



*Banco de Portugal*

EUROSYSTEM

Economic Bulletin | *Winter 2006*

Volume 12, Number 4

Available at  
[www.bportugal.pt](http://www.bportugal.pt)  
Publications

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**Distributed by**

Administrative Services Department

Av. Almirante Reis, 71-2<sup>nd</sup> floor

1150-012 Lisboa

**Printed by**

Tipografia Peres, S.A.

**Number of copies printed**

600 issues

Legal Deposit no. 241773/06

ISSN 0872-9786



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## ECONOMIC POLICY AND SITUATION

Outlook for the Portuguese Economy: 2007-2008

## OUTLOOK FOR THE PORTUGUESE ECONOMY: 2007-2008

### 1. INTRODUCTION

The outlook for the Portuguese economy in the period 2007-2008 presented in this article points towards a gradual acceleration in economic activity, in a context of some correction in domestic macro-economic imbalances and moderate growth in consumer prices. It should also be highlighted that the start of the economic rebound in 2006 was accompanied by an effective fiscal consolidation, which despite having some restrictive effects in the short run, is deemed to be essential to the improvement in medium term economic growth prospects.

As usual, the current projection relies on a set of assumptions regarding the evolution of interest rates, exchange rates, the prices of a number of commodities and the external demand for Portuguese goods and services throughout the projection horizon. This projection also includes some specific assumptions on particular aspects of the Portuguese economy, specifically regarding general government behaviour.

The current projection points to a recovery of economic activity throughout the projection horizon. Following the weak economic growth recorded in 2005 (0.4 per cent), gross domestic product (GDP) is estimated to have grown by 1.2 per cent in 2006 and is projected to accelerate to 1.8 and 2.1 per cent in 2007 and 2008, respectively (Table 1.1). The projected rebound in economic activity is nevertheless still too mild to allow for a restart in the real convergence process *vis-à-vis* the euro area, which was interrupted at the beginning of the decade. However, economic growth in the Portuguese economy is

**Table 1.1**

BANCO DE PORTUGAL PROJECTIONS FOR 2007-2008								
Rate of change, in percentage								
	Weights in 2005	2005	Current projection			EB Autumn 2006	EB Summer 2006	
			2006(e)	2007	2008	2006	2006	2007
Gross domestic product	100.0	0.4	1.2	1.8	2.1	1.2	1.2	1.5
Private consumption	65.2	1.7	1.2	1.5	1.7	1.1	1.3	1.2
Public consumption	21.4	1.9	-0.2	0.0	0.3	-0.2	0.7	0.5
Gross fixed capital formation	21.7	-2.6	-3.1	0.0	3.9	-3.2	-1.2	0.5
Domestic demand	108.7	0.6	0.1	1.1	1.9	0.1	0.8	0.9
Exports	28.6	1.0	9.3	6.2	6.1	9.0	8.4	4.7
Imports	37.3	1.6	4.3	3.5	4.7	4.0	5.7	2.3
Contribution to GDP growth (in p.p.)								
Net Exports		-0.3	1.1	0.6	0.1	1.1	0.3	0.5
Domestic demand		0.7	0.1	1.2	2.0	0.1	0.9	1.0
of which: change in inventories		-0.2	0.1	0.2	0.0	0.1	0.1	0.0
Current and capital account (% of GDP)		-8.1	-7.6	-7.3	-7.2	-7.6	-9.4	-9.8
HICP		2.1	3.0	2.3	2.4	3.0	2.6	2.1

**Note:** (e) estimate.

For each variable the projection presented corresponds to the central scenario (deemed to be the most likely value of this variable conditional on the set of assumptions considered). As elaborated in Section 4 of this article, the probability distributions assigned to the possible variable values may be asymmetric, and therefore the probability of a value below the central scenario may differ from the probability of a value above the central scenario.

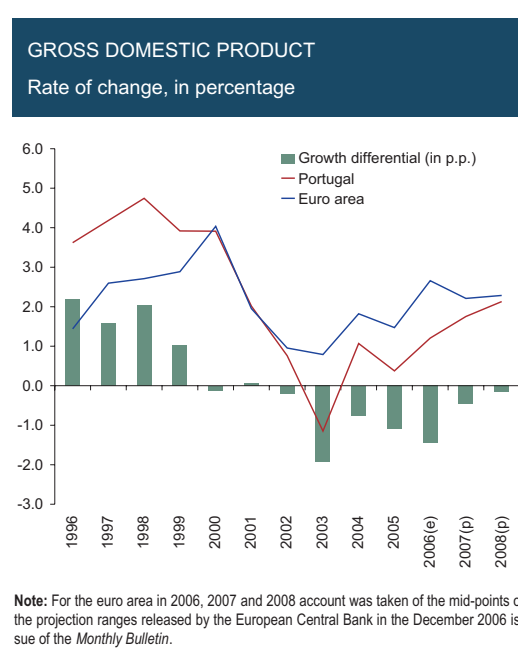
projected to record close to euro area projected growth rate at the end of the projection horizon