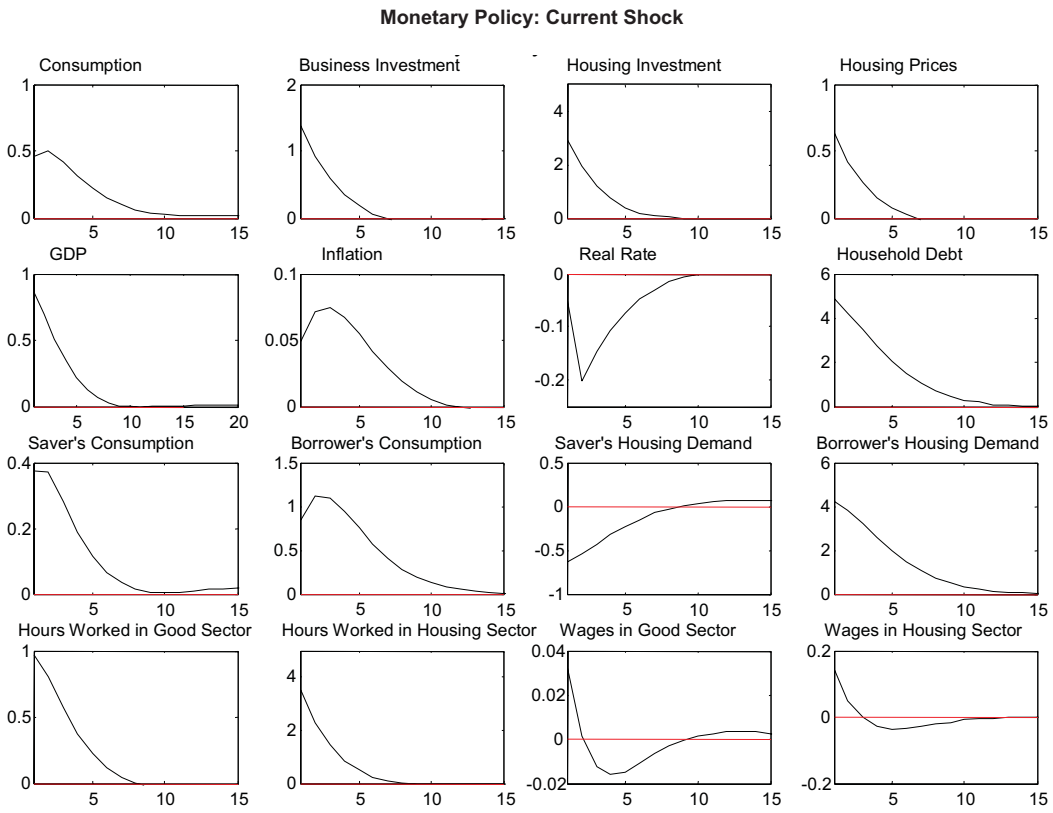
4.1. Expectations on future expansionary monetary policy

In order to develop intuition on the dynamics of the model, we first present the response to a current unexpected decline in the interest rate – *i.e.* a negative shock to the policy rule $\left(\varepsilon_{R,t} < 0\right)$. A decline in the policy rate induces agents to increase their current expenditures. Aggregate demand rises. Borrowers significantly increase their level of indebtedness and housing investment. Housing prices rise and the subsequent collateral effect induces a sizable increase in borrowers' consumption. See Chart 4.

In the following we study the role of expectations of a future reduction in the policy rate in driving business cycle fluctuations in the housing market. Chart 5 reports the effect of an anticipated future decline of the nominal policy rate $\left(\varepsilon_{R,t-4} < 0\right)$. Chart 6 illustrates the case in which the expected fall in the policy rate turns out to be wrong and at time $t = 4$ there is no reduction in the policy rate. Expectations of a reduction of the policy rate generate a macroeconomic boom that turns into a bust if agents' expectations are not realized *ex-post*. The intuition is as follows. Signals of lower policy rates generate ex-

Chart 4

RESPONSES OF THE MODEL ECONOMY TO A ONE-PERIOD NEGATIVE MONETARY POLICY SHOCK

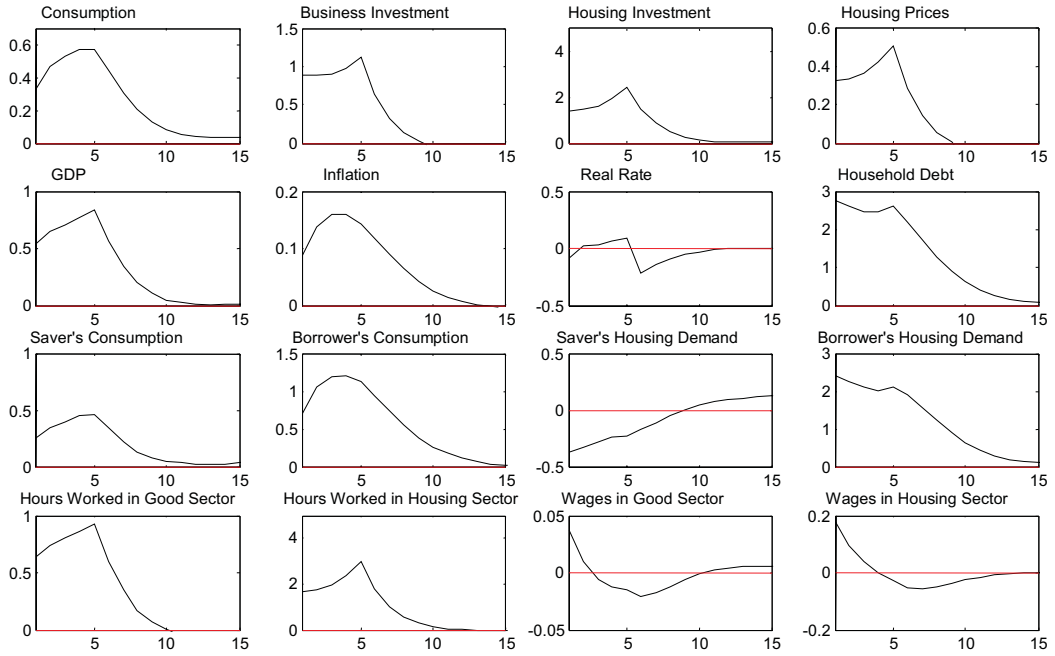


Source: Author's calculations.
Note: The vertical axes measure deviations from the steady state, while on the horizontal axes are quarters.

Chart 5

RESPONSES OF THE MODEL ECONOMY TO A 4 PERIOD AHEAD ANTICIPATED NEGATIVE MONETARY POLICY SHOCK

Monetary Policy: Anticipated



Source: Author's calculations.
Note: The vertical axes measure deviations from the steady state, while on the horizontal axes are quarters.

pectations of a decline in the future real interest rate. Thus, borrowers anticipate this effect and increase their current consumption. Demand pressures rise current inflation. The current *ex-post* real rate declines reducing the debt services. The anticipation of an expansionary monetary policy also creates expectations of higher future housing prices that further induce borrowers to increase their current demand for housing and thus indebtedness. Due to limits to credit, impatient households increase their labour supply in order to raise internal funds for housing investments. Lenders face a reduction in their current and expected interest income. Thus, for this group of agents, consumption increases by less, current housing investment declines and their labor supply significantly increases.

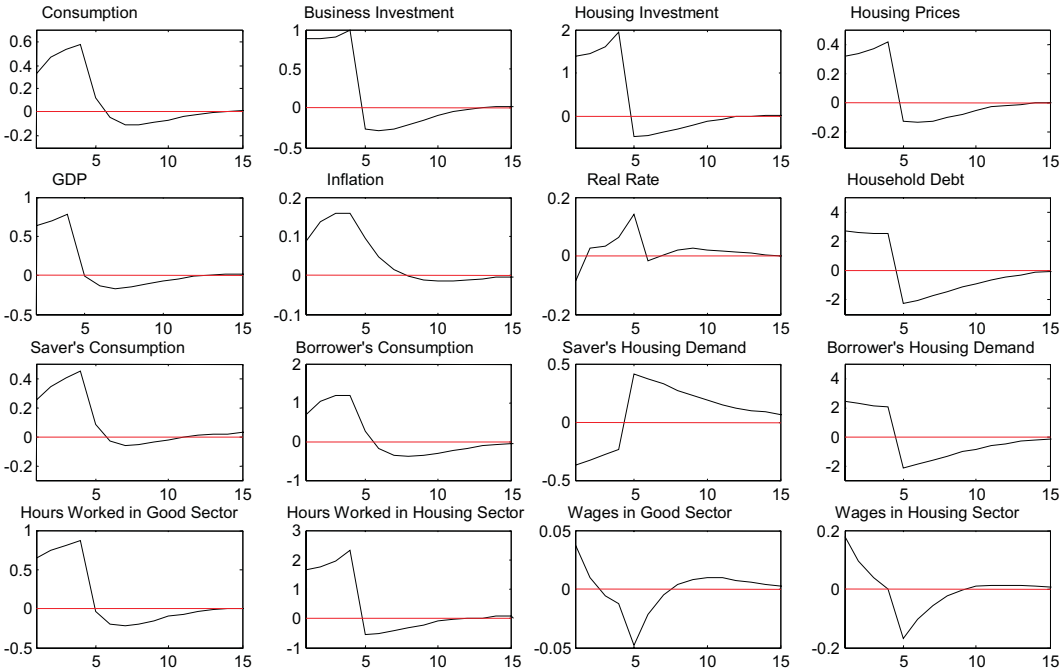
Due to the presence of capital adjustment costs, firms are willing to start adjusting the stock of capital already at the time in which news about a future reduction in the policy rate spreads. For the increase in investment to be coupled with an increase in hours, wages rise in both sectors. The increase in business and housing investment makes GDP increase already at the time of the signal. As a result of the current increase in inflation and the rise in GDP, the policy rate increases at the time of the anticipation of the shock, and declines only at the time of occurrence of the shock.

In the case of an anticipated shock aggregate variables keep booming and then slowly decline. The

Chart 6

RESPONSES OF THE MODEL ECONOMY TO A 4 PERIOD AHEAD ANTICIPATED NEGATIVE MONETARY POLICY SHOCK THAT DOES NOT OCCUR

Monetary Policy: Not Realized



Source: Author's calculations.
Note: The vertical axes measure deviations from the steady state, while on the horizontal axes are quarters.

peak response in output corresponds to the time in which expectations are realized. In contrast, if expectations do not realize there is a dramatic drop in both quantities and prices below their initial level. Thus, expectations of looser monetary policy that do not realize generate a macroeconomic boom-bust cycle.

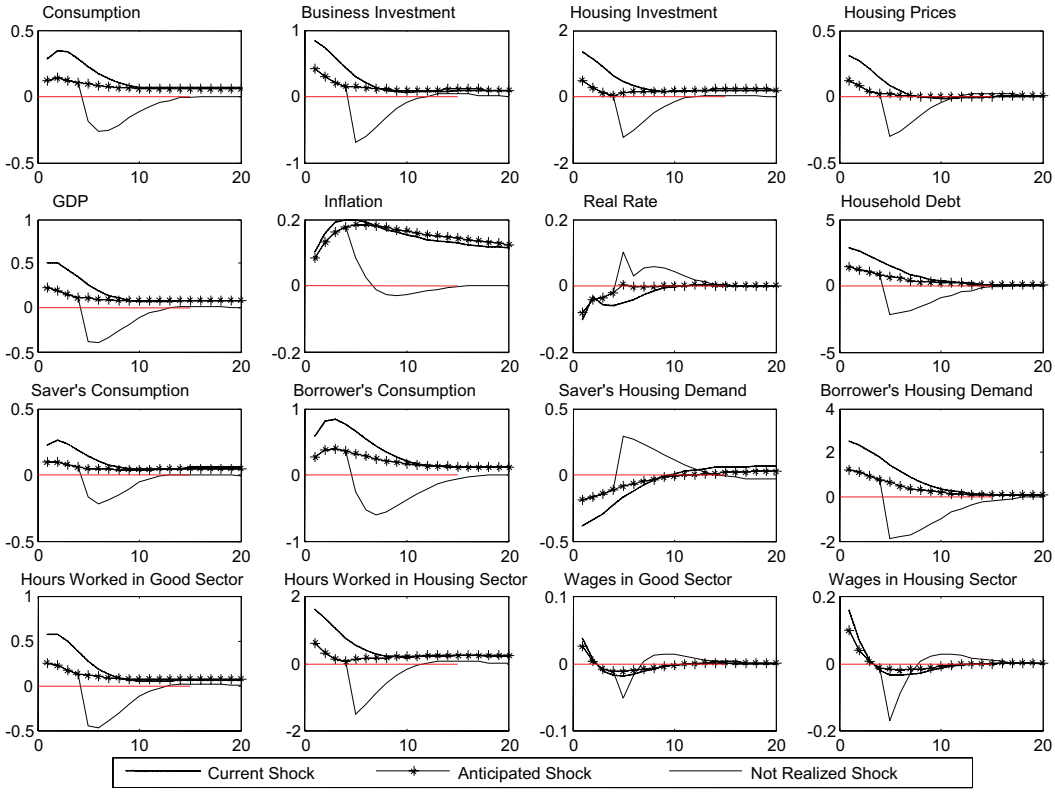
4.2. Expectations of a shift in the central bank's inflation target

Chart 7 documents the effect of expectations of a temporary but persistent upward deviation from the central bank's inflation target. The anticipation of a higher target for inflation means higher long run expected inflation. Since prices are sticky, firms that can change prices in the current period already adjust their price upwards. Thus, expectations of higher inflation in the future increase inflation already in the current period. Expectations of a future reduction of the realized real rate coupled with a current reduction in the rate induces an increase in household indebtedness and, thus, higher consumption and housing spending. Housing prices and housing investment increase. Due to adjustment cost in capital, firms start adjusting the stock of capital already at the time in which news spreads. Real wages and

Chart 7

RESPONSES OF THE MODEL ECONOMY TO A 4 PERIOD AHEAD ANTICIPATED TEMPORARY INCREASE IN THE INFLATION TARGETING

Central Bank's Inflation Target Shock



Source: Author's calculations.
Note: The vertical axes measure deviations from the steady state.

hours worked rise. The economy experience a macroeconomic boom. After the shock is realized all variables slowly return to their initial levels. Chart 7 also displays the behavior of the model economy when news on future central bank's target do not realize (the target doesn't increase in period 4). As expected at time t=5 quantities and prices drastically drop. Compared to the previous case, expectations of a temporary upward shift in the inflation target generate a less sizable boom but a more pronounced bust.

5. CONCLUSION

In this article, we show that expectations on the conduct of monetary policy can be a source of fluctuations in the housing market. In fact, expectations of either a future reduction in the policy rate or a temporary increase in the central bank's inflation target that are not fulfilled can generate macroeconomic boom-bust cycle dynamics. Our results imply that good communication on monetary policy is essential for reducing the occurrence of expectation-driven cycles. However, as shown by Lambertini,

Mendicino and Punzi (2009) monetary policy is one of the mechanisms that can generate boom-bust cycles in the housing market. In fact also expectations about the future state of productivity, investment cost, housing supply and inflation can generate housing-market cycles in accordance with the empirical findings. Empirical work to test the different sources of boom-bust cycle formations is left to future research.

REFERENCES

Beaudry, P., and F. Portier (2004), "An exploration into Pigou's theory of cycles", *Journal of Monetary Economics*, 51:1183-1216.

Beaudry, P., and F. Portier (2006), "Stock Prices, News, and Economic Fluctuations", *American Economic Review*, 96(4): 1293-1307.

Beaudry, P. and F. Portier (2007), "When can Changes in Expectations Cause Business Cycle Fluctuations in Neo-classical Settings?", *Journal of Economic Theory*, 135(1): 458-477.

Campbell, J. R. and Z. Hercowitz (2005), "The Role of Collateralized Household Debt in Macroeconomic Stabilization", NBER *Working Paper* No. 11330.

Christiano, L., C. Ilut, R. Motto, and M. Rostagno, (2007), Monetary Policy and Stock Market Boom-Bust Cycles", *Mimeo* (*http://faculty.wcas.northwestern.edu/~lchrist/research.htm*).

Den Haan, W.J., and G. Kaltenbrunner (2007), "Anticipated Growth and Business Cycles in Matching models", CEPR *Discussion Paper* No. 6063.

Floden, M. (2007), "Vintage Capital and Expectations Driven Business Cycles", CEPR *Discussion Paper* No. 6113.

Kiyotaki, N. and J. Moore (1997),"Credit Cycles", *Journal of Political Economy*, 105, April 211-48.25

Iacoviello, M. (2005), "House Prices, Borrowing Constraints, and Monetary Policy in the Business Cycle", *American Economic Review*, 95(3):739-64.

Iacoviello M. (2005), "House Prices, Borrowing Constraints and Monetary Policy in the Business Cycle", *American Economic Review*.

Iacoviello, M. and S. Neri, S. (2009), "Housing Market Spillovers: Evidence from an Estimated DSGE Model", *AEJ Macro*, forthcoming.

Jaimovich, N. and S. Rebelo (2007), "Can News about the Future Drive the Business Cycle?", NBER *Working Paper* No. 12537.

Lambertini L, C. Mendicino and M.T. Punzi (2009), "Expectation-Driven Cycles in the Housing Market.", *Mimeo*, Banco de Portugal.

PRICE ADJUSTMENT LAGS: EVIDENCE FROM FIRM-LEVEL DATA*

*Daniel A. Dias***

*Carlos Robalo Marques****

*Fernando Martins****

*J.M.C. Santos Silva*****

1. INTRODUCTION

Price stickiness has a central role in macroeconomics and, besides a vast theoretical literature, it has generated numerous empirical studies trying to explain its origins and gauge its importance. A consensual finding of this work is that prices at the micro level may remain unchanged for periods that can last up to several months. Studies documenting this stylised fact include, among many others, Bils and Klenow (2004), Klenow and Kryvtsov (2008), and Nakamura and Steinson (2008), who study consumer prices in the United States (US), and Dhyne *et al.* (2006) and Vermeulen *et al.* (2007), who give a synthesis of studies carried out for the Euro Area (EA). For example, using comparable micro data on consumer prices, Dhyne *et al.* (2006) find that the estimated monthly frequency of price changes is around 15 percent in the EA and 25 percent in the US, and that the implied average duration of a price spell is 13 months in the EA and 6.7 months in the US. These results are consistent with evidence from survey data: according to Fabiani *et al.* (2006), the median frequency of price changes is one per year in the EA, lower than the estimated 1.4 price changes per year in the US reported in Blinder *et al.* (1998).

The empirical literature investigating the reasons for such infrequent price changes at the firm-level is, however, scanter. Dhyne *et al.* (2008) have recently made an important contribution to the understanding of this phenomenon by distinguishing between intrinsic price rigidity (price rigidity that is inherent to the price-setting mechanism), and extrinsic rigidity (price rigidity that is induced by a low degree of volatility of shocks to the marginal cost and/or the desired mark-up). They find that the differences across products in the frequency of price changes do not strictly correspond to differences in intrinsic price rigidity, i.e., the frequency of price changes also depends, in a significant way, on the magnitude of the shocks to the unobserved optimal price. Thus, as Blinder (1991, p. 94) puts it: "From the point of view

* We would like to thank Nuno Alves, Mário Centeno, Ana Cristina Leal, José Ferreira Machado, Stefan Niemann and Pedro Portugal for helpful discussions and useful suggestions. The usual disclaimer applies. Daniel Dias and João Santos Silva gratefully acknowledge the partial financial support from Fundação para a Ciência e Tecnologia, program POCTI, partially funded by FEDER. The opinions expressed in the article are those of the authors and do not necessarily coincide with those of Banco de Portugal or the Eurosystem. Any errors and omissions are the sole responsibility of the authors.

** Anderson Graduate School of Management - UCLA and CEMAPRE.

*** Banco de Portugal, Economics and Research Department.

**** Department of Economics, University of Essex and CEMAPRE.

of macroeconomic theory, frequency of price change may not be the right question to ask, for it depends as much on the frequency of shocks as on the firms' pricing strategies. We are more interested to know how long price adjustments lag behind shocks to demand and cost".

Therefore, rather than looking into the reasons for infrequent price changes, as done in most of the previous literature on price stickiness (Munnick and Xu, 2007, Vermeulen *et al.*, 2007, Dhyne *et al.*, 2006, and the references therein), in this paper we directly investigate the deeper and more meaningful question of the determinants of the speed of price adjustments to demand and cost shocks. In particular, we use survey data on price adjustment lags reported by Portuguese firms to investigate how they adjust their prices in response to changes in market conditions. The advantage of using such data is that, in order to study the intrinsic price rigidity, we do not need to match market conditions with price changes decisions, which is usually a difficult task.

A potential disadvantage of our dataset is that it does not distinguish between aggregate and idiosyncratic shocks. Indeed, the economic literature has stressed that the reaction of firms to shocks may depend on whether these are aggregate or idiosyncratic (Lucas 1973), and recently Mackowiak and Wiederholt (2009) developed a model in which firms' prices react quickly to idiosyncratic shocks, but only slowly to aggregate shocks. The fact that our data has no information on whether the shock is aggregate or idiosyncratic is an important limitation that should be borne in mind when evaluating the findings in this paper.[1]

In this paper we tackle several interesting questions. Do prices respond with different lags to demand and cost shocks? Do prices respond differently to shocks that would imply a rise in prices than to shocks that would imply a fall in prices? Are prices stickier when a firm operates in a less competitive industry? Does price stickiness depend on how long firms have been dealing with their customers? Are prices stickier when goods are sold in foreign markets? Do the competitiveness factors affect the degree of price stickiness and, if so, in which direction?

The analysis is conducted in the context of a panel-ordered probit model that allows for the presence of unobserved firm-specific random-effects. This a major distinguishing feature of our approach, which in our view allows a richer analysis of the data than the simple probit models used so far in the literature.

We find that adjustment lags to cost and demand shocks (either positive or negative), vary significantly with firm characteristics such as the type of pricing policy, cost structure, and sources of competitiveness, among others. Interestingly, and in contrast to what one could expect, measures of the importance of explicit and implicit contracts — two of the most cited sticky-price theories in firms' surveys — do not emerge as having significant implications for the speed of price reaction to demand or cost shocks. The evidence also suggests that firms with similar characteristics react asymmetrically to positive and negative shocks.

(1) Another potential disadvantage of this type of data is that these are reported, not actual, lags and it is impossible to know whether the answers provided are close to reality. However, the fact that in our model we only use the ordinal information in the answers given by the firms will significantly mitigate potential measurement errors.

As a by-product of our analysis, we also explore the information provided by the firms on the relative importance of different sticky-price theories as determinants of price adjustment lags. Since the pioneering work of Blinder et al. (1998), several surveys have asked firms to rank the main reasons underlying infrequent price changes or infrequent price reviews (see, for instance, Almirault et al., 2006, Fabiani et al., 2006, and the references therein), and this information has been used to empirically assess the relevance of alternative sticky-price theories. Although this information may allow the evaluation of the relative importance of intrinsic and extrinsic price rigidity,[2] we find that the rankings of sticky-price theories as reported directly by firms do not help explaining the differences in price adjustment lags.

The rest of the article is organised as follows. Section 2 presents the theoretical background which underlies the estimated model. Section 3 describes the dataset used and presents the results of a preliminary data analysis. Section 4 presents the estimated model and discusses the main results. Finally, Section 5 summarizes the main conclusions.

2. THEORETICAL BACKGROUND

Individual firms do not continuously adjust their prices in response to shocks that hit the economy. To model this fact, the economic literature considers mainly two types of pricing behaviour: time dependent and state dependent pricing rules. According to the former, firms are assumed to change their prices periodically using either a deterministic (Taylor, 1980) or a stochastic (Calvo, 1983) process of price adjustment, i.e., the timing of the price changes is exogenous and does not depend either on the state of the economy or on the timing of the shocks.

Firms following state-dependent pricing rules are usually assumed to review their prices whenever relevant shocks hit the economy, but, due to the existence of fixed costs of changing prices (e.g., the cost of printing and distributing new price lists), they change their prices only when the difference between the actual and target prices is large enough (see, for example, Sheshinski and Weiss, 1977, Caplin and Spulber, 1987, Caballero and Engel, 1993, Dotsey *et al.*, 1999). Thus, a company facing these menu costs will change its price less frequently than an otherwise identical firm without such costs.

Some authors have, however, argued that the main benefit of infrequent price changes is not lower menu costs, but reduction of the costs associated with information collection and decision-making. Obtaining this benefit necessarily means that the timing of the occasions upon which prices are reconsidered may be largely independent of current market conditions (see Woodford, 2003, Zbaracki *et al.*, 2004). In the same vein, Ball and Mankiw (1994a) argue that "the most important costs of price adjustment are the time and attention required of managers to gather the relevant information and to make and implement decisions".

(2) Among the many reasons for price stickiness suggested to firms in the surveys, some may be seen as relating to extrinsic rigidities (for example, the importance of changes in variable costs induced by shocks) and some to intrinsic rigidities (for example, the importance of information and menu costs).

In addition to menu costs and/or information costs, economic theory has suggested a large number of other potential explanations for the existence of price rigidities, of which the theories of explicit and/or implicit contracts, cost-based pricing, coordination failure, and pricing thresholds, are notable examples.

With explicit contracts, firms aim at building long-term relationships with their customer in order to stabilise their future sales. Customers, on the other hand, are attracted by a constant price because it makes their future costs more predictable and helps to minimize transaction costs (e.g., shopping time). In turn, the theory of implicit contracts is based on the idea that firms try to win customer loyalty by changing prices as little as possible. The idea that explicit contracts may be central for price stickiness was first introduced in the economic literature through wage contracts (see, for instance, Fisher, 1977), while the idea of implicit contracts goes back to Okun (1981), who distinguishes between price increases due to cost shocks and those that are due to demand shocks. He argues that higher costs are an accepted rationale for rising prices, while increases in demand are viewed as unfair. Consequently, firms hold prices constant in the face of demand shocks, as they do not want to jeopardise customer relations. The idea that consumers wish to buy from firms whose prices are fair is also stressed by Rotemberg (2005).

Rather than emphasizing the firm-customer relation, the theory of coordination failure focuses on the interaction between firms as the explanation for sticky prices. Like in the case of explicit contracts, the idea was first introduced for the analysis of the labour market (see, for instance, Clower, 1965). After a shock, a firm might want to change its price, but only if the other firms change their prices too. Without a coordinating mechanism which allows the firms to move together, the prices might remain unchanged.

As regards the cost-based pricing theory, the idea is that input costs are an important determinant in firms' pricing decision, and that if costs do not change, prices will not change either. Basically, this means that prices do not change because other prices (input costs) do not change (see Hall, 1986). Finally, some firms set their prices at psychologically attractive thresholds. This pricing strategy can cause price stickiness because, in face of small shocks calling for small price changes, firms might not react and postpone price adjustments until new events justify a price change to the next pricing threshold.

The different sticky-price theories discussed above have informed most of the empirical research on the existence and significance of infrequent price changes, and the present work is no exception to this trend. A useful way of looking at these sticky-price theories is to think of them as reflecting the existence of both real and nominal rigidities. As Ball and Romer (1990) noticed, nominal price stickiness depends not only on the costs of changing nominal prices (nominal frictions) but also on the benefits of changing prices (real rigidities). Thus, as a general principle, we may expect that the less (the more) profits change when firms set their prices away from the optimum, the smaller (the bigger) will be the benefits from adjusting more rapidly, and so the more slowly (rapidly) firms will adjust their prices towards the optimum. In this paper we look into the factors that may explain why some firms adjust their prices more rapidly than others. For that purpose, we will look into the factors that might reflect differ-

ences in the relative importance of the alternative sticky-price theories at the firm-level i.e., the factors that might reflect differences in the firms' adjustment costs or that might be expected to make profits more or less sensitive to sub-optimal prices.

3. THE DATA

3.1. Data sources

Most of the data used in this study come from a survey about price setting practices carried out by Banco de Portugal.[3] In this survey, firms were asked how long they would take to react to significant cost and demand shocks. More specifically, they were asked the following four questions: 1) After a significant increase in demand how much time on average elapses before you raise your prices?; 2) After a significant increase in production costs how much time on average elapses before you raise your prices?; 3) After a significant fall in demand, how much time on average elapses before you reduce your prices?; and 4) After a significant decline in production costs how much time on average elapses before you reduce your prices?. The responses to these questions, which will be the dependent variable in our model, are recorded as continuous interval data with six categories: 1 - less than one week; 2 - from one week to one month; 3 - from one month to three months; 4 - from three to six months; 5 - from six months to one year; 6 - the price remained unchanged. With the expression significant increase or significant decline the authors of the survey seem to have had in mind inducing respondents to interpret the shock as significant enough to lead firms to react to it by changing their price. Therefore, we interpret option 6 as indicating that the price will eventually change, but the adjustment lag is longer than one year.

Besides the questions on price adjustments lags, the survey also contains information on a large set of firms' characteristics. These include information on the main market of the firm (internal versus external market), main destinations of sales (wholesalers vs. retailers, private vs. public sector), number of competitors, relations with customers (long-term vs. short-term), type of product competition (price vs. quality, differentiation vs. after sales service), price discrimination (same price for all customers vs. decided on a case-by-case basis), price setting decisions (own company vs. external entity, main customers vs. main competitors), and reasons for postponing price changes (the risk that competitors do not follow, existence of implicit or written contracts, cost of changing prices, costs of collecting information, absence of significant changes in variable costs, preference for maintaining prices at psychological thresholds, etc.).

The information from the survey is supplemented with data from two other sources. From *Central de Balanços*, a comprehensive dataset maintained by Banco de Portugal in which the balance sheets and income statements of most Portuguese firms are registered, we obtain data on the number of employees, the share of sales that are made abroad, and the shares of labour, inputs and financial costs. Fi-

(3) For further details on this survey, see Martins (2010).

nally, we obtain information about the proportion of domestic and foreign capital of the firm from *Quadros de Pessoal*, a large administrative database collected by the Ministry of Employment which, among other, includes information about all the Portuguese firms with wage earners (size, ownership, location, etc.).

By combining the three datasets through the individual tax identification number of each firm, we are able to obtain detailed information on 903 firms from different branches of activity. More specifically, our sample includes firms with 20 or more employees, from which almost 90 percent belong to Manufacturing (NACE - classification of economic activities - 15 to 37) and the remaining to Services (NACE 60 to 64, 80 and 85 - Transport, Storage and Communication, Education and Healthcare). Sectors such as agriculture, construction, or wholesale and retail trade are not included.

3.2. Preliminary data analysis

As mentioned above, the four survey questions about price adjustment lags are our variates of interest. Table 1 summarises the information on these variables by displaying the distribution of the observed price adjustment lags for each type of shock. These results suggest that firms are quicker to react to cost shocks, in particular when they are positive, than to demand shocks. For example, only around 10 percent of the firms keep their prices unchanged in the first year after a positive cost shock, while the fraction of firms that hold their prices unchanged in response to a positive demand shock is around 35 percent. Interestingly, firms seem to react more quickly to positive cost shocks than to negative cost shocks, but to be slower to react to positive demand shocks than to negative demand shocks. A formal test for the hypothesis that the reaction time is the same for positive and negative shocks will be performed in the next section.

The results of this preliminary analysis, however, are not informative about the possible effect of the characteristics of the firms on the speed of adjustment. As an illustration of the importance of these characteristics, Table 2 gives the breakdown by sector and firm size of the firms that do not adjust the price in the first year after the shock. Clearly, the speed of price adjustment varies with firm sizes and across sectors. Naturally, all these findings will be taken into account in the econometric analysis we present in the next Section.

Table 1

SPEED OF PRICE RESPONSE TO DEMAND AND COST SHOCKS

	Cost shocks		Demand shocks	
Price adjustment lag	**Positive**	**Negative**	**Positive**	**Negative**
1 - less than one week	4.7	3.5	2.8	4.8
2 - from one week to one month	16.8	15.2	12.2	16.8
3 - from 1 month to 3 months	25.0	25.7	19.3	23.4
4 - from 3 to 6 months	17.6	15.0	13.4	13.7
5 - from 6 months to one year	26.3	21.2	17.7	14.0
6 - the price remained unchanged	9.6	19.5	34.7	27.4
Total	100	100	100	100

Table 2

PERCENTAGE OF FIRMS THAT DO NOT CHANGE THEIR PRICES IN THE FIRST YEAR AFTER THE SHOCK

	Cost shocks		Demand shocks	
	Positive	Negative	Positive	Negative
Manufacturing	8.5	17.5	33.0	25.1
Services	20.0	37.8	50.0	47.8
Small firms	9.0	18.7	35.2	27.1
Large firms	13.5	24.1	31.6	28.6
Total	9.6	19.5	34.7	27.4

Note: Small and large firms are firms with up to 250 employees and more that 250 employees, respectively. The percentages in the table are computed as a proportion of the total number of firms in the corresponding sector or firm type.

As in similar studies, the survey data also contains information on the reasons why firms may delay price changes. Specifically, firms were asked to rank the main sticky-price theories according to their importance in explaining why firms sometimes avoid or postpone price changes in the face of changes in the relevant economic environment. Respondents were asked to indicate the degree of importance attached to each theory in a scale ranging from 1 (unimportant) to 4 (very important). Table 3 summarises these results by ranking theories by mean scores.

The results in Table 3 are in line with the findings of similar surveys. For example, implicit contracts, explicit contracts, cost-based pricing and coordination failure, also emerge as the top four theories for the EA (Fabiani *et al.*, 2006), while coordination failure, cost-based pricing, implicit contracts and explicit contracts rank first, second, fourth and fifth, respectively, for the US (Blinder *et al.*, 1998). Similar results were obtained for Sweden (Apel *et al.*, 2005) and the UK (Hall *et al.*, 1997). The results for the lower part of the ranking are also similar across countries. In these surveys, menu costs and information costs systematically rank very poorly as explanations for price rigidities. For example, menu costs rank eighth and information costs ninth out of ten alternative explanations in the EA (Fabiani *et al.*, 2006), and similar results were obtained for other countries such as the UK, Canada and Sweden (Hall *et al.*, 1997, Almirault *et al.*, 2006, Apel *et al.*, 2005).

Table 3

THEORIES OF PRICE STICKINESS (MEAN SCORES)

		Sectors		Size	
Theory	Total	Manufacturing	Services	Small	Large
Implicit contracts	3.2	3.2	3.1	3.2	3.0
Coordination failure	2.8	2.8	2.7	2.8	2.8
Cost-based pricing	2.7	2.7	2.9	2.7	2.6
Explicit contracts	2.6	2.6	2.9	2.5	2.8
Temporary shock	2.5	2.5	2.1	2.5	2.5
Quality signal	2.3	2.3	2.3	2.3	2.2
Menu costs	2.0	2.0	2.1	2.0	1.8
Costly information	1.7	1.7	1.7	1.7	1.6
Pricing thresholds	1.6	1.6	1.8	1.7	1.6

In the literature, the rankings of sticky-price theories have been used either directly, as a way of ranking the importance of the different sticky-price theories (see, among others, Fabiani *et al.*, 2006, and the references therein), or indirectly through regression analyses, to explain the frequency of price changes (see, for instance, Munnick and Xu, 2007). However, although these rankings provide evidence on the causes of the existence of price adjustment lags, they tell us little about the length of the lags and on how these vary across firms, which is the main purpose of this paper. For this reason, in the model to be presented in the next Section, the rankings of the sticky-price theories as reported by the firms are not used as covariates. Rather, and for the reasons explained above, we will look into the factors that might reflect differences in the relative importance of the alternative sticky-price theories at the firm-level by identifying the factors that might affect the firms' adjustment costs, or that are expected to affect the sensitivity of profits to deviations from the optimal price.

4. AN ECONOMETRIC MODEL FOR PRICE ADJUSTMENT LAGS

The model we use to gauge the impacts of the different covariates on the lags of price adjustments takes into account both the interval nature of the data and the fact that each firm contributes to the sample with four observations. We therefore use a panel-ordered probit model that allows for the presence of unobserved firm-specific effects.[4] More specifically, we model the latent variable y_{ij}, which represents the time firm i takes to react to a shock of type j, as a function of a set of firm characteristics. Because y_{ij} is not fully observable, and due to the potential existence of reporting errors, our model uses only the ordinal information provided by the firms. That is, the dependent variable in our model is $\tilde{y}_{ij} = m$, where $m = 1,2,..,6$ indicates one of the six possible response categories.

Because the preliminary data analysis suggests that the speed of price adjustment is shock specific, we estimate a model which allows for the possibility of different coefficients for each type of shock, including different cut-off parameters and different variances for the non-observed stochastic components.[5]

To complete the model specification it is necessary to define the set of regressors to use. As mentioned above, this choice was guided by the literature on the sticky-price theories briefly reviewed in Section 2. Ultimately, the importance of the different sticky-price theories at the firm-level may be captured by the characteristics of the firm itself, the good that is produced, or the sector in which the firm operates. For this reason, we have chosen as regressors sectoral, product, and firm-level characteristics that may be related directly to the above discussed sticky-price theories, or may be expected to make profits more or less sensitive to shocks.

(4) This a major distinguishing feature of our approach, which in our view allows a richer analysis of the data than the simple probit models used so far in the literature. To our knowledge, all the papers in the empirical literature that have looked at the speed of price reactions by firms in face of demand and costs shocks, have estimated binary probit models. In these models the dependent variable is defined such that it equals 1 if the price reaction occurs in the first three months (say) after the shock and is zero otherwise, or such that it equals one, if the firm reports that it reacts to shocks (and is zero otherwise). As a robustness check we also estimated a binary probit model (allowing for unobserved heterogeneity) with the dependent variable defined such that it equals 1 if the adjustment takes more than one month and equals zero otherwise. Although the point-estimates obtained with this model are not very different from those of the ordered model, the binary model is considerably less efficient and therefore most of its parameters are not statistically significant.

(5) Therefore, this is almost equivalent to estimating four different models, one for each type of shock, with the difference being that in our case the models are linked by the unobserved heterogeneity component, which is assumed to be common to the four shocks. Further details on the model may be seen in Dias *et al.* (2009).

The Appendix describes the different regressors and provides the corresponding summary statistics, and Table 4 presents the results of the estimated model.[6] For ease of presentation we grouped these variables into the following six categories: 1) Price setting practices, 2) Cost structure, 3) Market environment, 4) Source of competitiveness, 5) Type of good, and 6) Other characteristics.

Table 4

PANEL-ORDERED PROBIT ESTIMATES FOR THE PRICE ADJUSTMENT LAGS

	Cost shocks		Demand shocks	
Covariates	**Positive**	**Negative**	**Positive**	**Negative**
Constant	3.477**	4.665**	3.345**	3.611**
	(0.327)	(0.448)	(0.321)	(0.382)
Explicit contracts	0.041	-0.037	0.073	0.116
	(0.127)	(0.154)	(0.123)	(0.146)
Implicit contracts	-0.142	-0.114	0.101	-0.196
	(0.148)	(0.180)	(0.143)	(0.171)
Price discrimination	-0.392**	-0.383*	-0.565**	-0.621**
	(0.163)	(0.198)	(0.160)	(0.189)
Quantity discount	-0.425**	-0.301*	-0.402**	-0.430**
	(0.152)	(0.184)	(0.149)	(0.176)
Price set by customers	0.418**	-0.213	0.113	-0.139
	(0.181)	(0.219)	(0.174)	(0.206)
Price set by competitors	0.314*	-0.079	-0.408**	-0.671**
	(0.163)	(0.196)	(0.156)	(0.186)
Labour costs	0.417**	0.394**	0.413**	0.514**
	(0.122)	(0.149)	(0.119)	(0.141)
Intermediate input costs	-0.252**	-0.291*	-0.052	0.036
	(0.126)	(0.153)	(0.122)	(0.144)
Competition	-0.358**	-0.366**	-0.302**	-0.399**
	(0.136)	(0.165)	(0.132)	(0.157)
Domestic market	-0.029	-0.067	0.047	0.233
	(0.128)	(0.154)	(0.123)	(0.146)
Price competitiv.	-0.027	-0.241*	-0.213*	-0.407**
	(0.113)	(0.137)	(0.109)	(0.130)
Quality competitiv.	0.271**	0.204	0.314**	0.489**
	(0.130)	(0.157)	(0.125)	(0.150)
Delivery competitiv.	-0.091	-0.107	0.268**	0.301**
	(0.111)	(0.134)	(0.108)	(0.128)
Services	1.035**	1.112**	0.561**	0.951**
	(0.205)	(0.253)	(0.199)	(0.238)
Intermediate goods	-0.263**	-0.424**	-0.419**	-0.418**
	(0.158)	(0.151)	(0.120)	(0.143)
Size	0.352**	0.520**	-0.134	0.164
	(0.157)	(0.193)	(0.152)	(0.181)
Capital structure	-0.418**	-0.477**	-0.146	-0.270
	(0.177)	(0.216)	(0.171)	(0.202)

Note: Standard errors computed from analytical second derivatives are in parenthesis. **Marks significance at 5%; *marks significance at 10% level.

Price setting practices

This category includes six regressors that we view as affecting directly the ability of the firm to change its price in the event of a shock: the proportion of sales under written contracts, information on whether the relation with the customers is essentially of a long- or short-term nature, information on whether the firm

(6) Given the definition of the categorical variables (given in the Appendix), the reference or baseline group is composed of firms for which: a) the proportion of sales under written contracts is less than 50 percent; b) the relationship with their customers is essentially of a short-term nature; c) the price is the same for all customers (absence of price discrimination) and there are no quantity discount prices; d) the price of the product is set by the firm itself and not by an external entity, including the main competitors or main customers; e) the share of labour and input costs are below the corresponding median share; f) the number of competitors is less than 5; g) exports represent more than 50 percent of their main product; h) price, quality and delivery time are not considered very important factors for the competitiveness of the main product; i) belong to the manufacturing sector; j) the production is essentially for final consumption (the main destination market is composed of wholesalers, retailers or final consumers), as opposed to intermediate consumption; and k) the number of employees is equal or less than 250.

practices price discrimination and/or quantity discounts, and, finally, information on whether the price is set by the firm's main customers or main competitors.

The first variable measures how important explicit contracts are for firms' regular operations, while the second may be seen as a proxy for the existence of implicit contracts. As we have seen in Section 2, economic theory suggests that the existence of explicit and/or implicit contracts may be an important source of price stickiness, and thus may help explaining the lags of price adjustment across firms in the event of a shock. The results in Table 4, however, show that the coefficients of these two covariates are not statistically different from zero for either of the four shocks. Thus, in contrast to what the analysis in Section 3 could suggest, the fact that the firm has a large proportion of sales under written contracts, or whether the relation with the customers is essentially of a long-term nature, does not have a bearing on the speed with which firms adjust prices following significant demand or cost shocks.

In contrast, the type of pricing policy (single price versus price discrimination and existence of quantity price discounts) emerges as playing an important role in determining the speed of price adjustments. Firms that decide the price on a case-by-case basis, or that do quantity price discounts, tend to be faster to adjust to both cost and demand shocks. These results can be interpreted as reflecting the fact that firms with such flexible pricing practices are likely to face relatively low information, managerial, or menu costs, which also allow them to react more quickly to shocks.

Finally, we consider two variables related to the firms' lack of autonomy in setting their own prices (as opposed to cases in which the price is set by the firm itself). We find that the price set by customers variable has a positive and significant impact only in the case of positive cost shocks, suggesting that customers have enough power to delay the firms' reaction when costs push prices up. Regarding the price set by competitors variable, our results show that firms that have their prices set by the main competitors are faster to respond to demand shocks than firms that set their own prices. This suggests that firms whose prices are set by the main competitors may be acting as market followers in a market where the presence of market leaders helps reducing, or even eliminating, potential coordination problems.

We notice that in our sample only about 12 percent of the firms recognised the lack of autonomy in setting their own prices (both when they are set by the main customers or by the main competitors), which suggests that these characteristics do not contribute much to explain differences in the speed of price adjustment across firms for the whole economy. In contrast, the type of pricing policy (single price versus price discrimination and existence of quantity price discounts) may be seen as an important characteristic with important implications for the speed of price adjustment as 37 percent of the firms set their prices on a case-by-case basis, and 41 percent do quantity discounts (see Table A1 in the Appendix).

Cost structure

In order to test whether the cost structure matters for explaining the differences in the lags of price adjustments, we included two variables that measure the importance of labour costs and other input costs (intermediate inputs). From Table 4 we see that the shares of labour and intermediate input costs emerge as important factors in explaining the lags of price adjustment. Irrespective of the type of shock, firms with a labour share above the median tend to be slower to react to shocks. On the other hand, firms with a share of intermediate input costs above the median tend to react more quickly to cost shocks than otherwise similar firms.[7]

Cost structure is an important determinant of how firms react to cost shocks. In monopolistic competition models, under quite general conditions, firms choose to charge a price that represents a mark-up over marginal cost. Thus, for firms following mark-up rules, the higher the volatility of input prices, the higher will be the frequency with which they change their prices. If input costs are relatively stable, such as wages which are changed, on average, once a year, prices can also be expected to be relatively stable. On the contrary, if input costs are highly volatile, in particular some raw materials, the frequency of price changes could be much higher. Thus, *ceteris paribus*, one may expect firms with higher labour cost shares to change their prices less frequently than firms with higher shares of more volatile intermediate inputs. Our findings suggest that this result translates into the speed of price adjustment to cost shocks: firms with a higher labour share tend to be slower to react, while firms with a higher share of intermediate input costs tend to be faster (see also Altissimo *et al.*, 2006). As for demand shocks we may expect a similar result. Infrequent wage changes give rise to flatter product supply curves, making the optimal price more inelastic to demand shocks. Thus, we may expect demand shocks to have larger implications in terms of the lags of price adjustments for firms with higher labour cost shares. This is confirmed by our findings.

Market environment

To capture the market environment in which firms operate, we use a direct measure of market competition (number of competitors), and information on the main destination market (domestic vs. foreign market). According to the estimated model, the degree of competition is a very relevant factor in determining the speed of price adjustment. Firms in more competitive environments tend to be faster to react to shocks. Indeed, it is known that the more competitive a sector is, the more sensitive profits are to sub-optimal prices. Thus, for given nominal adjustment costs (due for instance to the presence of information or menu costs) stronger competition may be expected to translate into quicker responses to shocks (see, for instance, Martin, 1993).

Regarding the market destination variable, we find that the coefficients of the covariate that measures the importance of the domestic market are not statistically significant for any of the four shocks. Thus,

(7) This is a very robust result that has been extensively documented in the literature for the frequency of price adjustments (see, among other, Altissimo, Ehrmann and Smets, 2006, and the references therein). Our results show that the same result is valid for the speed with which firms react toshocks.

whether the firm sells their products in the domestic market or abroad does not seem to make a difference for the speed with which firms react to shocks.

Source of competitiveness

In order to investigate if the different competitiveness factors affect the speed with which firms respond to shocks, we distinguish between price, quality, and delivery period, as alternative sources of competitiveness. It turns out that firms that consider price as an important variable for competitiveness tend to adjust prices more quickly, while firms that value more the quality of the product or the delivery period as competitiveness factors tend to adjust their prices at a slower pace in response to shocks (specially so, in face of demand shocks).

We may think of these factors as reflecting different product characteristics which translate into different demand elasticities (higher demand elasticity for firms for which price is an important factor, and lower elasticity for firms that value more the quality of the product or the delivery period).[8] In our sample 60 percent of the firms consider price as a very important source of competitiveness, while 77 percent and 51 percent select quality and the delivery period, respectively. These figures suggest that the competitiveness factors, especially the price and the delivery period, are important factors in shaping the time responses to demand shocks across firms.

Type of good

In the data we have information regarding the sector where firms operate (manufacturing or services), and the destination of the product (final vs. intermediate consumption). As earlier results suggested (see Table 2), from Table 4 we find that firms that operate in the services sector are substantially slower to react to shocks than firms that operate in the manufacturing sector. The speed of price adjustment also varies according to the type of market for the product. Firms that sell their products to other firms (intermediate goods) tend to be quicker to adjust their prices than firms whose products are mainly for final demand (whose main destinations are wholesalers, retailers or consumers). These results my reflect the fact that services and final goods are typically more differentiated than manufacturing and intermediate goods, respectively, and thus face a less elastic demand.

In our sample 31 percent of the firms declared that its main destination market is composed of other companies, which means that the "intermediate goods" covariate may have a significant contribution in explaining the differences in the lags of price adjustment across firms.

(8) Martin (1993) showed that the speed of price adjustment increases with the elasticity of demand, that is, firms react faster to shocks when the demand schedule facing them is flatter. This same idea was used by Gopinath and Itskhoki (2009) to show the link between the frequency of price adjustment and exchange rate pass-through.

Other characteristics

The last group of variables we considered as potentially relevant to explain the differences in the lags of price adjustment includes the firm size and the capital structure. In line with the findings fom the previous section, size matters for the speed of price adjustment. In the face of cost shocks, large firms tend to be slower at adjusting their prices than small firms. The fact that size matters is probably because the products of large firms are typically more differentiated and therefore face a less elastic demand, or because firm size is capturing some remaining firm characteristics, like the flexibility of the decision making process.

As regards the capital structure, we find that firms with a higher share of domestic capital tend to adjust faster in the face of shocks (especially so in the face of cost shocks), probably because, in contrast to what can be expected for foreign firms, the decision making process of domestic firms resides inside the country allowing a prompter reaction to shocks.

Overall we do not expect the covariates "size" and "capital structure" to contribute much to explain the differences in the lags of price adjustment, as large firms only represent 15 percent of total firms in the sample and only 11.6 percent of the firms have a share of foreign capital larger than 50 percent.

Symmetric or asymmetric response lags?

An interesting issue is whether the lags of price adjustments to cost and demand shocks are symmetric or asymmetric, as the consequences of monetary policy shocks might differ depending on the direction of the shock. There is now a vast theoretical literature that focus on the question of whether prices are more sticky in response to a shock that warrants a price decrease than to a price increase. Such asymmetries may arise because of strategic behaviour (Hansen *et al.*, 1996, Kavenock and Widdows, 1998, Bhaskar, 2002, Devereux and Siu, 2007), adjustment costs under trend inflation (Tsiddon, 1993, Ball and Mankiw, 1994b, Ellingsen *et al.*, 2006), search models (Lewis, 2004, Yang and Ye, 2008, Bayer and Ke, 2009), capacity constraints (Finn, 1996, Laxton *et al.* 1996, Loertscher, 2005), inattentive consumers (Chen *et al.*, 2008), or customer anger (Okun, 1981, Rotemberg, 2005). Importantly, there seems to be no theoretical unanimity as to whether prices will be more sticky when warranted prices move up or down.

According to the preliminary analysis in Section 2, and in accordance with results found in other countries, some asymmetry is expected as firms seem to react more quickly to positive than to negative cost shocks, and more slowly to positive than negative demand shocks. However, formal tests of possible asymmetric reaction times were not performed, and therefore it is important to investigate whether the observed differences are statistically significant.

In the context of our model, comparing just the individual coefficients of the covariates for positive and negative shocks provides little information on the symmetry of the responses, because of the different parameters defining the functional form of the model. Therefore, symmetry tests have to conducted by testing not only the coefficients of the covariates, but also all other parameters that are shock specific. The

results of the two global tests — one for cost shocks and one for demand shocks — clearly reject the null of equal coefficients for positive and negative shocks in both cases, so that we conclude that firms react differently to negative and positive shocks.

5. CONCLUSIONS

This paper investigates firm-level price rigidities by looking at the lags of price adjustments to demand and cost shocks, which is a better measure of price rigidities than the commonly used frequency of price changes.

By estimating a panel-ordered probit model, we find that the lags of price adjustments vary with the sector, product, and firm characteristics, namely the competitive environment, the cost structure of the firm, the different factors of competitiveness, pricing policy, or the type of market for the firm's product. These factors, using the terminology in Ball and Romer (1990), affect directly the degree of real rigidities, which in turn, determines the speed at which firms adjust their prices, for a given level of nominal adjustment costs (or nominal frictions).

In particular, we document that, *ceteris paribus*, firms with a high share of labour costs, that value the quality of the product or the delivery period as important competitiveness factors, that have their price set by their main customers, are large, or belong to the services sector, tend to be slower to react to shocks. In turn, firms that operate in a competitive environment, have a large share of other input costs, consider price as an important competitiveness factor, decide the price on a case-by-case basis, have their price set by the main competitors, do quantity discount prices, sell their products to other firms (intermediate goods), or have a large share of national capital, tend to react more quickly to demand or costs shocks. Among these factors, the cost structure (labour share and intermediate input share), the type of pricing policy (single price versus price discrimination and existence of quantity price discounts), the competitiveness factors (especially the price and the delivery period), and the destination of the product (final vs. intermediate consumption), emerge as especially important characteristics in explaining the differences in the lags of price adjustment across firms.

In contrast to what one could expect, the fact that the firm has a large proportion of sales under written contracts, or whether the relation with the customers is essentially of a long-term nature, does not have implications on the speed with which firms adjust prices following significant demand or cost shocks. Likewise, whether the firm sells its products in the domestic market or abroad does not seem to make a difference.

Finally, both for demand and cost shocks, statistical tests clearly reject the null hypothesis that firms respond symmetrically to positive and negative shocks.

Overall, the findings in this paper are consistent with the idea that differences in the speed of price adjustment depend on the costs of changing nominal prices, as well as on the sensitivity of firms' profits to deviations from the optimal price, and that firms behave asymmetrically in the face of positive and negative shocks.

REFERENCES

Altissimo, F., Ehrmann, M., and Smets, F., 2006. "Inflation persistence and price-setting behaviour in the euro area. A summary of the IPN evidence", European Central Bank, *Occasional paper series* No. 46.

Alvarez, L. J., Hernando, I., 2005. "The price setting behaviour of Spanish firms: evidence from survey data", European Central Bank, *Working Paper* No. 538.

Amirault D., Kwan, C., Wilkinson, G., 2006. "Survey of price-setting behaviour of Canadian Companies", Bank of Canada, *Working Paper* 2006-35.

Apel, M., Friberg, R., Hallsten, K., 2005. "Micro foundations of macroeconomic price adjustment: survey evidence from Swedish firms", *Journal of Money Credit and Banking*, 37 (2), 313-338.

Ball, L., Mankiw, N. G., 1994a. "A sticky price manifesto", *Carnegie-Rochester Conference Series on Public Policy*, 41, 127-151.

Ball, L., Mankiw, N. G., 1994b. "Asymmetric price adjustment and economic fluctuations", *Economic Journal*, 104, 247-261.

Ball, L., Romer, D., 1990. "Real rigidities and the non-neutrality of money", *Review of Economic Studies*, 57, 183-203.

Bayer, R., Ke, C., 2009. "Asymmetric price adjustment with costly consumer search: a laboratory study", *Mimeo*.

Bhaskar, V., 2002. "Asymmetric price adjustment: Micro-foundations and macroeconomic implications", University of Essex, *Discussion Paper* No. 547.

Bils, M., Klenow, P.J., 2004. "Some evidence on the importance of sticky prices", *Journal of Political Economy*, Vol. 112, No. 3, 947-985.

Blinder, A. S., 1991. "Why are prices sticky? Preliminary results from an interview study", *American Economic Review*, 81 (2), 89-96.

Blinder, A.S., Canetti, D.E., Lebow, D.E., Rudd, J.B., 1998. *Asking about prices: a new approach to understanding price stickiness,* Russel Sage Foundation, New York.

Caballero R., Engel, E.M.R., 1993. "Heterogeneity and Output fluctuations in a dynamic menu-cost economy", *Review of Economic Studies*, 60, 95-119.

Calvo, G., 1983. "Staggered prices in a utility-maximizing framework", *Journal of Monetary Economics*, 12,383-98.

Caplin A., Spulber, D. F., 1987. "Menu costs and the neutrality of money", *The Quarterly Journal of Economics*, Vol. 102, Issue 4, 703-725.

Chen, H., Levy., D., Ray, S., Bergen, M., 2008. "Asymmetric price adjustment in the small", *Journal of Monetary Economics*, 55, 728-737.

Clower, R., 1965. "The Keynesian counterrevolution: A theoretical appraisal" in Hahn F. and F. Brechling (eds) *The theory of interest rates*, London: Macmillan.

Devereux, M. B., Siu, H. E., 2007. "State dependent pricing and business cycle asymmetries", *International Economic Review*, 48 (1), 281-310.

Dhyne, E., Alvarez, L., Le Bihan, H., Veronese, G., Dias, D., Hoffmann, J., Jonker, N., Lunnemann, P., Rumler, F., Vilmunen, J. 2006. "Price Changes in the Euro Area and the United States: Some Facts from Individual Consumer Price Data", *Journal of Economic Perspectives*, 20(2), 171-192.

Dhyne, E., Fuss, C., Pesaran, H., Sevestre, P., 2008. "Lumpy price adjustments: a microeconomic analysis", *mimeo*.

Dias, M., Dias, D., and Neves, P.D., 2004. "Stylised features of price setting behaviour in Portugal: 1992-2001", European Central Bank, *Working Paper* No. 332.

Dias, D., Marques, C. R., Martins, F., Santos Silva, J.M.C., 2009. "What makes it stick: firm-data evidence on price adjustment lags", *Mimeo*.

Dotsey, M., King, R. and Wolman, A., 1999. "State-dependent Pricing and the General Equilibrium Dynamics of Money and Output", *Quarterly Journal of Economics*, 114, 655-690.

Ellingsen, T., Friberg, R., Hassler, J., 2006. "Menu costs and asymmetric price adjustment", CEPR, *Discussion Paper* No. 5749.

Fabiani, S., Gatulli, A., Sabbatini, R., 2004. "The pricing behaviour of Italian firms: New survey evidence on price stickiness", European Central Bank, *Working Paper*, No. 333.

Fabiani, S., Druant, M., Hernando, I., Kwapil, C., Landau, B., Loupias, C., Martins, F., Mathä, T., Sabbatini, R., Stahl, H., and A. Stokman. 2006. "What firms' surveys tell us about price-setting behavior in the Euro Area", *International Journal of Central Banking*, Vol. 2, Number 3, September.

Finn, M., G., 1996. "A theory of the capacity utilization/inflation relationship", Federal Reserve Bank of Richmond, *Economic Quarterly*, 82(3), 67-86.

Fisher, S., 1977. "Long-term contracts, rational expectations and the optimal money supply rule", *Journal of Political Economy*, 85 (1), 191-205.

Gopinath, G., Itskhoki, O., 2009. "Frequency of price adjustment and pass-through", *Quarterly Journal of Economics*, forthcoming.

Hall, R., 1986. "Market structure and macroeconomic fluctuations", *Brookings Papers on Economic Activity*, 2, 285-322.

Hall, S., Walsh, M., Yates, A., 1997. "How do UK companies set prices?", Bank of England, *Working Paper* No. 67.

Hansen, R. S., Mollgaard, H. P., Overgaard, P. B., Sorensen, J. R., 1996. "Asymmetric adjustment in symmetric duopoly", *Economics Letters*, 53, 183-188.

Klenow, P. J., Kryvtsov, O., 2008. "State-dependent or time-dependent pricing: Does it matter for recent US inflation?", *The Quarterly Journal of Economics*, 123 (3), 863-904.

Kovenock, D., Widdows, K., 1998. "Price leadership and asymmetric price rigidity", *European Journal of Political Economy*, 14, 167-187.

Kwapil, C., Baumgartner, J., Scharler, J., 2005. "The price-setting behavior of Austrian firms: some survey evidence", European Central Bank, *Working Paper* No. 464.

Laxton, D., Meredith, G., Rose, D., 1994. "Asymmetric effects of economic activity on inflation - Evidence and policy implications" IMF *Working Paper* No. 139-EA.

Lewis, M., 2004. "Asymmetric price adjustment and consumer search: An examination of the retail gasoline market", University of California, Competition Policy Center, *Working Paper* N0. CPC04-47.

Loertscher,A., 2005. "Asymmetric price adjustment: the role of costly capacity", *Mimeo*.

Loupias, C., Ricart, R., 2004. "Price setting in France: New evidence from survey data. European Central Bank", *Working Paper* No. 423.

Lucas, R. E. Jr, 1973. "Some international evidence on output-inflation tradeoffs", *The American Economic Review*, 63 (3), 326-334.

Lünnemann, P., Mathä, T., 2006. "New survey evidence on the pricing behaviour of Luxembourg firms", European Central Bank, *Working Paper* No. 617.

Mackowiak, B., Wiederholt, M., 2009. "Optimal sticky prices under rational inattention", *The American Economic Review*, 99 (3), 769-803.

Martin, C., 1993. "Price adjustment and market structure", *Economics Letters*, 41, 139-143.

Martins, F., 2005. "The price setting behaviour of Portuguese firms: Evidence from survey data", European Central Bank, *Working Paper* No. 562.

Martins, F., 2010. "Price stickiness in Portugal: Evidence from survey data", *Managerial and Decisions Economics*, forthcoming.

Munnick, D., Xu, K., 2007. "Micro foundations of price-setting behaviour: Evidence from Canadian firms", Bank of Canada, *Working Paper* 2007-31.

Nakamura, E., Steinsson, J. 2008. "Five facts about prices: a reevaluations of menu costs models", *The Quarterly Journal of Economics*, 123(4), 1415-1464.

Okun, A., 1981. *Prices and Quantities: A macroeconomic Analysis*, The Brookings Institution, Washington D.C.

Rotemberg, J., 2005. "Customer anger at price increases, changes in the frequency of price adjustment and monetary policy", *Journal of Monetary Economics*, 52 (4), 829-852.

Sheshinski E., Weiss, Y., 1977. "Inflation and costs of price adjustment", *The Review of Economic Studies*, 44, 287-303.

Small, I., Yates, T., 1999. "What makes prices sticky? Some survey evidence for the United Kingdom", Bank of England *Quarterly Review*.

Taylor, J. B., 1980. "Aggregate dynamics and staggered contracts", *Journal of Political Economy*, 88(1), 1-23.

Tsiddon, D., 1993. "The (Mis)Behaviour of the aggregate price level", *The Review of Economic Studies*, 60, 889-902.

Vermeulen, P., Dias, D., Dossche, M., Gautier, E., Hernando, I., Sabbatini, R., Stahl, H., 2007. "Price setting in the euro area: some stylised facts from individual producer price data", ECB, *Working Paper* No. 727.

Woodford, M., 2003. *Interest and prices*, Princeton University Press.

Yang, H., Ye, L., 2008. "Search with learning: Understanding asymmetric price adjustments", RAND *Journal of Economics*, 39, 2, 547-564.

Zbaracki, M.J., Ritson, M., Levy, D., Dutta, S., and Bergen, M., 2004. "Managerial and customer costs of price adjustment: direct evidence from industrial markets", *The review of Economics and Statistics*, 86, 514-533.

APPENDIX

In this Appendix we describe the covariates used in the ordered probit model whose results are presented in section 4, and provides the corresponding summary statistics. With the exception of "capital structure" which measures the share of domestic capital in the total capital of the firm, all the other covariates are dummy variables. The details are as follows:

- *Explicit contracts* — Equal to one if the percentage of sales under written contracts is larger than 50 percent of total sales;
- *Implicit contracts* — Equal to one if the relationship with customers is essentially a long-term one (more than one year);
- *Price discrimination* — Equal to one if the price of the firm's product is decided in a case-by-case basis;
- *Quantity discount* — Equal to one if the price depends on the quantity sold but according to a uniform price list;
- *Price set by customers* — Equal to one if the price of the product is set by the firm's main customer(s);
- *Price set by competitors* — Equal to one if the price of the product is set by the firm's main competitor(s);
- *Labour costs* — Equal to one if the labour cost share is above the median of the sample;
- *Intermediate input costs* — Equal to one if the other input costs share is above the median of the sample;
- *Competition* — Equal to one if the number of firm's competitors is equal to 5 or bigger;
- *Domestic market* — Equal to one if Portugal is the main destination market for the firm's product;
- *Price competitiveness* — Equal to one if the firm considers price as a very important factor for competitiveness;
- *Quality competitiveness* — Equal to one if the firm considers quality as a very important factor for competitiveness;
- *Delivery competitiveness* — Equal to one if the firm considers delivery period as a very important factor for competitiveness;
- *Services* — Equal to one if the firm operates in the Services sector;
- *Intermediate goods* — Equal to one if "other companies" is the main destination of sales (as opposed to wholesalers, retailers, Government, consumers);

- *Size* — Equal to one if the number of employees is larger than 250;
- *Capital structure* — Share of domestic capital (owned by Portuguese entrepreneurs) on the total capital of the firm.

Table A1 summarizes the relative importance in the sample of the above defined covariates. The entries in the Table record the share of firms in each category, with the exception of the labour and intermediate input costs, which represent the corresponding average shares, and the capital structure, which represents the share of firms whose national capital accounts for 50 percent or more of total capital. For instance, from the Table we see that around 83 percent of firms have implicit contracts, i.e., they have an essentially long-term relationship with customers, and that the distribution of implicit contracts is relatively homogeneous across sectors and do not vary much with the size of firms. In contrast, only in about 25 percent of the firms do formal contracts account for 50 percent or more of total sales (explicit contracts), and its distribution varies significantly across sectors and firms' size.

Table A1

MAIN CHARACTERISTICS OF THE SAMPLE

Share of firms in each category in percentage

	Total	Sectors		Firms' size	
		Manufacturing	Services	Small	Large
Explicit contracts	25.5	23.9	40.0	23.6	36.1
Implicit contracts	82.6	83.3	76.7	82.0	86.5
Price discrimination	37.4	38.3	30.0	37.8	35.3
Quantity discount	41.0	42.2	30.0	40.8	42.1
Price set by customers	11.7	11.8	11.1	10.9	16.5
Price set by competitors	12.3	12.9	6.7	13.6	4.5
Labour costs [(a)]	27.3	26.2	36.8	27.6	25.2
Intermediate input costs [(a)]	39.3	43.1	5.1	39.2	40.3
Competition	76.0	74.8	86.7	79.0	58.6
Domestic market	68.4	66.3	87.8	70.5	56.4
Price competitiveness	59.5	61.4	42.2	59.2	60.9
Quality competitiveness	77.0	76.4	82.2	76.1	82.0
Delivery competitiveness	51.1	51.7	45.6	50.0	57.1
Intermediate goods	30.9	30.6	33.3	31.8	25.6
Size (large firms)	15.0	14.5	18.9	–	–
Capital Structure [(b)]	88.2	87.6	93.2	90.4	75.4

Notes: **(a)** Average of labour or intermediate input cost share (percent). **(b)** Share of firms whose national capital accounts for 50 percent or more of total capital.

THE REDISTRIBUTIVE EFFECTS OF VAT IN PORTUGAL*

*Cláudia Braz***

*Jorge Correia da Cunha***

"Em matéria de taxas, não foi possível adoptar a solução que, nos dias de hoje, vem merecendo, e com justas razões, uma clara preferência no plano estritamente técnico. É com efeito assente que, nesta matéria, os impostos gerais de transacções muito têm a ganhar e pouco a perder, com uma estrutura de taxas o mais simples possível – no limite com uma taxa única. Evitam-se assim não poucos problemas administrativos."

VAT Code preamble, 1986

"If an income tax is well designed, adding differential commodity taxation is likely to increase the ability to redistribute income little, if at all".

Stiglitz J., Economics of the Public Sector, 2000

1. INTRODUCTION

In economic terms, State intervention in a market economy may be made on a multitude of grounds. Overall, these may be related to efficiency or equity goals. Given a specific system of social preferences, its pursuance implies trade-offs that have to be carefully taken into account in the design of public policies.

State actions aimed at promoting equity may use a large number of instruments, with different costs in terms of efficiency and different effectiveness concerning redistribution. As a consequence, it is advisable to follow an overall approach, choosing a policy mix well suited for income redistribution, both on the revenue and expenditure sides.

Economic theory and the requirements for a good tax system suggest that taxation on consumption should not comprise several rates set down on the basis of redistributive concerns, given their sizeable efficiency and tax administration costs. However, Value Added Tax (VAT), which is the main tax on consumption in European Union Member-states and several other industrialized countries, has in most cases multiple rates, basically defined with the aim of ensuring that the tax is progressive, or at least not regressive.

* The opinions expressed in the article are those of the authors and do not necessarily coincide with those of Banco de Portugal or the Eurosystem. Any errors and omissions are the sole responsibility of the authors.

** Banco de Portugal, Economics and Research Department.

The objective of this paper is to analyse the impact of VAT in Portugal, in terms of redistribution. Section 2 briefly presents the main aspects of its introduction, working and receipt developments with a particular emphasis on the recent period. Section 3 analyses consumers' patterns of expenditure subject to VAT, by classes of goods and services, using the data compiled in the context of the 2005-2006 Household Expenditure Survey (HES). On the basis of the same information, Section 4 classifies VAT in Portugal according to its effects on the distribution of expenditure and income. In Section 5, the distributive impact of this tax *vis-à-vis* expenditure is broken down into its vertical, horizontal and reranking components. The conclusion is provided in Section 6.

2. VAT IN PORTUGAL

VAT was introduced in Portugal in 1986, in the context of the reform of taxation on goods and services. This change occurred before it was required by the conditions of Portugal's membership of the European Community. VAT, as prescribed by European directives, is a general tax on the consumption of goods and services, applied at each stage of production, whose legal incidence is on final consumers. Economic incidence, however, is split between producers and consumers, according to market conditions. Exports are not subject to VAT, as they are only taxed in the country of destination.[1] Imports are taxed on their overall amount. VAT replaced the Tax on Transactions and several other indirect taxes, and its introduction made it possible to achieve an increase in receipts by broadening the tax base and reducing tax fraud and evasion. The VAT code initially established four rates: 0 per cent, 8 per cent (reduced rate), 16 per cent (standard rate) and 30 per cent (increased rate). Additionally, several goods and services, such as medical services, were tax exempt. The decision not to adopt a single rate was to prevent the reform from having a regressive impact on income distribution. VAT rates have been changed several times since the introduction of the tax,[2] mainly to increase receipts, implement decisions at the European level and improve the competitiveness of several specific sectors. Presently, there are only three rates: the 5 per cent reduced rate, the 12 per cent intermediate rate and the 20 per cent standard rate. Over the last few years the standard rate was increased from 17 to 19 per cent (in mid 2002) and to 21 per cent (in mid 2005), in both cases in the context of fiscal programmes aimed at reducing the general government deficit. Only recently, in mid 2008, was the standard rate reduced to the current level.

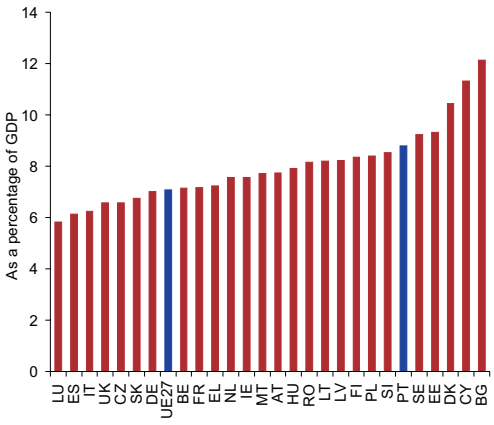
As in the remaining European Union Member-states, VAT in Portugal is one of the main sources of revenue. As illustrated in Chart 1, in 2007, Portugal had the sixth highest ratio of VAT receipts to GDP in the context of the Union. This outcome has been highly influenced by the high ratio of private consumption to GDP and also by the fact that the standard rate exceeds the European Union average (Chart 2). Chart 3 shows the evolution of VAT receipts from 1986 to 2008, as a ratio of both GDP and

(1) The definitive VAT regime in the European Union, to come into force on a date not yet established, is likely to rely on the origin principle.
(2) For a detailed description of changes to VAT rates from 1986 to 2002, see Rodrigues *et al.* (2002).

Chart 1

VAT RECEIPTS IN THE EU

2007

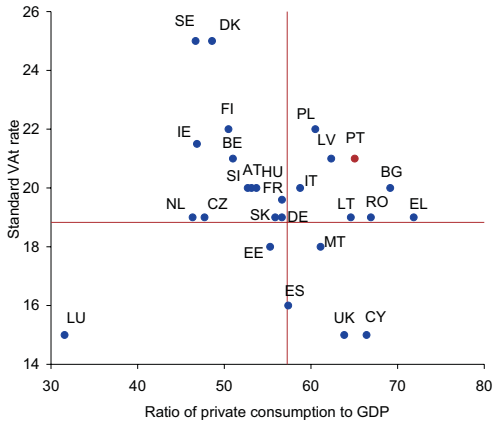


Source: European Commission (2009).

Chart 2

STANDARD VAT RATE AND THE RATIO OF PRIVATE CONSUMPTION TO GDP IN THE EU

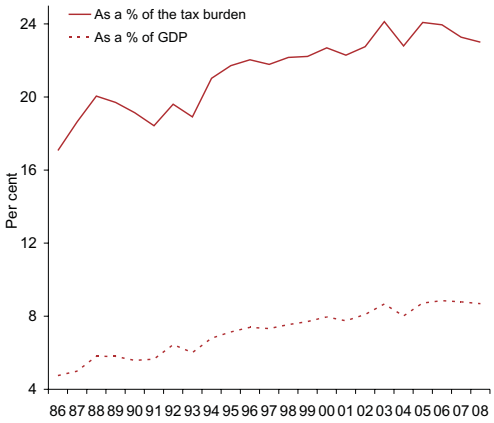
2007



Sources: European Commission (2009), Eurostat and authors' calculations.
Note: The lines represent the weighted averages for the EU as a whole.

Chart 3

VAT RECEIPTS IN PORTUGAL



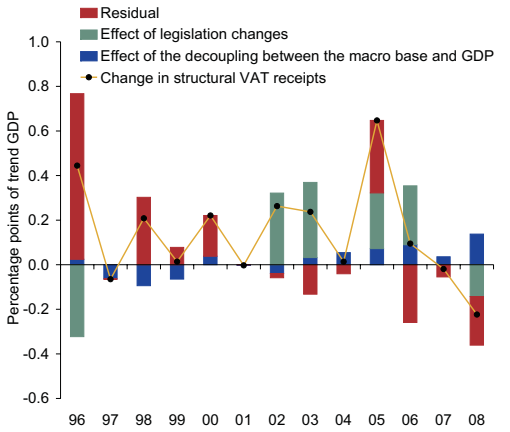
Sources: *INE* and authors' calculations.

the tax burden.[3] The upward trend of VAT proceeds is clear and mainly derives from changes to the rates, several structural developments in course in the economy and the increased effectiveness of tax administration. Regarding structural developments in the economy, the long-term trend of consumption patterns towards a rise in the share of goods and services taxed at the standard rate and the growing importance of large and medium-sized firms, less averse to fulfilling their tax obligations, are worth

(3) The definition of tax burden consists of the sum of the receipts from taxes on income and wealth, taxes on production and imports (including the amounts that are revenue of the Community budget) and social contributions, as recorded in the National Accounts.

Chart 4

BREAKDOWN OF THE CHANGE IN STRUCTURAL VAT RECEIPTS



Sources: *INE* and authors' calculations.
Note: For more details on the methodology used to calculate these contributions, see Kremer *et al*. (2006) and Braz (2006).

mentioning. As shown in Chart 4, from 1996 to 2008[4] the change in VAT structural tax revenue as a percentage of trend GDP not explained by changes to legislation and the discrepancy between the macroeconomic base (private consumption) and GDP developments was, in cumulative terms, positive.[5]

3. PATTERNS OF CONSUMPTION EXPENDITURE

The analysis of consumers' expenditure patterns set out in this paper is based on data compiled in the context of the 2005-2006 HES. This survey, implemented by the *INE*, covers a two-week period and aims at obtaining indicators on income distribution and the level and structure of expenditure of households resident in Portugal. It is a large scale survey, consisting of the records of all of the expenses of a sample of households over a two week period,[6] which are used to estimate figures for the whole year. Complete and valid data were collected for 10403 households. Representativeness is firstly ensured by the choice of the sample followed by a definition of the weights to be used in the extrapolation of the results to the universe. These have always been used in the analysis presented in this paper.

Consumer choices, in terms of the allocation of overall expenditure to the various classes of goods and services, are a function of their preferences and income and relative prices. Information on prices is not included in the set of variables collected in these surveys. Chart 5 shows the relationship between

(4) The analysis did not cover the 1986-1995 period owing to difficulties in quantifying the effects of changes to legislation.

(5) It should be noted that the negative residuals in 2006 and 2008 partly stem from an acceleration of refunds resulting from changes to administrative procedures, whose impact on revenue is impossible to quantify from the information available.

(6) The two-week period for data collection was established for frequent household expenditure, such as food. In order to take into account the less frequent acquisition of several goods and services, other periods were defined: i) a month, for regular expenses, such as rents, water, electricity, gas and others; ii) two months, for goods and services such as clothing and footwear whose frequency of acquisition exceeds a month; iii) a year, for durable goods and services such as appliances, furniture and personal transportation vehicles acquired infrequently.

Chart 5 (to be continued)

PERCENTAGE OF EXPENDITURE SUBJECT TO VAT BY CLASSES OF GOODS AND SERVICES

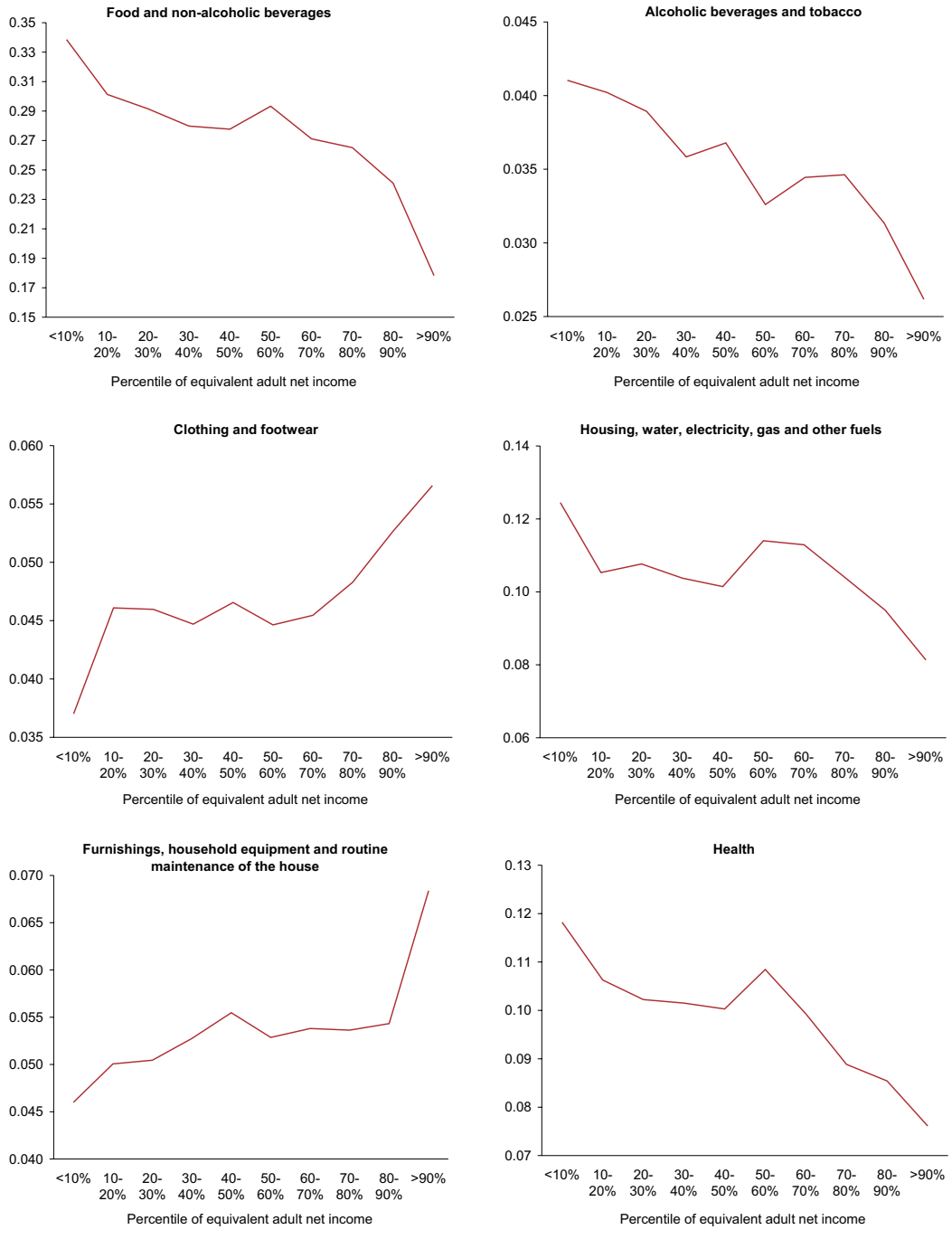
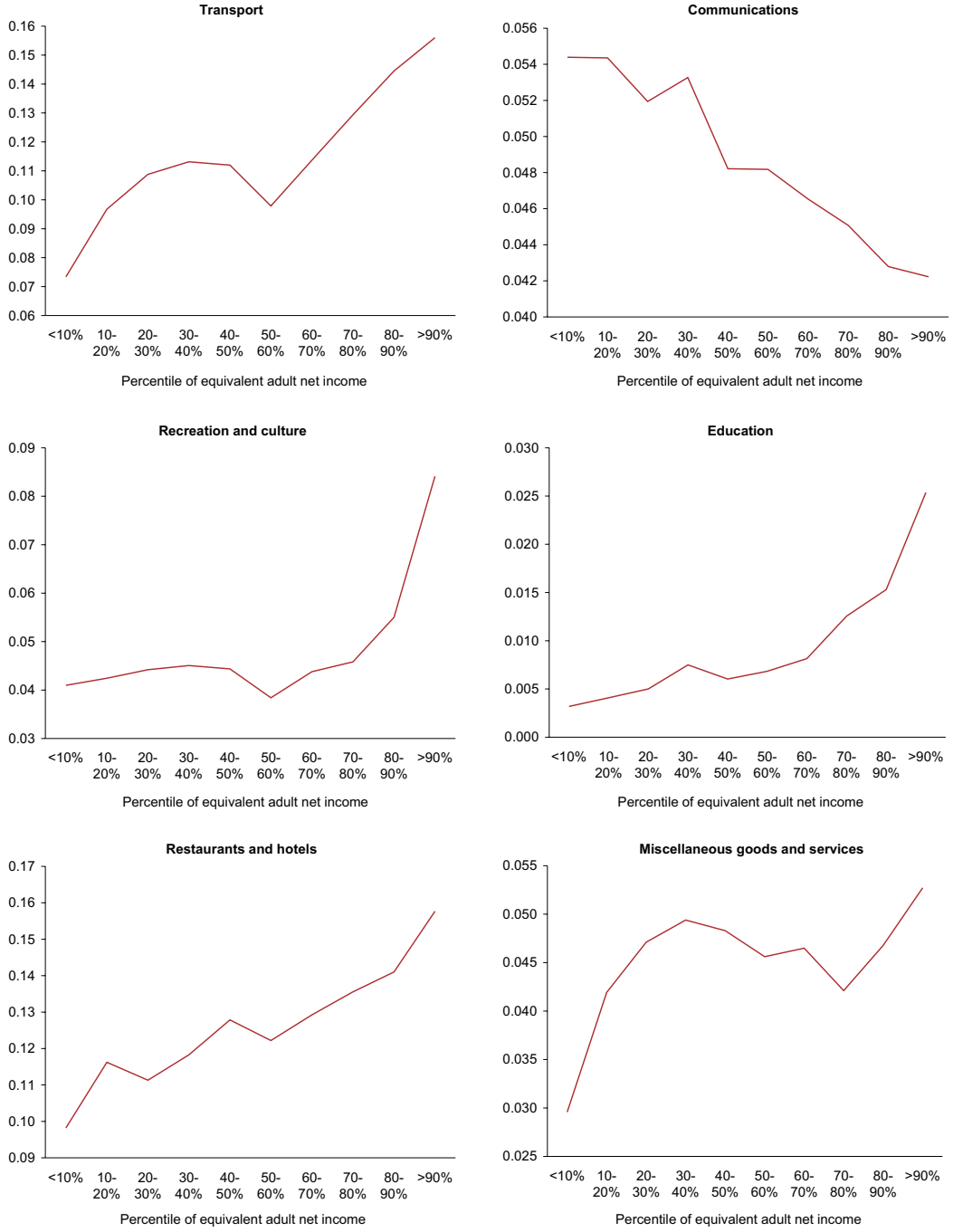


Chart 5 (continued)

PERCENTAGE OF EXPENDITURE SUBJECT TO VAT BY CLASSES OF GOODS AND SERVICES



Sources: *INE* and authors' calculations.

expenditure in several classes of goods and services (as a share of overall expenditure), and adult equivalent net income according to the HES information.[7] Bearing in mind that the objective of this paper is to analyse the distributive effects of the current structure of VAT in Portugal, the definition of expenditure considered excludes several goods and services such as rents, financial services, insurance and gambling, which are not subject to VAT. The concept of net income includes households' gross monetary income from labour, property and capital and social and private transfers net of taxes on income and social contributions. The calculation of adult equivalent net income uses the OECD's equivalence scale, which attributes a weight of 1 to the first household member, 0.7 to the remaining adults and 0.5 to each child (defined in this case as being up to 14 years old).

According to the results obtained and in line with economic literature, the share of expenditure on food and non-alcoholic beverages declines with the level of net income. In 2005-2006, the households in the first income decile spent, on average, 34 per cent of overall expenditure on food and non-alcoholic beverages, while in the highest income decile this proportion decreases to 18 per cent. The same pattern is observed for other classes, ranked according to the ratio to overall expenditure: health; housing, water, electricity, gas and other fuels; communications; alcoholic beverages and tobacco. Regarding the remaining categories, for which the proportion to expenditure increases with net income (restaurants and hotels; transport; recreation and culture; furnishings, household equipment and routine maintenance of the house; clothing and footwear; education; and miscellaneous goods and services), it is important to highlight that, in spite of the said relationship, in several cases the goods and services are exempt from VAT or subject to the reduced or intermediate rates. Thus, it is possible to conclude that the definition of the lists of exemptions and goods and services subject to the different VAT rates did not stem exclusively from distributive objectives, but sometimes resulted from other considerations, such as the fact of being merit goods or services.

4. REDISTRIBUTIVE ASPECTS OF THE CURRENT STRUCTURE OF VAT IN PORTUGAL

The analysis of the redistributive effects of the current structure of VAT in Portugal is also based on detailed information on household expenditure included in the HES. In this context, each expenditure category was assigned to the respective VAT rate, with the exception of the items not subject to this tax, to which reference has already been made. It is important to highlight that in the calculation of consumers' expenditure, excluding VAT, it is implicitly assumed that the economic incidence of the tax corresponds to its legal incidence, i.e. that there is no repercussion effect. In most cases,[8] the introduction of a tax on the consumption of a specific good generates a new equilibrium in the market, in which part of the tax burden is on producers, in a proportion which depends on the relative elasticities of demand and supply. This issue is not considered in the analysis set out in this paper. Four points are still worth

(7) The relationships shown approach the Engel curves defined in economic theory as relating consumers' optimal choices with the level of income, keeping prices unchanged. If the Engel curve has a positive (negative) slope the goods will be called normal (inferior). Normal goods may be classified as necessary goods, if the demand rises by a lesser proportion than income, and as luxury goods, in the opposite case.

(8) With the exception of the cases where the demand curve is perfectly inelastic or the supply curve is perfectly elastic, in which the entire tax burden is borne by consumers.

mentioning concerning this exercise. Firstly, the observations pertaining to the Autonomous Regions of the Azores and Madeira were excluded, as transactions in the said regions are subject to different VAT rates. Secondly, as the breakdown of expenditure in the HES is, in several cases, insufficient, it was necessary to use the shares resulting from the previous survey (2000 Households' Budgets Survey)[9] in several categories. Thirdly, the analysis is restricted to VAT, although the data are affected by other indirect taxes such as the Tax on Oil Products in the case of expenditure on fuels and Car Tax which is included in the amounts spent on the acquisition of new motor vehicles. As the available information does not allow an accurate estimate of these effects to be produced, they were not considered in the analysis. Lastly, in the HES, as data on household expenditure were collected between October 2005 and October 2006, the 21 per cent standard rate of VAT, then in force, was taken into account.

The classification of taxes on the basis of the respective redistributive effects is not straightforward. In theory, given a certain income level, a tax is proportional when the income elasticity of the tax is equal to one, progressive if it exceeds this value and regressive if the elasticity is less than one. It can be shown that this definition corresponds to assuming a tax as proportional, progressive or regressive depending in whether the marginal tax rate is equal to, higher or lower than the average tax rate. Apart from the usual difficulties associated with its implementation, this definition raises additional questions in the case of indirect taxation. The average tax rate can be defined as the ratio between the amount of indirect taxes and income $\left(\overline{T_I} = \frac{Tax}{Income}\right)$ or expenditure $\left(\overline{T_E} = \frac{Tax}{Exp.}\right)$. The classification of an indirect tax as far as redistributive effects are concerned is based on the analysis of how these average rates evolve with income.[10] Thus, an indirect tax is progressive, proportional or regressive relative to income if the respective average rate $\left(\overline{T_I}\right)$ increases, remains constant or declines along the distribution of income. Similarly, an indirect tax is progressive, proportional or regressive relative to expenditure if the relationship between the average rate $\overline{T_E}$ and income is rising, constant or decreasing. In this paper, the tax is VAT, expenditure used in the calculation of the average rate $\overline{T_E}$ is individual household expenditure excluding VAT, the denominator of $\overline{T_I}$ is households' net income and the distribution of income relevant for determining redistributive effects corresponds to net income per equivalent adult. It should also be noted that, in the case of the analysis of the progressivity/regressivity of indirect taxation to income, it would be more suitable to use gross income for the calculation of the average rate, as this would make it possible to conclude whether taxation on consumption strengthens or partially offsets the progressive effect of taxation on income. Data on gross income, however, were not included in available HES information.

Chart 6 presents the distribution of the number of households according to the average VAT rate. Most households (around 65 per cent) paid an average VAT rate of between 10 and 14 per cent, in 2005-2006. The median and the unweighted average of this distribution are quite similar at almost 12 per cent (the average rate weighted for each household's expenditure would have been slightly

(9) This procedure was adopted for the following expenditure categories: bread and bakery products, cookies and biscuits; other cereal products; sausages, dried, salted or smoked meat and offal; canned fish, crustaceans and shellfish, prepared and semi-prepared products; honey and sweet products based on fruits; salt and spices; prepared ferments and soups; television and radio fees and rental equipment for leisure and culture.

(10) Income is the most frequently used tax base, as it is a good proxy of the ability to pay and the welfare level of households. Several authors, however, consider that consumption is a fairer tax base as it corresponds to what individuals take out of society. The difference between the two alternative tax bases is not clear cut when lifetime income is the focus of the analysis, as it often happens in the literature.

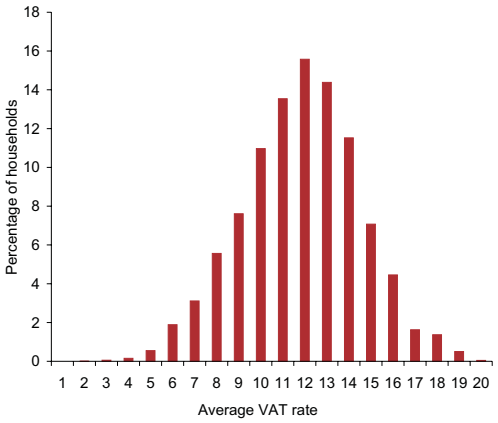
higher). It should be noted that this average tax rate may differ from the rate implicit in the economy as a whole, as it only takes into account the VAT paid by households. Both firms and general government sectors cannot deduct VAT as final consumers and on the production of exempt goods and services, whose amounts are not considered in this analysis.

Chart 7 shows the proportion of expenditure, net of VAT, by rates for equivalent adult net income deciles in the HES. According to the results obtained, the proportion of expenditure subject to the reduced rate of VAT declines with the increase in equivalent adult net income and the said proportion which is subject to the standard rate rises. In the first income decile, the proportions of expenditure subject to reduced and standard rates total 43 and 37 per cent, respectively, and in the last income decile are 29 and 47 per cent. The share of exempt expenditure in terms of overall expenditure is reasonably constant along income distribution, with the exception of the highest incomes in which there is a minor increase. This result probably stems, to a large extent, from the above referred to expenditure pattern on education. The proportion of consumption subject to the intermediate rate is very stable over income distribution as a whole. This analysis overall suggests that VAT is slightly progressive relative to expenditure although Chart 7 does not allow a clear cut conclusion to be drawn in respect of income. This hypothesis is confirmed by Chart 8 which shows a positive relationship between the average VAT rate (calculated in relation to expenditure net of this tax) and equivalent adult income, with the exception of the first income decile on which VAT appears to be proportional.

The analysis of VAT's progressivity/regressivity relative to income is illustrated by Chart 9, which presents the relationship between the average tax rate, defined as being VAT as a percentage of household net income, and equivalent adult net income. Although VAT is clearly regressive when passing from the first to the second income decile, this result may, in several cases, be influenced by very low stated net monetary incomes, in particular given the respective household expenditure. Regressivity is still

Chart 6

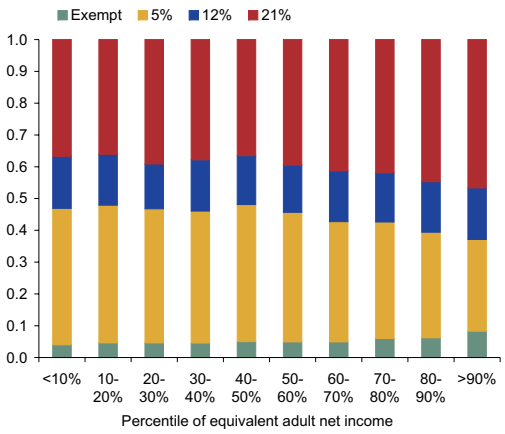
DISTRIBUTION OF THE NUMBER OF HOUSEHOLDS BY AVERAGE VAT RATE



Sources: *INE* and authors' calculations.

Chart 7

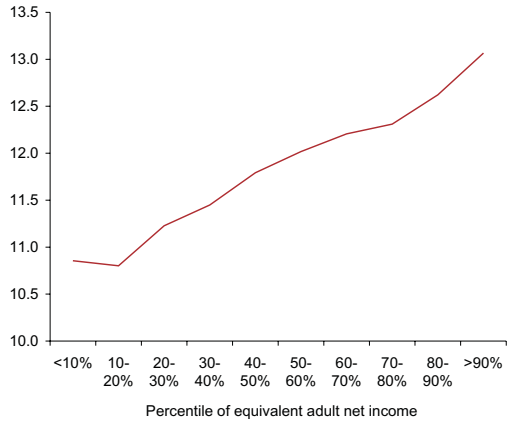
BREAKDOWN OF EXPENDITURE (NET OF VAT) BY VAT RATES



Sources: *INE* and authors' calculations.

Chart 8

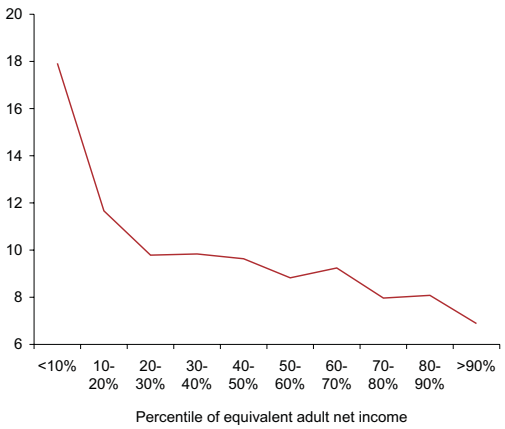
AVERAGE VAT RATE AS A RATIO TO EXPENDITURE (NET OF VAT)



Sources: *INE* and authors' calculations.

Chart 9

AVERAGE VAT RATE AS A RATIO TO NET INCOME



Sources: *INE* and authors' calculations.

present in the remaining distribution, although attenuated (with cases of proportionality between several income deciles). This result is in accordance with the assumption of an average propensity to consume declining with the level of income, which partially offsets the progressive nature of VAT in relation to expenditure. The average propensity to consume ranges between 1.75 and 0.58 in the first and last income deciles, respectively.

As already mentioned, policy instruments aimed at promoting equity in a given economy should be analysed as a whole. The results obtained in this paper suggest that the VAT system currently in force in Portugal is not an effective instrument for complementing the redistributive policy, which is mainly based on taxes on income and social transfers. A differentiated structure of VAT rates substantially reduces the efficiency gains associated with obtaining an important part of tax revenue through taxes on consumption, without contributing significantly to redistribution.[11] This prospect is in line with the results obtained by Correia (2010) who concludes, in a general equilibrium context, that a tax on consumption with a single rate, combined with a lump-sum transfer to households, may be used jointly with a tax on labour income also with a single rate to generate a certain level of tax revenue, without efficiency costs and with gains in terms of equity.

The redistributive effects of VAT in Portugal have already been analysed in two previous studies: Albuquerque and Neves (1994) and Rodrigues *et al.* (2002). In the first case, the authors used the data of the 1990 Households' Budgets Survey and the study was more comprehensive as it also focused on other indirect taxes such as the Tax on Oil Products and the Tax on Tobacco. These authors concluded that VAT was clearly progressive in relation to expenditure and to income when the first quartile of dis-

(11) Only assuming independent demands it would be possible to minimise the deadweight loss associated with consumption taxation based on different rates, as long as the goods with a more inelastic demand were more heavily taxed, as for example is the case of food. This would be, however, the opposite of what is intended in terms of redistribution.

posable income was excluded. In the second case, the authors used the 2000 Households' Budgets Survey and focused only on VAT. Their main conclusions confirm the results of Albuquerque and Neves (1994) concerning the progressivity of VAT when the tax burden relative to expenditure is considered. In relation to income, however, they classify the tax as regressive, in line with the results now obtained.

5. BREAKDOWN OF THE REDISTRIBUTIVE EFFECTS OF VAT IN PORTUGAL

In practice, the tools and indicators used to measure the redistributive effects of taxation are quite diverse. The Lorenz curve, which represents the relationship between the distribution functions of population and income, has, over the last few decades, been the most widely used graphical tool for visualising and comparing income inequality. The measurement of the distance between the Lorenz curve and the line of perfect equality in income, for each proportion of population and income, is very useful and is the basis for the Gini index concept. This index represents twice the area between the line of perfect equality in income and the Lorenz curve and, as such, is zero in the case of perfect equality in the distribution of income and is equal to one when maximum inequality occurs. Over the years, several indexes for the evaluation of progressivity in taxation, based on these concepts, have been suggested and used (see Kiefer (1984) for a description and critical assessment of the different progressivity indexes). Most of these indicators focus on the comparison between the Gini indexes before and after taxation or between the Gini indexes before taxation and for the tax itself.[12] Reference should be made to the fact that the definition and interpretation of these indicators are useful for assessing the progressivity of VAT relative to expenditure but do not make it possible to determine the effect of indirect taxation on the distribution of income, a topic also important in the context of this paper.

These indicators include, *inter alia*, the Reynolds-Smolensky index (1977), which states that the redistributive effect of a taxation structure may be measured by the difference between the before and after tax Gini indexes, i.e. $L = G_y - G_x$ (where G_y is the before tax Gini index and G_x is the after tax Gini index). The results for equivalent adult expenditure before and after VAT, based on the HES data, are presented in Table 1. The inequality in the distribution of expenditure including VAT is slightly higher than that before VAT, which confirms the classification of this tax as slightly progressive in relation to expenditure. In statistical terms, the difference in inequality is significant, as it is considerably higher than two standard deviations.

The work performed by Aronson *et al.* (1994) allows the breakdown of the redistributive effect of taxation, measured by the Reynolds-Smolenksy index, into three components: vertical, horizontal and reranking. The vertical component measures the redistributive effect of taxation deriving from the ascription to each household of the average tax rate paid by similar households in terms of expenditure

(12) The use of the Gini index as a measure of inequality has been criticised in the literature. In particular, since the work of Atkinson (1970), the implications of the Gini index in terms of social welfare have been analysed. The Gini index, however, continues to be generally used in empirical studies.

Table 1

REYNOLDS-SMOLENSKY INDEX

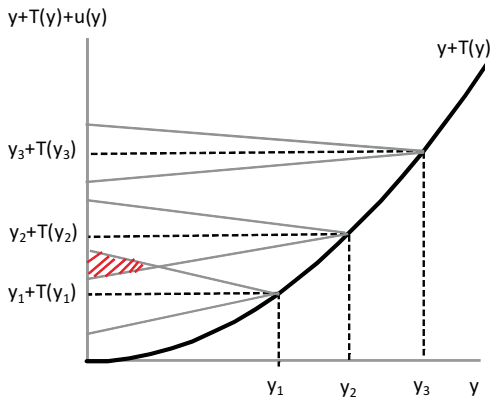
	Gini index before VAT (Gy)	Standard deviation of Gy	Gini index after VAT (Gx)	Redistributive effect (L=Gy-Gx)
HES (2005-2006)				
Equivalent adult expenditure	0.362046	0.000155	0.367175	-0.005129

Source: Authors' calculations.
Note: The Gini indexes and respective standard deviations were calculated using DASP software developed by Araar and Duclos (2009).

before VAT. The horizontal inequality is related with the "unequal treatment of equals", i.e., households with the same level of expenditure which are subject to different average tax rates. Reranking refers to the "unequal treatment of unequals", i.e. the ordering of households on the basis of expenditure levels before tax may be changed as a result of the taxation system. Actual redistribution is affected by the horizontal and reranking effects, which are unwelcome from a social planner's viewpoint. Fairness in the relative treatment of individuals through the taxation system is one of the five desirable characteristics of a taxation system as presented in the literature.[13] Chart 10 is based on the referred to paper and is quite useful to understand this breakdown. Let T_i be the tax function of a household i with expenditure y which assumes the following expression $T_i = T(y) + u_i(y)$, where $\frac{T(y)}{y}$ is increasing, $T'(y) > 1$ and $u_i(y)$ is a disturbance term having zero mean at each expenditure level. This type of tax introduces "unequal treatment of equals" through the disturbance term, represented in the chart by the fans. It may also generate a reranking effect, which occurs in the chart when the two fans overlap. Indeed, in this case, the before tax ranking of households 1 and 2 may be reversed after tax.

Chart 10

ILLUSTRATION OF THE BREAKDOWN OF THE REDISTRIBUTIVE EFFECTS OF TAXATION



Source: Based on Aronson *et al.* (1994).

(13) The other four characteristics of a good taxation system are: efficiency, administrative simplicity, flexibility to cater for different economic circumstances and political responsibility (Stiglitz J. (2000)).

In the context of taxation on income, horizontal and reranking effects stem from the existence of different tax benefits that depend on individuals' personal characteristics, not related with income levels, or which are subject to specific thresholds. In the case of indirect taxation, these effects result from the fact that households with the same level of expenditure do not necessarily have the same structure of consumption of goods and services, even adjusting for different household compositions, and the tax has several rates.

According to Aronson *et al.* (1994), in a population split into N classes $(k = 1,\ldots,N)$, such that in each class households have similar expenditure levels before tax (y_k), ordered increasingly, $(y_1 < y_2 < \ldots < y_N)$, the overall redistributive effect may be expressed as: $L = \left(G_y - G_0\right) - \sum_{k=1}^{N} \theta_k G_k - R$, where G_0 represents the Gini index for after tax expenditure obtained with the replacement of the after tax expenditure by a new one obtained through the use of the average tax rate of the class; θ_k is the product of population and expenditure shares of class k; G_k is the Gini index of expenditure of class k; and R is the reranking effect.[14] The first two terms measure vertical redistribution, V, and horizontal inequality ("unequal treatment of equals"), H, respectively. According to Atkinson (1979) and Plotnick (1981), the reranking effect, R, may be measured as $R = G_x - C_x$, where C_x is the Gini index of after tax expenditure based on the ordering of the distribution of the before tax expenditure. Thus, $L = V - H - R$.

In practice, the fact that identical before tax expenditure among households is not observed implies that the above mentioned breakdown cannot be applied directly. This question was studied in depth by van de Ven *et al.* (2001). The authors concluded that the use of arbitrary classes of almost-equals produces misleading results. The analysis showed, however, that the increase in the bandwidth of almost-equals classes has two effects, one that improves and another that worsens the actual estimate for the redistribution effect. Owing to the decrease in the number of classes, the averaging of before tax expenditure of almost-equals classes reduces the degree of breach of the progressivity assumptions underlying the effective tax schedule (with an increase in H and R and, consequently, in V). On the contrary, the inclusion of more differentiated households into close-equals classes implies that increasing proportions of V and R observed in a given sample population are attributed to H (the effect on H is, as such, undetermined). The combination of the two effects suggests that there is an optimal bandwidth for almost-equals classes that minimises the error associated with the estimate of the effective tax schedule. In practice, this one may be obtained through the maximisation of the estimate derived for V. After this step, the reranking measure, R, may be calculated directly from the non-grouped values and the horizontal effect may be finally derived from $H = V - R - L$.

The results of the application of this methodology to VAT in Portugal, using the HES information, are presented in Table 2. The relevant bandwidth for the definition of the almost-equals classes, obtained from the maximisation of the vertical redistributive effect, is 50 euros on an annual basis. The fact that the bandwidth is quite small means that the averaging benefits diminish reasonably quickly relative to

(14) If classes of almost-equals are used, as must necessarily be the case with the applications to survey data, the formula presented has to be slightly modified, as described in van de Ven *et al.* (2001). In particular, G_y is obtained through the replacement of before tax expenditure by the unweighted average of each class.

Table 2

RESULTS OF THE BREAKDOWN OF THE REDISTRIBUTIVE EFFECTS OF VAT

	L	V	% de L	100H	% de L	100R	% de L
HES (2005-2006)							
Equivalent adult expenditure	-0.0051	-0.0050	96.8	-0.0017	-0.3	0.0181	3.5

Source: Authors' calculations.
Note: The calculations used DASP software developed by Araar and Duclos (2009).

the increase in costs from the inclusion of heterogeneous households in terms of expenditure in the different classes. According to the values obtained, the VAT horizontal effect is very small, not contributing significantly to the reduction of the overall redistributive effect (the contribution accounts for no more than -0.3 per cent). Similar households in terms of before tax expenditure are not expected to be subject to different actual VAT rates. The reranking effect is more important, as 3.5 per cent of the overall redistributive effect in 2005-2006 stems from the fact that the ranking of households with different before tax levels of expenditure is modified as a result of VAT. As a whole, these results show that the progressivity of VAT relative to expenditure is not particularly affected by adverse factors in terms of the relative fairness of a tax system.

6. CONCLUDING REMARKS

Distribution issues related with VAT in Portugal have always been relevant and have justified the option for several rates at the time of the introduction of this tax. Additionally, the fact that VAT has frequently been used as a key fiscal policy instrument over the last few years has made a thorough assessment of its distributive effects even more important. The analysis performed in this paper is based on the information compiled in the context of the HES and aims to evaluate the progressivity/regressivity of VAT, with the structure in force in 2005-2006.

Regarding consumption patterns, the results obtained for the relationship between the share of expenditure and net income distribution for classes of goods and services are, in most cases, in line with economic theory predictions. The relationship is negative in the case of goods such as food and positive for services such as recreation and culture and restaurants and hotels. It is also important to highlight that in the case of several services which are exempt or taxed at the reduced or intermediate VAT rates, particularly education, there is a positive relationship between the share of expenditure and the level of income. This outcome suggests that reasons other than distribution issues, such as the fact of being merit goods, may have been relevant to the definition of the lists of goods and services exempt or subject to the different VAT rates.

VAT appears to be a slightly progressive tax relative to expenditure, with the exception of the first and second income deciles, in which it is highly likely to be proportional. This result is confirmed by the Reynolds-Smolensky index, which evidences a statistically significant negative value. Relative to income, VAT appears to be clearly regressive from the first to second income deciles, though this out-

come may be affected by very low stated monetary net incomes, given expenditure levels. Regressivity is still present for the remaining distribution of net income, though mitigated (with several cases of proportionality between income deciles). As the multi-rate structure of VAT implies sizeable administration costs and substantially limits the efficiency gains associated with the change in the tax burden in favour of consumption taxation, income redistribution should be predominantly pursued using other tools such as direct taxation and social transfers.

Lastly, an analysis based on the breakdown of VAT's distributive effects relative to expenditure into its vertical, horizontal and reranking components was performed. The objective was to examine whether the horizontal and reranking effects, undesirable in terms of the fairness of the tax system, were important in the case of VAT in Portugal. The conclusion was that presently these effects are minor, and as such may be disregarded.

REFERENCES

Albuquerque, R. and Neves, P. (1994), "Efeitos redistributivos da tributação indirecta em Portugal", Banco de Portugal, *Boletim Trimestral*, vol. 16, Setembro/Dezembro, pp. 43-56.

Araar, A. and Duclos, J. (2009), "DASP: Distributive Analysis Stata Package (version 2.0)", Université Laval, PEP, *CIRPÉE and World Bank*.

Aronson, J., Johnson, P. and Lambert, P. (1994), "Redistributive effect and unequal tax treatment", *Economic Journal*, vol. 104, pp. 262-70.

Atkinson, A. (1970), "On the measurement of inequality", *Journal of Economic Theory*, vol. 2, pp. 244-263.

Atkinson, A. (1979), "Horizontal equity and the distribution of the tax burden", *The Economics of Taxation*, Brookings Institution, Washington, pp. 3-18.

Braz, C. (2006), "The calculation of cyclically adjusted balances at Banco de Portugal: an update", Banco de Portugal, *Economic Bulletin*-Winter, vol. 12, pp. 75-94.

Correia, I. (2010), "Consumption taxes and redistribution", *American Economic Review*, forthcoming.

European Commission (2009), *Taxation trends in the European Union*, European Commission.

Kiefer, D. (1984), "Distributional tax progressivity indexes", *National Tax Journal*, vol. XXXVII, pp. 497-513.

Kremer, J., Braz, C., Brosens, T., Langenus, G., Momigliano, S. and Spolander, M. (2006), "A disaggregated framework for the analysis of structural developments in public finances", ECB *Working Paper*, 579.

Plotnick, R. (1981), "A measure of horizontal inequity", *Review of Economics and Statistics*, vol. 63, pp. 283-287.

Reynolds, M. and Smolensky, E. (1977), "Post-fisc distributions of income in 1950, 1961 and 1970", *Public Finance Quarterly*, vol. 11, pp. 109-120.

Rodrigues, C., Parente, P. and Bago d'Uva, T. (2002), "Efeito Distributivo do aumento da taxa normal do IVA", Direcção Geral de Estudos and Previsão do Ministério das Finanças, *Documento de Trabalho* nº 30.

Stiglitz J. (2000), *The economics of the public sector*, (third edition), W. W. Norton and Company eds, New York/London.

van de Ven, J., Creedy, J. and Lambert, P. (2001), "Close equals and calculation of the vertical, horizontal and reranking effects of taxation", Oxford *Bulletin of Economics and Statistics*, vol. 63, nº 3, pp. 381-394.

DATA REVISIONS: THE CASE OF PORTUGUESE EXPORTS AND IMPORTS*

*Fátima Cardoso***

*Cláudia Duarte***

1. INTRODUCTION

Export and import data are of paramount importance for macroeconomic analysis on different areas (such as national accounts or balance of payments) and even more so in a small open economy as Portugal. As most economic data, international trade statistics undergo revisions. The existence of revisions may have implications, not only for economic analysis, but also for policy decisions, as revisions may alter the current assessment and forecasts of economic developments. In this article we analyse revisions to total goods export and import series, in nominal terms, released by *Instituto Nacional de Estatística* (*INE*). Assessing these revisions required collecting the underlying series as they were released in each period (or *vintage*) - in other words, it required compiling a *real-time* database.

Since revisions add uncertainty to data analysis, one may be tempted to see data revisions as a "bad thing". However, this is not necessarily so. To understand why, one should bear in mind that the main goal of revisions is to improve the quality of preliminary figures, as latter estimates should move closer to the "truth". Since there is a trade-off, inherent to statistical production, between timeliness of releases and a more complete coverage of source data, one of the reasons for revisions of official statistics is the incorporation of new and more complete information, which only becomes available after the first release of the data. Moreover, subsequent releases also present an opportunity to correct errors, in the raw data or in computation. Therefore, series that do not undergo revisions should not be seen, *a priori*, as of higher quality than series that are revised.

Revision analysis consists in gauging data revisions and understanding its behaviour. For example, Croushore and Stark (2001) describe the properties of the revisions to several time series for the United States. For the United Kingdom, Meader (2007) and George (2005) present an analysis of revisions to GDP growth and its components, while Turner (2005) uses balance of payments quarterly data. McKenzie (2006) analyses the revisions to some economic activity indicators for OECD countries and a few selected non-member economies. BCE (2009) presents summary measures for revisions to first GDP estimates and its components, for the euro area and the six largest euro area economies. Similarly, Kholodilin and Siliverstivs (2009) assess the quality of early releases of German

* The authors thank Ildeberta Abreu, Nuno Alves, Sónia Cabral, Mário Centeno, Paulo Esteves, Ricardo Félix, Ana C. Leal and António Rua for useful comments and suggestions. The opinions expressed in the article are those of the authors and do not necessarily coincide with those of Banco de Portugal or the Eurosystem. Any errors and omissions are the sole responsibility of the authors.

** Banco de Portugal, Economics and Research Department.

national accounts data. For Portugal, José (2004) presented a set of summary statistics of revisions to quarterly national accounts data.

Instead of measuring accuracy (i.e., how close early estimates are from the underlying "true" values), revision analysis examines the reliability of early releases as estimates of the final values (Meader (2007)). For first estimates to be reliable, revisions should be "well-behaved", as Aruoba (2008) put it. The main features of "well-behaved" revisions are: (i) the mean of the series should not change because of revisions, so revisions should have zero mean; (ii) the volatility of the series should not be greatly affected by the volatility of revisions, so the standard deviation of revisions should be small, compared to the standard deviation of the revised series; and (iii) given the information available at the time of the initial estimate, revisions should not be predictable, that is, revisions should add news instead of reducing noise (see, among others, Mankiw and Shapiro (1986) and Faust *et al*. (2005)).

This analysis is a crucial step for assessing the impact of revisions on different areas, such as: model specification and forecasting (Koenig *et al*. (2003) and Cardoso and Duarte (2009) consider simple, single equation models, while a Kalman filter framework is used by Kishor and Koenig (2005) and Jacobs and van Norden (2007), among others); alternative detrending methods (Orphanides and van Norden (2002) and Döpke (2004)); information criteria for model selection (Stark and Croushore (2002)); and, robustness of well-established results reported on major macroeconomic studies to real-time databases (Croushore and Stark (2003)).

As "revision" is a wide concept, there are different types of revisions, determined by the events that give rise to the revisions. For example, regular or information-based revisions result from incorporating more (but less timely) source data, while benchmark revisions reflect methodological changes (see McKenzie (2006) for a summary list of reasons for revisions of official statistics). Assuming that current concepts, classifications and methodologies are the most relevant for economic analysis and policy decisions, benchmark revisions were not included in this analysis. In particular, this article aims at describing regular revisions to Portuguese export and import data, being presented some empirical evidence on revisions to year-on-year rates of change, from the first release to one year after.

The remainder of this article is organised as follows. In Section 2, we describe the real-time database used. In Section 3, data revisions to export and import data are analysed. Finally, Section 4 concludes.

2. REAL-TIME DATABASE

The series under analysis in this article refer to monthly data of total exports and imports of goods released by *INE* on a monthly basis. These series cover both intra-community trade (data mainly obtained from the Intrastat questionnaire) and extra-community trade (data obtained from customs declarations). In order to analyse the revisions to these series, we constructed a real-time database containing a collection of vintages of export and import data. Following Croushore and Stark (2001), we call vintage the latest data series available at a particular date.

The first estimate of exports and imports for each month (only aggregates) is available 40 days after the end of the reference month, being released in the context of the Special Data Dissemination Standard (SDDS).[1] The second estimate is released 70 days after the end of the reference month in the international trade statistics publication, which includes more detailed data disaggregated by product and by country. Subsequent estimates are available with an additional 30-day lag, as ensuing international trade statistics publications are released (the third estimate is released 100 days after the end of the reference month, the fourth estimate is released 130 days after the end of the reference month, and so on and so forth). Currently (since August 2009), the SDDS estimate is also released under the designation of flash estimate in the international trade statistics publication. This means that the first estimate for a given month (m) is released at the same time (and in the same publication) as the revised series up to the previous month $(m-1)$.

The international trade statistics publication includes data for the reference year (t) and for the 12 months of the previous year $(t-1)$. For example, flash estimates apart, the publication released in September 2007 includes data for the period from January 2006 to June 2007 and the publication released in April 2008 includes data since January 2007 up to January 2008 (Table 1).

Since data referring to the year t are usually no longer released from April $t+2$ onwards (when the second estimate for January $t+2$ is released), the monthly values for year t released in March $t+2$ are assumed to be the latest data for this period. Therefore, the number of potential revisions to figures for each month of the year varies according to the month of reference, ranging from a minimum of 13 times (in the case of December) to a maximum of 24 times (for January).

Our real-time data set includes vintages from March 2006 to August 2009, covering the period from January 2004 onwards.[2] The time series only go as far back as January 2004 because in September 2005 the methodology underlying the compilation of international trade statistics (namely its intra-community component) changed. The series compiled according to the new methodology are available only from January 2004 onwards.

Before this change in the methodology, the intra-community trade component consisted in values declared by firms, through the Intrastat declarations received until the closing date for publication. As more declarations were received, new data were incorporated in subsequent releases. This methodology hindered the use of rates of change implicit in each publication, as values for different periods were not comparable (in general, the values for more recent periods were underestimated, reflecting a shorter data collection period and a lower coverage).

The main changes introduced by the new methodology were the inclusion of non-response and *below-threshold*[3] estimates (for more details on the methodology, see *INE* (2007) and *INE* (2006)). So, instead of referring to declared figures only, international trade statistics have currently a broader cov-

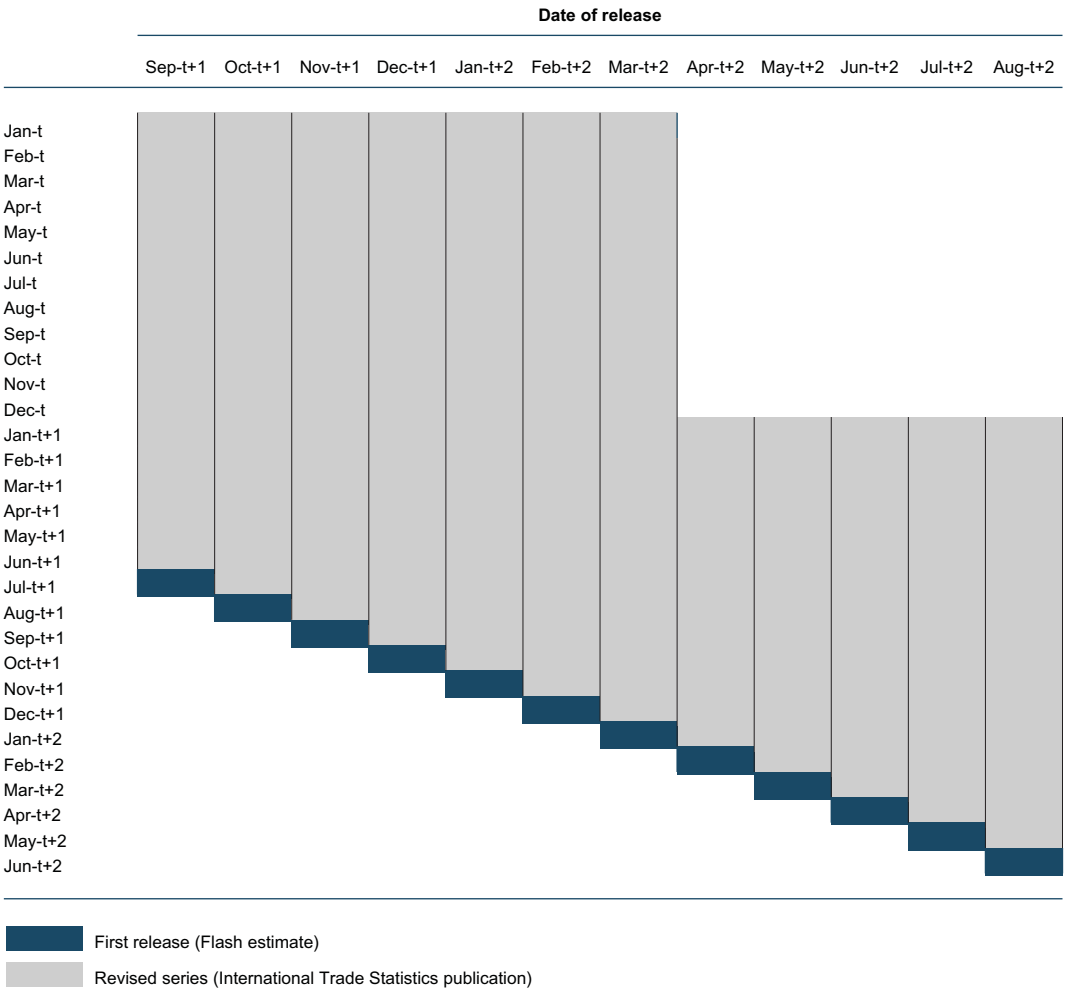
(1) The SDDS was established by the International Monetary Fund (IMF) in order to guide countries in the dissemination of their data to the public.

(2) Implicitly in the following analysis, we consider data available in March 2006 *vintage* (from January 2004 to January 2006) as first estimates. Although estimates from January 2004 to December 2005 are of a slightly different nature (in particular, when compared with January 2006 first estimate) including them in the analysis does not qualitatively change the results.

(3) Intrastat declarations are not mandatory for firms with an yearly transaction value inferior to a certain threshold.

Table 1

PATTERN OF RELEASES



erage. Revisions to these figures may occur as non-response estimates are replaced by actual data reported by firms or additional information (for example, correcting errors) is included.

To sum up, our real-time database contains 42 vintages, the first one containing data for the period from January 2004 to January 2006, and the last one from January 2004 to June 2009.

3. REVISION ANALYSIS

Let X_t^i be the estimate for period t of vintage i. Then, the revision to the estimate for period t, after j vintages is as follows:

$$r_t^{i,j} = X_t^{i+j} - X_t^i \qquad (1)$$

Given this general definition, several types of revisions can be calculated, depending on the kind of data considered (for example, levels, month-on-month rates of change rates, or year-on-year rates of

change), on its periodicity (monthly, quarterly, annual), and on the vintages used (from first estimate up to the latest vintage).

In particular, this article focuses on revisions of year-on-year rates of change. First of all, using rates of change is a common procedure when series are non-stationary. Moreover, year-on-year rates of change are typically used in Portuguese short-term economic analysis, in particular for the assessment of developments in exports and imports. The year-on-year rates of change smooth seasonality and other monthly fluctuations. Adding to the monthly frequency (which is the release frequency of the data) quarterly data are also analysed. Quarterly frequency is widely used for the assessment of global economic developments and forecasting, especially on short-term analysis, as many summary indicators are calculated on a quarterly basis. Another argument in favour of including the quarterly frequency in the analysis is that, in the case of a small open economy like Portugal, export and import developments play a central role on the evolution of economic activity, which is depicted in the main aggregates of quarterly national accounts.

As year-on-year rates of change contribute to mute revisions when compared to month-on-month rates of change (for more details, see Cardoso and Duarte (2009)), revisions to year-on-year rates of change of quarterly data are also smoother than revisions to monthly year-on-year rates of change. Bearing in mind the relation between quarterly year-on-year rates of change $\left(yoyq_{\tau} \right)$ and monthly year-on-year rates of change $\left(yoym_{t} \right)$, the relation between revisions to both rates is as follows:

$$
\begin{aligned}
r_{\tau}^{i,j} &= yoyq_{\tau}^{i+j} - yoyq_{\tau}^{i} \\
&= \sum_{m=0}^{2} \left(yoym_{t-m}^{i+j} - yoym_{t-m}^{i} \right) . \frac{X_{t-12-m}^{i}}{\sum_{h=0}^{2} X_{t-12-h}^{i}} \\
&+ \sum_{m=0}^{2} yoym_{t-m}^{i+j} . \left(\frac{X_{t-12-m}^{i+j}}{\sum_{h=0}^{2} X_{t-12-h}^{i+j}} - \frac{X_{t-12-m}^{i}}{\sum_{h=0}^{2} X_{t-12-h}^{i}} \right)
\end{aligned}
\qquad (2)
$$

where τ refers to quarters and t to months. So, revisions to $yoyq_{\tau}$ are equal to a weighted average of revisions to the respective $yoym_{t-m}$ (m=0,1,2) plus a correction term accounting for the revisions of the weights of each month in the respective quarter. If the relative weights of each month in the quarter of reference do not significantly change from vintage to vintage, then revisions to quarterly year-on-year rates of change can be roughly seen as weighted averages of revisions to monthly year-on-year rates of change of the three months of the respective quarter, from vintage i to vintage $i + j$.

In the case of quarterly data, the first estimate for each quarter is obtained from data for the vintage released when the last month of that quarter is released, the second estimate corresponds to data for the vintage released 3 months later, and so on. This means that only the vintages with data up to March, June, September and December (first releases) are considered. Therefore, the first quarterly estimate results of more mature versions than the corresponding aggregation of monthly first estimates for that quarter as it includes revised values for the first and second months of the quarter. In addition to the ag-

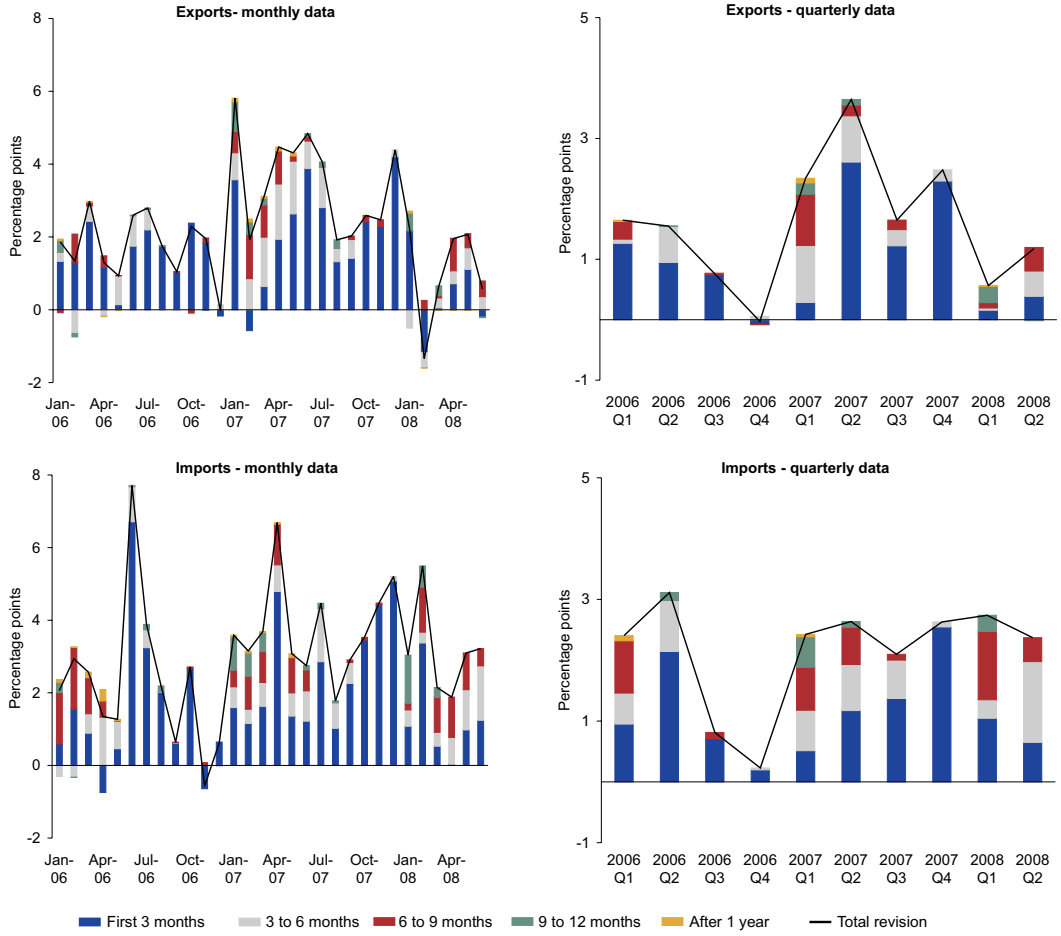
gregation process, this also helps to explain why it is reasonable to expect revisions to quarterly data to be smoother than revisions to monthly data.

Chart 1 displays revisions to previous estimates (previous month, in the case of monthly data, and previous quarter, for quarterly data). This plot shows that the majority of revisions takes place in early releases. On average, both for monthly and quarterly data, at least 60 per cent of total revision occur in the first three months after the first release, both for export and import data. The magnitude of monthly and quarterly revisions occurring from 9 to 12 months after the first release is quite small compared to the total revision (less than 10 per cent, both for exports and imports), and the revisions after one year are negligible. Therefore, since data in the latest vintage are in different stages of the revision process, we considered one-year estimates as final estimates.

Now, we proceed into the characterization of the cumulated revisions to year-on-year rates of change since the first release, up to the ‘‘final’’ estimate (one year later). In order to ensure comparability and consistency throughout the analysis, all calculations were made considering a fixed window of esti-

Chart 1

REVISIONS TO YEAR-ON-YEAR RATES OF CHANGE OF EXPORTS AND IMPORTS



Sources: *INE* and authors' calculations.
Note: Revisions *vis-à-vis* previous estimates.

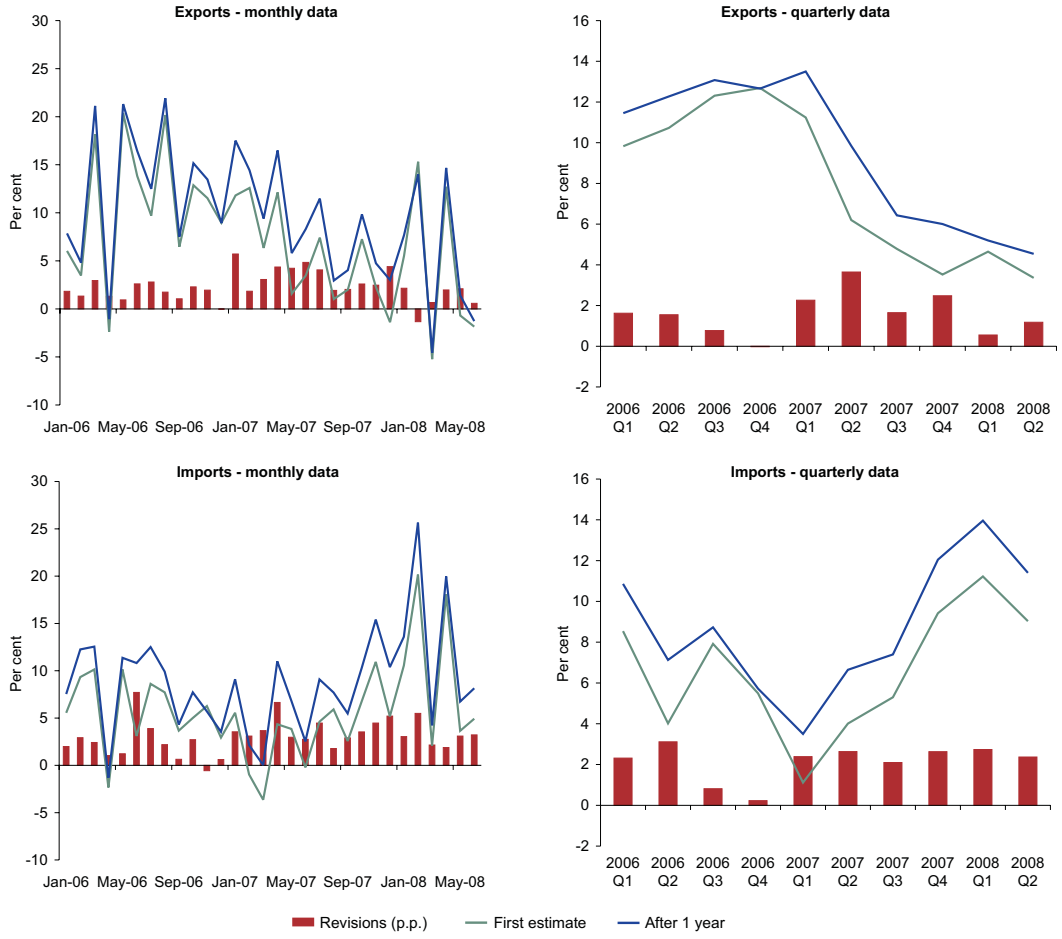
mates (that is, the same number of observations). Hence, the revision series used end in June 2008 (42 observations in the case of monthly data, and 14 observations for quarterly data). Since our sample ends in June 2009, in order to ensure that all estimates had at least one year to undergo revisions, we consider revisions to data only up to June 2008.[4]

- *Sign and size of revisions*

Chart 2 displays monthly and quarterly year-on-year rates of change of export and import data, as in first and final (one year later) releases, with revisions as the difference. It shows that early and final estimates have, in general, a similar evolution. Thus, export and import growth profiles do not seem to have been significantly affected by revisions. This evidence is in line with results for the impact of revisions on the sign and direction (acceleration/deceleration) of estimates (Table 2). For both exports and

Chart 2

YEAR-ON-YEAR RATES OF CHANGE OF EXPORTS AND IMPORTS: ESTIMATES AND REVISIONS TO FIRST ESTIMATES



Sources: *INE* and authors' calculations.

(4) For a more detailed analysis, including revisions to previous and first estimates, both for month-on-month and year-on-year rates of change, see Cardoso and Duarte (2009).

Table 2

SUMMARY STATISTICS OF REVISIONS UP TO ONE YEAR TO FIRST ESTIMATES

Year-on-year rates of change, January 2005 - June 2008

	Exports		Imports	
	Monthly data	Quarterly data	Monthly data	Quarterly data
Min	-1.33	-0.03	-0.56	-0.23
Max	5.71	3.65	7.71	3.11
% Positive	92.86	92.86	83.33	78.57
% Sign $\left(yoy^{i+j}\right)$ = Sign $\left(yoy^{i}\right)$	95.24	100.00	92.86	100.00
Direction	95.12	76.92	95.12	100.00
Mean	1.68	1.18	2.15	1.52
Significance test (ratio-*t*)	4.98 ***	3.44 ***	4.91 ***	3.65 ***
Mean Absolute Revision	1.75	1.18	2.23	1.56
Relative Mean Absolute Revision	0.20	0.16	0.28	0.20
Normality test statistics				
Jarque-Bera	2.59	1.42	2.87	1.83
Doornik and Hansen	3.90	2.28	3.99	9.45 ***

Notes: % Positive - Percentage of strictly positive revisions. % Sign$\left(yoy^{i+j}\right)$ = *Sign*$\left(yoy^{i}\right)$ - Percentage of observations for which the sign of estimates for vintages $i+j$ and i is the same. Direction - Percentage of observations for which the direction (acceleration or deceleration) of estimates for vintage $i+j$ and vintage i is the same. *** denotes significance at 1 per cent, ** at 5 per cent level and * at a 10 per cent level.

imports, more than 90 per cent of final estimates have the same sign as early estimates. Regarding direction (acceleration/deceleration), in a high percentage of cases the evolution of export and import growth rates is the same in first and final estimates.

Furthermore, over the period analysed, the vast majority of revisions is strictly positive (more than 90 per cent in the case of exports, and about 80 per cent for imports). As early estimates tend to be revised upwards, the mean of revisions is positive.[5] Considering monthly estimates, the mean of revisions to year-on-year rates of change of exports and imports is 1.7 and 2.2 percentage points (p.p.), respectively. For quarterly data, these values are smaller (as expected) but also positive (1.2 p.p. in the case of exports, and 1.5 p.p. for imports).

The results for the significance test, obtained using heteroskedastic and autocorrelation consistent (HAC) standard errors, suggest that mean revisions are statistically significantly different from zero, both for monthly and quarterly data (Table 2).[6] Considering a broader set of series, Aruoba (2008) and Faust *et al*. (2005) found similar results for other countries. Moreover, for the UK, Meader (2007) and George (2005) reported evidence of positive and statistically significant mean revisions to quarterly real growth rates of exports and imports. For Portugal, José (2004) concluded that real year-on-year rates of change of most components of quarterly national accounts were on average revised upwards (in particular, the international trade variables) but, in general, the revisions were not significantly different from zero.

(5) The results for the mean revisions are qualitatively invariant to the sign of estimates.

(6) Considering a significance level of 5 per cent. Using standard *t*-tests would not qualitatively change the results. See, for example, Di Fonzo (2005) for a description of the modified *t*-test.

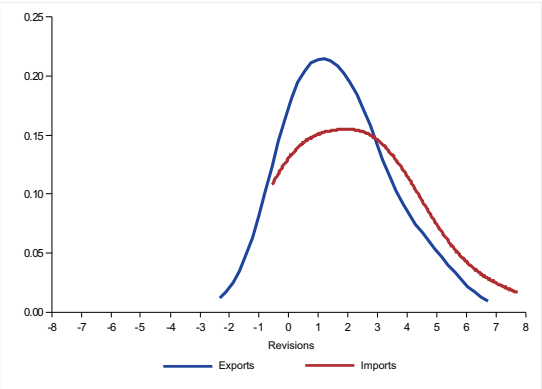
The significance tests for the mean revision rely on the assumption that revisions are normally distributed. Hence, normality of revisions was also tested using Jarque-Bera and Doonik and Hansen (2008) tests (the latter adjusted for small samples). Considering a significance level of 5 per cent, the null hypothesis of normality is not rejected (Table 2). Empirical distributions also favour the existence of normality (Chart 3).

Seasonality in revisions is also analysed, in order to assess whether there is evidence that some months are more revised than others. Chart 4 presents the mean revisions to first estimates by month of reference. In the case of exports, January and July have higher mean revisions, while for imports June is the month with the highest mean revision. However, when testing the equality of the means for the 12 sub-samples (one for each month of reference) using the Analysis of Variance (ANOVA) framework, the null hypothesis of equal means is not rejected. Moreover, in a regression context with revisions as the dependent variable, for both exports and imports, the coefficients associated to seasonal dummies are not statistically significant.[7]

Since, in the case of the mean, revisions with opposite sign (partially or completely) cancel out, a measure typically used to assess the size of revisions is the mean absolute revision. As revisions to the data are, in general, positive, the mean absolute revision is very similar to the mean revision (Table 2). Moreover, results for the relative mean absolute revision (i.e., the mean absolute revision scaled in terms of the size of the underlying series of vintage $i + j$) suggested that monthly year-on-year growth rates are likely to be revised, within a year since the first estimate, in a proportion of about 20 per cent, in the case of exports, and 28 per cent in the case of imports. Considering quarterly data, the results are quite similar (16 per cent in the case of exports and 20 per cent for imports).

Chart 3

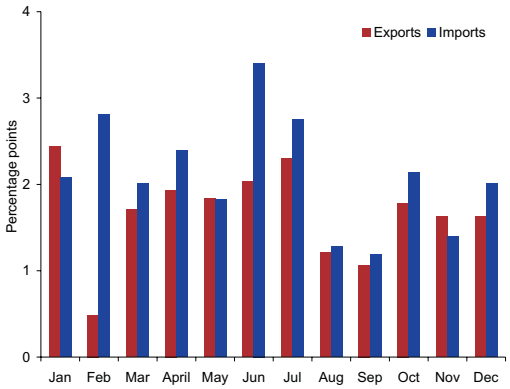
EMPIRICAL DISTRIBUTIONS OF REVISIONS



Source: Authors' calculations.

Chart 4

MEAN REVISIONS TO FIRST ESTIMATE BY MONTH OF REFERENCE



Sources: *INE* and authors' calculations.

(7) This evidence may be conditioned by the sample size.

- *Volatility of revisions*

Regarding volatility, standard deviations of revisions are shown in Table 3. Taking into account the variability of the estimates, the volatility of revisions does not seem to be sizeable. This fact is illustrated by the noise-to-signal ratio (ratio of the standard deviation of revisions to the standard deviation of final estimates, as in Orphanides and van Norden (2002)). If this measure exceeds one, then *noise* (standard deviation of revisions) outbalances the *signal* (standard deviation of final data). The choice of additional benchmarks for assessing this measure is relatively ad hoc (for example, Döpke (2004) considered as "small" values below 0.5). In light of our results, we consider that the noise-to-signal ratios are relatively small (about 0.25 for imports and 0.40 for exports). Cunningham e Jeffery (2007) also found relatively low noise-to-signal ratios for UK data on trade accounts. So, given the volatility of the underlying series, the volatility of revisions does not seem significant. This evidence is in line with the conclusions drawn from Chart 2, as final estimates exhibit an evolution similar to early estimates and, consequently, correlation coefficients between early and final estimates are high (Table 4).

- *(Un)Predictability of revisions*

Another important question is the (un)predictability of revisions. When revisions are *news*, early releases reflect all available information at that time, being efficient estimates of the final release. Thus, revisions are unpredictable, being attributable to the incorporation of new information (Fixler (2008)). Contrarily, when revisions are *noise*, early releases reflect both the final estimate and a measurement error, which decreases over time. As the simple test to mean revisions suggests that revisions are, on average, positive, the *news* hypothesis is immediately ruled out. Nevertheless, some further insights into the *news/noise* discussion are presented, resorting to additional measures, such as correlation coefficients and the decomposition of the mean squared revision.

If revisions were correlated with final estimates, then its evolution would be unpredictable (*news*). On the other hand, if revisions were correlated with earlier estimates, then its evolution would be predict-

Table 3

VOLATILITY STATISTICS OF REVISIONS UP TO ONE YEAR TO FIRST ESTIMATES
Year-on-year rates of change, January 2005 - June 2008

	Exports		Imports	
	Monthly data	Quarterly data	Monthly data	Quarterly data
St. Dev.	1.57	1.05	2.01	1.22
Noise-to-Signal	0.23	0.25	0.40	0.39
St. Dev $yoy^{\,i}$	6.56	3.97	4.50	2.73
St. Dev $yoy^{\,i+j}$	6.97	4.27	5.06	3.12

Notes: St. Dev. - Standard deviation of revisions. Noise-to-Signal - ratio of the standard deviation of revisions to the standard deviation of final estimates. Considering Equation 1, St. Dev. $yoy^{\,i}$ ($yoy^{\,i+j}$) denotes the standard deviation of estimates for vintage i ($i + j$).

Table 4

(UN)PREDICTABILITY OF REVISIONS UP TO ONE YEAR TO FIRST ESTIMATES

Year-on-year rates of change, January 2005 - June 2008

	Exports		Imports	
	Monthly data	Quarterly data	Monthly data	Quarterly data
Mean Square Revision (MSR)	5.30	2.49	8.66	3.78
Decomposition of MSR				
UM (%)	53.39	55.44	53.45	60.82
UR (%)	1.06	1.19	0.22	0.57
UD (%)	45.55	43.37	46.33	38.62
Root Mean Square Revision	2.30	1.58	2.94	1.94
Correlation tests				
Correlation (yoy^{i}, yoy^{i+j})	0.97 ***	0.97 ***	0.92 ***	0.92 ***
Correlation $(r^{i,j}, yoy^{i+j})$	0.37 **	0.40	0.46 ***	0.50 *
Correlation $(r^{i,j}, yoy^{i})$	0.15	0.16	0.07	0.12

Notes: Considering Equation 3, UM can be interpreted as the proportion of mean squared revision associated to the mean revision (α), UR as the proportion associated to the slope b being different from one and, finally, UD can be interpreted as the disturbance proportion. For more details on this decomposition, see Di Fonzo (2005). Correlation (yoy^{i}, yoy^{i+j}) - Correlation between estimates for vintages i and $i+j$. Correlation $(r^{i,j}, yoy^{i})$ - Correlation between revisions and estimates for vintage i. Correlation $(r^{i,j}, yoy^{i+j})$ - Correlation between revisions and estimates for vintage $i+j$. *** denotes significance at 1 per cent, ** at 5 per cent level and * at a 10 per cent level.

able (*noise*), as the information available at the time of initial releases was not fully taken into account. In this case, the co-movement of revisions and growth rates of the underlying series would indicate that higher (lower) growth rates signalled greater (smaller) revisions. According to our results, the correlation coefficients between revisions and preliminary estimates are small, not statistically significant, and smaller than those for final estimates (Table 4). This suggests that revisions reflect the incorporation of new information. Moreover, revisions do not seem to be persistent, as autocorrelations are low and, in general, not statistically significant.[8]

Additionally, results from decomposing the mean squared revision are also presented (Table 4). Assume that the mean squared revision can be decomposed as UM+UR+UD=100 (Di Fonzo (2005)). This decomposition can be better understood if one considers the following regression:

$$yoy_t^{i+j} = \alpha + \beta yoy_t^{i} + u_t \qquad (3)$$

where UM can be interpreted as the proportion of mean squared revision associated to the mean revision (α), UR as the proportion associated to the slope β being different from one and, finally, UD can be interpreted as the disturbance proportion, i.e., the proportion that is not associated to systematic differences between preliminary and later estimates.

If revisions were "well-behaved", then preliminary estimates would present low UM and UR, and high UD. In this case, for both imports and exports, UD is quite high and UR is very low, reflecting the high correlation between early and final estimates. However, the UM proportion is large, reflecting a mean revision different from zero.

(8) Furthermore, evidence from Augmented Dickey Fuller (ADF) tests suggests that revisions are stationary.

Thus, these results suggest that the existence of a positive mean revision induces a systematic behaviour on revisions. However, inferring the predictability of revisions is not a straightforward task, as argued by Cardoso and Duarte (2009), who further discuss this topic.

4. CONCLUSIONS

This article characterises data revisions to Portuguese export and import data. Focusing on monthly and quarterly year-on-year rates of change, revisions were gauged, resorting to a broad set of statistical measures. The results suggest that revisions are, on average, positive, which implies a systematic component in the behaviour of revisions. Therefore, although correctly indicating the sign and direction of changes, early estimates tend to underestimate final releases. The positive mean does not seem to be significantly different by month of reference.

Moreover, the standard deviation of revisions is quite small compared to the standard deviation of the underlying series. Thus, the small noise-to-signal ratios suggest that the potential challenges in analysing the data are associated to the volatility of the underlying series, rather than to the volatility of revisions. Overall, early and final estimates show a similar evolution, as indicated by the high correlation between both series.

Revision analysis is a crucial step for assessing the impact of revisions on forecasting. In empirical analysis, one typically uses data of the most recent *vintage* (both for in-sample estimation and out-of-sample forecasting). However, this choice has been questioned, as model specification and forecasting performance may be sensitive to the data *vintage* used. Therefore, prior to setting up a forecasting procedure, a key decision is to choose the nature of data to forecast (first release, final estimates or something in between), conditional on one's purposes and also on the behaviour of revisions. The results presented in this article for data on Portuguese exports and imports reinforce the importance of this choice for forecasting purposes.

REFERENCES

Aruoba, S. (2008), "Data revisions are not well behaved", *Journal of Money, Credit and Banking* 40(2-3), 319–340.

Cardoso, F. and Duarte, C. (2009), "Back to basics: Data revisions", *Working Paper* 26-2009, Banco de Portugal.

Croushore, D. and Stark, T. (2001), "A real-time data set for macroeconomists", *Journal of Econometrics* 105, 111–130.

Croushore, D. and Stark, T. (2003), "A real-time data set for macroeconomists: Does the data vintage matter?", *The Review of Economics and Statistics* 85(3), 605–617.

Cunningham, A. and Jeffery, C. (2007), "Extracting a better signal from uncertain data", *Quarterly Bulletin* Q3, Bank of England.

Di Fonzo, T. (2005), "The OECD project on revisions analysis: First elements for discussion", *Paper presented at the OECD STESEG meeting*, Paris, 27-28 June 2005, OECD.

Doornik, J. A. and Hansen, H. (2008), "An omnibus test for univariate and multivariate normality", Oxford *Bulletin of Economics and Statistics* 70(s1), 927–939.

Döpke, J. (2004), "Real-time data and business cycle analysis in Germany", *Discussion Paper* 11/2004, Deutsche Bundesbank.

ECB (2009), "Revisions to GDP estimates in the euro area", *Monthly Bulletin* April, European Central Bank.

Faust, J., Rogers, J. and Wright, J. (2005), "News and noise in G-7 GDP announcements", *Journal of Money, Credit, and Banking* 37(3), 403–419.

Fixler, D. (2008), «How to interpret whether revisions to economic variables reflect "news" or "noise"», *Technical report, Contribution to the ECD/Eurostat Task Force on "Performing Revisions Analysis for Sub-Annual Economic Statistics".*

George, E. (2005), "Revisions to quarterly GDP growth and its production and expenditure components", *Economic Trends* 614, Offce for National Statistics, UK.

INE (2006), "Current statistics on extracommunity trade", *Documento Metodológico* February, Instituto Nacional de Estatística.

INE (2007), "Current statistics on intracommunity trade", *Documento Metodológico* November, Instituto Nacional de Estatística.

Jacobs, J. and van Norden, S. (2007), «Modeling data revisions: Measurement error and dynamics of "true" values», *Les Cahiers du CREF* 07-09, Centre de recherche en e-finance (CREF) HEC Montréal.

José, C. (2004), "Real-time quarterly national accounts", *Economic Bulletin* December, Banco de Portugal.

Kholodilin, K. and Siliverstivs, B. (2009), "Do forecasters inform or reassure? Evaluation of the German real-time data", *KOF Working Paper* 215, KOF Swiss Economic Institute.

Kishor, N. K. and Koenig, E. (2005), "VAR estimation and forecasting when data are subject to revision", *Working Papers* 05-01, Federal Reserve Bank of Dallas.

Koenig, E., Dolmas, S. and Piger, J. (2003), "The use and abuse of real-time data in economic forecasting", *The Review of Economics and Statistics* 85(3), 618–628.

Mankiw, G. and Shapiro, M. (1986), "News or noise: an analysis of GNP revisions", *Survey of Current Business* 66, 20–25.

McKenzie, R. (2006), "Undertaking revisions and real-time data analysis using the OECD main economic indicators original release data and revisions database", *OECD Statistics Working Paper* 2006/2, OECD.

Meader, R. (2007), "Revisions to quarterly GDP growth and its components", *Economic and Labour Market Review* 1(11), Office for National Statistics, UK.

Orphanides, A. and van Norden, S. (2002), "The unreliability of output-gap estimates in real time", *The Review of Economics and Statistics* 84(4), 569–583.

Stark, T. and Croushore, D. (2002), "Forecasting with a real-time data set for macroeconomists", *Journal of Macroeconomics* 24, 507–531.

Turner, E. (2005), "Analysis of revisions to quarterly current account balance of payments data", *Economic Trends* 621, Office for National Statistics, UK.

CHRONOLOGY OF MAJOR FINANCIAL MEASURES

January to December 2009

2009

January

- 9 January (Circular Letter of Banco de Portugal No. 4/2009/DET, Treasury and Issue Department)

  Informs on the implementation by cash-in-transit companies of the regulations applicable to euro banknote recycling, and on which companies are qualified for such activity in 2009, pursuant to Decree-Law No. 195/2007 of 15 May.

- 14 January (Circular Letter of Banco de Portugal No. 9/09/DSBDR, Banking Supervision Department)

  Credit institutions are requested to send to Banco de Portugal, within 10 working days, a summary evaluation of the implementation of Decree-Law No. 171/2008 of 26 August, which approved borrower protection measures in housing credit regarding the renegotiation of loan conditions.

- 14 January (Circular Letter of Banco de Portugal No. 10/09/DSBDR, Banking Supervision Department)

  Provides clarification on the implementation of Decree-Law No. 51/2007 of 7 March as regards advance payments in credit agreements 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.

- 15 January (Instruction of Banco de Portugal No. 21/2008, BNBP 1/2009)

  Regulates reporting to Banco de Portugal of actual or contingent liabilities arising from credit operations, under any form, to be centralised and published by this central bank. Revokes Instruction No. 7/2006, published in the Official Bulletin No. 6 of 16 June 2006.

- 26 January (Circular Letter of Banco de Portugal No. 14/09/DSBDR, Banking Supervision Department)

  Following the conclusions of the meeting held by the Committee of Experts as regards the evaluation of measures against money laundering and terrorist financing (MONEYVAL), credit institutions and financial companies are advised to maintain enhanced surveillance procedures, and to examine with special caution all operations undertaken or intermediated by entities or institutions established in Azerbaijan.

- 28 January (Circular Letter of Banco de Portugal No. 15/09/DSBDR, Banking Supervision Department)

  Provides clarification on the procedures to be adopted by the institutions subject to the supervision of Banco de Portugal as regards the register of write-offs of loans in off-balance-sheet items.

- 28 January (Instruction of Banco de Portugal No. 1/2009, BNBP 2/2009)

  Introduces changes in Instruction No. 1/99, published in the Official Bulletin No. 1 of 15 January 1999, which laid down the general rules governing the Intervention Operations Market.

- 29 January (Circular Letter of Banco de Portugal No. 16/09/DSBDR, Banking Supervision Department)

  Informs that the list in Annex 1 of Instruction of Banco de Portugal No. 26/2005 should be replaced by the list of countries or jurisdictions integrating the concept “equivalent third country”, for the purposes of the implementation of Law No. 25/2008 of 5 June, defined in the Executive Order No. 41/2009 of 17 December 2008, published in the Official Gazette, Series II, Part C, No. 8 of 13 January 2009.

February

• 3 February (Circular Letter of Banco de Portugal No. 19/09/DSBDR, Banking Supervision Department)	Provides clarification on interest charged after total early repayment of lending for house purchase and, as a result, on the interpretation of Article 5 (2) of Decree-Law No. 51/2007 of 7 March, as reworded by Decree-Law No. 88/2008 of 29 May.
• 09 February (Instruction of Banco de Portugal No. 4/2009, BNBP 3/2009)	Defines the locations, schedules, rules and conditions for euro banknote deposits and withdrawals over the counter at Banco de Portugal.
• 16 February (Instruction of Banco de Portugal No. 2/2009, BNBP 2/2009)	Regulates the opening and operation of current accounts with Banco de Portugal and creates the AGIL (Portuguese acronym for: Integrated Settlement Management Application), for the local management of access to current accounts held with Banco de Portugal by institutions that are not direct participants in TARGET2-PT.
• 16 February (Instruction of Banco de Portugal No. 3/2009, BNBP 2/2009)	Regulates the Interbank Clearing System (SICOI), which comprises the following sub-systems: cheques, bills of exchange, direct debits, Interbank Electronic Transfers and transactions via ATMs.
• 17 February (Circular Letter of Banco de Portugal No. 2/2009/DMR, Market and Reserve Management Department)	Discloses, effective as of 1 March 2009, the new price list of the services provided by SITEME (market electronic transfer system), which replaces the one annexed to Circular Letter of Banco de Portugal No. 9/DMR of 15 December 2006. The changes introduced in the price list are mainly a consequence of the closure of the interbank money market (*Mercado Monetário Interbancário – MMI*) on 31 December 2008.
• 20 February (Circular Letter of Banco de Portugal No. 20/2009/DSB, Banking Supervision Department)	Makes known that the understanding presented in Circular Letter of Banco de Portugal No. 49/2001/DSB of 29 November 2001 is no longer applicable, given the accounting framework established in Notice of Banco de Portugal No. 1/2005 of 28 February 2005.
• 26 February (Instruction of Banco de Portugal No. 5/2009, BNBP 03/2009)	Amends Instruction of Banco de Portugal No. 1/99 of 15 January 1999, which regulated the intervention transactions market (*Mercado de Operações de Intervenção – MOI*).
• 26 February (Circular Letter of Banco de Portugal No. 06/2009/DMR, Market and Reserve Management Department)	Makes known the alterations introduced in Instruction of Banco de Portugal No. 1/99 of 15 January 1999, relating to the end of the period of transition to TARGET2, on 2 March 2009.
• 27 February (Circular Letter of Banco de Portugal No. 24/2009/DSB, Banking Supervision Department)	Transmits some recommendations regarding the professional qualification and independence of management and auditing bodies.

March

• 2 March (Circular Letter of Banco de Portugal No. 10/2009/DET, Treasury and Issue Department)	Informs that the cash-in-transit company ESEGUR, S.A., has set up in the Autonomous Region of Madeira - Funchal, a Cash Recycling Centre for the recycling of euro banknotes.

- 5 March (Notice of Banco de Portugal No. 1/2009, Official Gazette No. 45, Series II)

Amends some paragraphs of Notice of Banco de Portugal No. 5/2007 of 27 April (regulatory framework governing own funds requirements and solvency ratio).

- 19 March (Circular Letter of Banco de Portugal No 32/09/DSBDR, Banking Supervision Department)

Following the introduction of regulatory amendments, conveys the understanding of Banco de Portugal as to the recognition of significant credit risk transfer

- 20 March (Decree Law No 64/2009, Official Gazette No 56, Series 1, Ministry of Finance and Public Administration)

Establishes extraordinary mechanisms to reduce the nominal value of shares of public limited companies.

- 23 March (Circular Letter of Banco de Portugal No 33/09/DSBDR, Banking Supervision Department)

Conveys the understanding of Banco de Portugal and of the Securities Market Commission as to the delimitation of competences in the supervision of complex financial products.

April

- 1 April (Executive Order No 333-B/2009, Ministry of Finance and Public Administration)

In accordance with the provisions laid down in Article 3 of Decree-Law No 8/2007 of 17 January, approves new forms (Annexes C and F) for the annexes to the statement on Simplified Corporate Information to be used from 1 January 2009 irrespective of the year/fiscal year the statement refers to

- 14 April (Circular Letter of Banco de Portugal No 33/09/DSB, Banking Supervision Department)

Conveys the understanding of Banco de Portugal and of the Securities Market Commission as to the delimitation of competences in the supervision of complex financial products

May

- 7 May Guideline of the European Central Bank (2009/391/EC) Official Journal of the European Union No 123 Series L

Amends Guideline ECB/2000/7 on monetary policy instruments and procedures of the Eurosystem (ECB/2009/10). Section 2.1, first paragraph, second indent, third period is hence replaced accordingly. The present Guideline enters into force on 11 May 2009. The NCB of participating Member States are the addressees of the Guideline. The NCB mentioned in No 1 must report to the ECB, by 11 May 2009, the measures they intend to adopt in order to implement the provisions laid down in this Guideline

- 8 May (Executive Order No 493-A/2009, Official Gazette No 89, Supplement, Ministry of Finance and Public Administration)

In compliance with the provisions laid down in Article 23 of Law No 63-A/2008 of 24 November 2008, defines the necessary procedures to implement said law as regards the capitalisation of credit institutions with recourse to public investment. Empowers Banco de Portugal to monitor and audit the fulfilment by the beneficiary credit institutions of requirements established under this scheme. This executive order shall enter into force on the day following its publication.

- 12 May (Decree-Law No 103/2009 in the Official Gazette No 91, Series I, Ministry of Finance and Public Administration)

Creates an extraordinary credit line to protect own permanent homes in case at least one of the borrowers of a loan for the purchase of own permanent home becomes unemployed. This rule shall apply irrespective of the type of credit or its credit system, as long as these loans are, in every respect, for the purchase of own permanent homes. This credit line supports a 50 percent reduction

in the monthly principal and interest instalment by the borrower for a maximum period of 24 months. This Decree-Law shall enter into force on the day following its publication.

- 19 May (Instruction of Banco de Portugal No 6/2009, BNBP)

Determines which items are to be included by applicant institutions in their plan to raise own funds, to be submitted to Banco de Portugal within the scope of the application to the capitalisation operations envisaged in Law nº 63-A/2008 of 4 November.

- 19 May (Circular-Letter No 44/09/DSBDR, Banco de Portugal. Banking Supervision Department)

Recommends that institutions, when revaluating real estate acquired as a result of mortgage credit repayment, shall identify any signs of significant changes in value and adjust the values of the latest evaluations available accordingly, or obtain new evaluations, within the scope of a systematic monitoring procedure through a dedicated structure, thereby complying with a range of minimum requirements, similar to those defined in Part 2, point 8, b) and c) of Annex VI to Notice No 5/2007.

- 19 May (Circular-Letter No 45/09/DSBDR, Banco de Portugal. Banking Supervision Department)

Publishes assessment criteria regarding the eligibility of certain items for original own funds.

- 20 May (Circular-Letter No 47/09/DSBDR, Banco de Portugal. Banking Supervision Department)

Provides clarification on the opinion conveyed by Banco de Portugal in its Circular-Letter No 61/2008/DSB of 30 September, confirming that Decree-Law No 171/2008 of 26 August prohibits the collection of any fees associated with the renegotiation of loan conditions, specifying that this prohibition covers any change in the insurance company.

June

- 2 June (Decree-Law No 133/2009 of the Ministry of the Economy and Innovation, Official Gazette No 106 Series 1)

Transposes into the national law Directive 2008/48/EC of the European Parliament and of the Council of 23 April 2008 on credit agreements for consumers. This Decree-Law enters into force on 1 July 2009. At the end of the first year after the date of its entry into force, and biannually in subsequent years, Banco de Portugal shall prepare an evaluation report on the impact of its implementation, and, making use of all the means at its disposal, shall make that information public.

- 3 June (Circular-Letter No 50/09/DSBDR Banco de Portugal. Banking Supervision Department)

Provides clarification on the internal control reports of the financial group to be submitted by offshore entities, pursuant to Notice No 5/2008.

- 5 June (Decision No 13364-A/2009 Ministry of Finance and Public Administration. Secretary of State for Treasury and Finance's Office, Official Gazette No 109 Supplement. Series 2, Part C)

Authorises that the State personal guarantee continues to be used within the scope of the bank loan granted to Banco Privado Português, S.A., by a group of credit institutions. Its maturity is extended for six months. The other terms and conditions of the guarantee granted under Decision No 31268-A/2008 of 1 December remain unchanged.

- 16 June (Decree-Law No 142/2009, Official Gazette No 114, Series 1, Ministry of Finance and Public Administration)

Introduces the sixth amendment in the Legal Framework of Mutual Agricultural Credit, approved by Decree-Law No 24/91 of 11 January, with a view to adapting the management model of mutual agricultural credit banks to the structures laid down in the Company Law, considering developments in the financial system. This De-

cree-Law enters into force on the day following its publication. The Central Mutual Agricultural Credit Bank and the mutual agricultural credit banks should adjust their statutes in compliance with the provisions of the present Decree-Law, and elect new members of the Boards until the date of the first general meeting to be held during 2010.

- 17 June (Decree-Law No 144/2009, Official Gazette No 115, Series 1, Ministry of Finance and Public Administration)

Creates the "ombudsman for financial services" (credit mediator), who will operate in Banco de Portugal. His tasks will be to protect and promote the rights, guarantees and legitimate interests of any person or entity involved in credit operations, and to contribute to improving access to credit from the financial system. This Decree-Law enters into force on the day following its publication.

- 17 June (Instruction of Banco de Portugal No 7/2009, BNBP 7/2009)

Amends Instruction No 21/2008, published in the Official Bulletin No 1/2009 of 15 January, enabling it to cover the credit line created for the protection of permanent and owner-occupied dwellings in the event of unemployment.

- 19 June (Law No 28/2009, Official Gazette No 117, Series 1, Parliament)

Reviews the sanctionatory regime of the financial sector in the criminal and breach-of-regulations fields, and establishes the regime for the approval and disclosure of the remuneration policies applicable to members of the management and auditing boards of public-interest bodies. This law enters into force on the day following its publication. All processes pending on the date of its entry into force will continue to be subject to previously prevailing substantive and procedural legislation.

- 25 June (Decree-Law No 148/2009, Official Gazette No 121, Series 1, Ministry of Finance and Public Administration)

Introduces the fourth amendment in Decree-Law No 252/2003 of 17 October, which approves the legal regime governing collective investment undertakings and their managing companies, transposing into the national legal system Directive 2007/16/EC of the European Parliaments and of the Council of 19 March, relating to undertakings for collective investment in transferable securities (UCITS).

July

- 7 July (Notice of Banco de Portugal No 2/2009, Official Gazette No 137, Series II, Part E)

Amends Notice of Banco de Portugal No 12/92, as regards the derivation of the value of asset items to be deducted, for the calculation of own funds, and defines the accounting treatment of gains and losses in those asset items. This Notice enters into force on the day following its publication.

- 13 July (Decree-Law No 158/2009, Official Gazette No 133, Series 1, Ministry of Finance and Public Administration)

Approves the Accounting Standard System and revokes the National Chart of Accounts, approved by Decree-Law No 44/77 of 7 February.

- 13 July (Decree-Law No 160/2009, Official Gazette No 133, Series 1, Ministry of Finance and Public Administration)

Approves the legal system governing the organisation and functioning of the Accounting Standard Commission and revokes Decree-Law No 367/99 of 18 September.

- 13 July (Circular Letter of Banco de Portugal No 22/2009/DET, Treasury and Issue Department)

Announces the specific rules governing the implementation of the Protocol between Banco de Portugal and Caixa Geral de Depósitos on euro banknote deposits and withdrawals in Angra do Heroísmo and Horta.

- 14 July (Notice of Banco de Portugal No 3/2009, Official Gazette No 143, Series II, Part E)

  Indicates the systems covered by Decree-Law No 221/2000 of 9 September on settlement finality in payment and securities settlement systems.

- 15 July (Instruction of Banco de Portugal No 8/2009, BNBP 7/2009)

  Lays down that information to be provided by credit institutions and financial companies to consumers shall be processed through the Standard European Consumer Credit Information form according to the models attached.

- 20 July (Decree-Law No 162/2009, Official Gazette No 138, Series I, Ministry of Finance and Public Administration)

  Amends the Legal Framework of Credit Institutions and Financial Companies, approved by Decree-Law No 298/92 of 31 December 1992, Decree-Law No 345/98 of 9 November, which regulates the operation of the Mutual Agricultural Credit Guarantee Fund, and the legal framework relating to the system for the compensation of investors, approved by Decree-Law No 222/99 of 22 June, which transposed into Portuguese law Directive 2009/14/EC of the European Parliament and the Council of 11 March 2009 amending Directive 94/19/EC on deposit-guarantee schemes as regards the coverage level and the payout delay.

- 30 July (Circular Letter of Banco de Portugal No 57/2009/DSBDR, Banking Supervision Department)

  Recommends that credit institutions grant functional autonomy to their own consumer ombudsmen, so that these may be regarded as a second instance in the review of customer complaints.

August

- 5 August (Circular Letter of Banco de Portugal No 58/2009/DSBDR, Banking Supervision Department)

  Reiterates that institutions must comply with the recommendations of the Financial Stability Forum and the Committee of European Banking Supervisors, published in the 18 June 2008 reports on transparency and asset valuation, in line with the principle of proportionality.

- 12 August (Decree-Law No 185/2009, Official Gazette No 155, Series I, Ministry of Finance and Public Administration)

  Transposes into the national legal system Directive 2006/46/EC of the European Parliament and of the Council of 14 June 2006 amending Council Directives 78/660/EEC on the annual accounts of certain types of companies, 83/349/EEC on consolidated accounts, 86/635/EEC on the annual accounts and consolidated accounts of banks and other financial institutions and 91/674/EEC on the annual accounts and consolidated accounts of insurance undertakings. This Decree-Law also adopts simplification measures for commercial companies and civil law companies having a commercial form by amending the rules set out in Código de Registo Predial (land registration code), approved by Decree-Law No 224/84 of 6 July, Código das Sociedades Comerciais (company law), approved by Decree-Law No 262/86 of 2 September, Código do Registo Comercial (commercial register law), approved by Decree-Law No 403/86 of 3 December, Estatuto dos Benefícios Fiscais (statute of tax incentives), approved by Decree-Law No 215/89 of 1 July, Regulamento Emolumentar dos Registos e do Notariado (regulation on registration and notarial fees), approved by Decree-Law No 322-A/2001 of 14 December, Código da Insolvência e da Recuperação de Empresas (corporate insolvency and rescue law), approved by Decree-Law No 53/2004 of 18 March, and Regulamento do Registo de Automóveis (car registration law), approved by Decree No 55/75 of 12 February.

• 13 August (Instruction of Banco de Portugal No 11/2009, BNBP 9/2009)	Summarises the procedures used to calculate the annual percentage rate of change (Portuguese acronym: TAEG) in accordance with the general rules, assumptions and formula defined in Decree-Law No 133/2009 of 2 June.
• 13 August (Instruction of Banco de Portugal No 12/2009, BNBP 9/2009)	Determines the information to be supplied to Banco de Portugal in order to calculate the highest annual percentage rate of change (Portuguese acronym: TAEG) to be applied to each type of contract under Decree-Law No 133/2009 of 2 June.
• 14 August (Instruction of Banco de Portugal No 13/2009, BNBP 2/2009)	Determines the information to be regularly supplied by institutions subject to the supervision of Banco de Portugal to ensure the periodic monitoring of their liquidity situation. This Instruction revokes Circular-Letter No 86/2007/DSB of 2 October 2007.
• 15 August (Extract from the decision (2009/C 192/04), Official Journal of the European Union)	Extract from the decision on reorganisation measures applied at the Banco Privado Português, S.A. under Article 3 of Directive 2001/24/EC of the European Parliament and of the Council on the reorganisation and winding-up of credit institutions (Directive 2001/24/EC). Publication provided for in Article 6 of that Directive and in Article 18 of Decree-Law No 199/2006 of 25 October 2006.
• 17 August (Instruction of Banco de Portugal No 9/2009, BNBP 8/2009)	Establishes the procedures to be adopted on counterfeit/suspect banknotes and coins. Revokes Instruction of Banco de Portugal No 5/2006, published in the Official Gazette No 4/2006 of 17 April 2006.
• 17 August (Instruction of Banco de Portugal No 10/2009, BNBP 8/2009)	Amends Instruction of Banco de Portugal No 19/2005, published in the Official Gazette No 6 of 15 June 2005, which contains provisions on the monitoring of interest-rate risk in the banking portfolio.
• 17 August (Decree-Law No 192/2009, Official Gazette No 158, Series I, Ministry of the Economy and Innovation)	Second amendment to Decree-Law No 51/2007 of 7 March, which governs banking practice at the level of housing loans, extending its scheme to other credit agreements collateralised by the same property and reinforcing the consumer's right to information. Extends to this type of credits the scheme laid down in Decree-Law No 171/2008 of 26 August. Creates the revised Effective Annual Rate (Portuguese acronym: TAER) that should be indicated to consumers whenever the purchase of other financial products or services is proposed. Lays down a one-year limitation period of enforceability for non-compliance with the conditions agreed on with the purpose of reducing the spread. This Decree-Law shall enter into force 60 days after its publication.
• 20 August (Notice of Banco de Portugal No 4/2009, Official Gazette No 161, Series II, Part E)	Lays down a series of information requirements to be observed by credit institutions when taking simple bank deposits from the public. This notice shall apply to all types of deposit envisaged in Decree-Law No 430/91 of 2 November and to the respective accounts. It publishes, as an annex, a standardised information form for deposits, which must be made available to customers prior to the opening of the deposit account. This notice shall enter into force 90 days after its publication. Amended and re-published by Rectification Declaration No 2086/2009 of 21 August, in Official Gazette, Series II, Part E, No 165 of 26 August 2009.

- 20 August (Notice of Banco de Portugal No 5/2009, Official Gazette No 161, Series II, Part E)

Lays down the information requirements to be observed by credit institutions in the trading of complex financial products, which are taken to mean index-linked deposits and dual deposits. It publishes, as an annex, templates of information brochures, which must be made available to customers prior to the signing of agreements regarding such financial products. This notice shall enter into force 90 days after its publication. Amended and re-published by Rectification Declaration No 2087/2009 of 21 August, in Official Gazette, Series II, Part E, No 165 of 26 August 2009.

- 20 August (Notice of Banco de Portugal No 6/2009, Official Gazette No 161, Series II, Part E)

Lays down rules regarding the characteristics of bank deposits, from the simplest to those taking the form of complex products. It also updates rules regarding value dates and the availability date of operations arising from deposit agreements. This notice shall enter into force on the date of its publication. Amended and re-published by Rectification Declaration No 2088/2009 of 21 August, in Official Gazette, Series II, Part E, No 165 of 26 August 2009.

- 26 August (Law No 84/2009, Official Gazette No 165, Series I, Parliament)

Authorises the Government to regulate access to the activity of payment institutions and the provision of payment services, as well as to set out the sanctions to be applied within the scope of the provision of payment services, transposing into national legislation the provisions of Directive 2007/64/EC of the European Parliament and of the Council of 13 November 2007 on payment services in the internal market. This authorisation shall have a duration of 180 days and enter into force on the day after its publication.

September

- 1 September (Law No 94/2009, Official Gazette No 169, Series I, Parliament)

Approves measures derogating banking secrecy and special taxation for unjustified asset increases of above €100,000, thereby introducing changes, as follows: to the Personal Income Tax Code, approved by Decree-Law No 442-A/88 of 30 November; the 19th change to the General Tax Law, approved by Decree-Law No 398/98 of 17 December; and the 16th change to the Legal Framework of Credit Institutions and Financial Companies, approved by Decree-Law No 298/92 of 31 December.

- 1 September (Notice of Banco de Portugal No 7/2009 Official Gazette No 180, Series II, Part E)

Taking into consideration the provisions of Articles 118-A, 122 (4), 197 (1), and 199-B (1) of the Legal Framework of Credit Institutions and Financial Companies, approved by Decree-Law No 298/92 of 31 December, this Notice determines that credit shall not be granted to entities having their head office in an offshore jurisdiction considered as non-cooperative or whose ultimate beneficiary is unknown. It defines offshore jurisdiction and non-cooperative offshore jurisdiction, establishing that the competent prudential supervisory authorities shall send Banco de Portugal a statement ensuring that there are no obstacles to the reporting of information. This notice shall enter into force on the day following its publication.

- 9 September (Instruction of Banco de Portugal No 14/2009, BNBP 10/2009)

Regulates the key aspects of supervision activities to be carried on by Banco de Portugal as regards entities qualified to recycle euro banknotes and coins, which are subject to such supervision, as well as the duties these entities must comply with.

- 11 September (Decree-Law No 222/2009, Official Gazette No 177, Series I, Ministry of the Economy and Innovation)

  Sets forth consumer protection measures in the signing of life insurance contracts associated with housing loans and introduces the 9th change to Decree-Law No 349/98 of 11 November. This Decree-Law shall enter into force 90 days after the date of its publication.

- 18 September (Instruction of Banco de Portugal No 15/2009, BNBP 10/2009)

  Lays down the limits to the granting of credit by agricultural banks pursuant to the provisions of Article 28(2) and Article 36-A (6) of the Legal Framework of Mutual Agricultural Credit and Mutual Agricultural Companies (Portuguese acronym: RJCAM).

- 18 September (Instruction of Banco de Portugal No 17/2009, BNBP 10/2009)

  Lays down the rules to be complied with by agricultural banks in the reporting of data to Banco de Portugal relating to their associates.

October

- 2 October (Circular Letter No 64/09/DSBDR, Banco de Portugal. Banking Supervision Department)

  Clears doubts about the filling-in of the tables annexed to Instruction No 13/2009 on the periodic reporting of liquidity data.

- 8 October 2009 (Circular Letter of Banco de Portugal No 29/2009/DET, Treasury and Issue Department)

  Makes known that a service is available, at the request of individuals, for the provision of information concerning situations involving loss, larceny, theft, forgery, counterfeiting and illegal use of personal identification documents, addressed to the authorities subject to the supervision of Banco de Portugal.

- 8 October (Notice of Banco de Portugal No 8/2009 Official Gazette No 197, Series II, Part E)

  Lays down the minimum information requirements that must be complied with in the disclosure of the general conditions of priced financial products and services made available to the public by credit institutions and financial companies having their head office or branch in the national territory. Revokes Notice No 1/95.

- 12 October (Instruction of Banco de Portugal No 21/2009, BNBP 11/2009)

  Presents the tables of the price brochures, the respective instructions for completion and other operational features, and establishes the deadlines for sending them to Banco de Portugal.

- 12 October (Circular Letter of Banco de Portugal No 8/2009/DMR, Markets and Reserve Management Department)

  Makes known, in accordance with the provisions laid down in Article 5 (4) of the Regulation of the European Central Bank on the application of minimum reserves (ECB/2003/9) of 12 September 2003, the time limit for the notification of minimum reserves and the calendar of the maintenance periods in 2010 and 2011 (quarterly basis reporting).

- 12 October (Circular Letter of Banco de Portugal No 9/2009/DMR, Markets and Reserve Management Department)

  Makes known, in accordance with the provisions laid down in Article 5 (4) of the Regulation of the European Central Bank on the application of minimum reserves (ECB/2003/9) of 12 September 2003, the time limit for the notification of minimum reserves and the calendar of the maintenance periods in 2010 and 2011 (monthly basis reporting).

- 13 October (Decree-Law No 317/2009, Official Gazette No 198, Series I, Ministry of Finance and Public Administration)

  Establishes the tax regime applicable to products sold by insurance companies, pension fund management companies and mutual associations, and changes to 15 July the deadline for the electronic reporting of data relating to the declarations under the simplified corporate information. This Decree-Law shall apply from 1 January 2009.

- 15 October 2009 (Instruction of Banco de Portugal No 16/2009 BNBP 10/2009)

  Sets out the requirements that must be met for the authorisation of the opening up of branches of agricultural banks that are not members of the Central Mutual Agricultural Credit Bank.

- 15 October 2009 (Instruction of Banco de Portugal No 18/2009 BNBP 10/2009)

  Revokes Instruction of Banco de Portugal No 87/96, published in BNBP No 1 of 17 June 1996.

- 15 October 2009 (Instruction of Banco de Portugal No 19/2009 BNBP 10/2009)

  Sets at 0.03% the base contributory rate applicable to the calculation of the contribution of each member institution to the Deposit Guarantee Fund in 2010.

- 15 October 2009 (Instruction of Banco de Portugal No 20/2009 BNBP 10/2009)

  Sets at 10% the limit for the irrevocable payment commitment applicable to annual contributions in 2010.

- 16 October 2009 (Instruction of Banco de Portugal No 22/2009 BNBP 11/2009)

  Introduces changes in Instruction of Banco de Portugal No 3/2009, published in the Official Bulletin No 2 of 16 February 2009, which regulates the Interbank Clearing System (SICOI).

- 16 October 2009 (Instruction of Banco de Portugal No 23/2009 BNBP 11/2009)

  Introduces changes in Instruction of Banco de Portugal No 33/2007, published in the Official Bulletin No 1 of 15 January 2008, which regulates the operation of the Target 2 national system.

- 16 October 2009 (Instruction of Banco de Portugal No 24/2009 BNBP 11/2009)

  Regulates the granting of intraday credit and the contingency liquidity facility.

- 21 October (Circular Letter of Banco de Portugal No 30/2009/DET, Treasury and Issue Department)

  Makes known that Banco de Portugal will provide to the banking system as from January 2010 a computer application for the integrated management of cash deposit and withdrawal operations at its cash offices, identifying the associated services and operational facilities. Cash and mandate management services will go live on 4 January 2010 and adherence will be compulsory for credit institutions. The remaining services will be implemented by stages during the first half of 2010.

- 30 October (Decree-Law No 317/2009, Official Gazette No 211, Series I, Ministry of Finance and Public Administration)

  Approves the legal framework governing the taking up of the business of payment institutions and the provision of payment services. Transposes into Portuguese law Directive 2007/64/EC of the European Parliament and of the Council of 13 November on payment services in the internal market. Provides for a transitional regime applicable to exchange offices and credit card issuing or management companies. This Decree-Law shall enter into force on 1 November 2009.

November

- 3 November (Notice of Banco de Portugal No 9/2009, Official Gazette No 223, Series II)

  Determines that the institutions participating in the Deposit Guarantee Fund shall have an information system making it possible to identify which deposits are covered by or excluded from the guarantee and their depositors, irrespective of the type or nature of the deposits. They shall be organised in such a manner as to supply the Fund, within two working days, with a full list, per depositor, of the

respective loans covered by the outstanding guarantee at a given date. The implementation of such system shall be concluded within six days as of the entry into force of this Notice.

- 10 November (Notice of Banco de Portugal nº 10/2009, Official Gazette No 227, Series II)

Defines, under the terms laid down in Article 6, 1) c) and Article 30, 2) of the legal framework governing the taking up of the business of payment institutions and the provision of payment services, approved by Decree-Law No 317/2009 of 30 October, the regulatory framework applicable to the issues in respect to which such institutions shall be under the supervision of Banco de Portugal. In this vein, it determines that Notices of Banco de Portugal Nos 12/92, 1/95, 3/95, 1/2003, 6/2003, 1/2005 and 10/2008 shall apply to payment institutions, as well as Notice No 5/2008, except as regards the activities listed in Article 8, 2) c) of the above regulatory framework, and Notices Nos 11/2005 and 3/2008 in the case of payment institutions authorised to provide payment accounts. This Notice shall enter into force on the date of its publication.

- 10 November (Notice of Banco de Portugal nº 11/2009, Official Gazette No 227, Series II)

Establishes, pursuant to Article 6, 1) c) and Article 32, 6) of the legal framework governing the taking up of the business of payment institutions and the provision of payment services, approved by Decree-Law No 317/2009 of 30 October, the minimum rules and procedures necessary to ensure compliance by payment institutions with the requirements for the separation of funds received from customers, and defines the meaning of secure, liquid low-risk assets. It also establishes the conditions applicable to the insurance contract or equivalent guarantee, to be agreed as a mechanism to protect the above funds. This Notice shall enter into force on the day following its publication.

- 18 November (Instruction of Banco de Portugal No 25/2009, BNBP 12/2009)

Defines, under the terms of Article 2 of Notice No 9/2009 of 17 November, the template of the full list, per depositor, of credits covered by the guarantee at a given date, to be sent to the Deposit Guarantee Fund.

- 18 November (Circular-Letter No 35/2009/DET, Banco de Portugal, Issue and Treasury Department)

Informs on the procedures to be complied with by credit institutions and cash-in-transit companies in the identification and security clearance of all employees authorised to carry out cash withdrawal orders, as well as in mandates for treasury operations with Banco de Portugal. It includes, in annex, the templates of the forms to be used in the respective reporting to Banco de Portugal.

- 20 November (Notice of Banco de Portugal No 12/2009, Official Gazette No 233, Series II)

Rewords, in view of the changes recently introduced in Decree-Law No 24/91 of 11 January which approves the legal framework of mutual agricultural credit, the conditions under which authorisation is granted for carrying out the operations envisaged in Article 36-A, 1) of the said framework.

December

- 9 December (Instruction of Banco de Portugal No 26/2009, BNBP 01/2010)

Fixes the maximum rates in credit agreements for consumers, within the scope of Decree-Law No 133/2009 of 2 June.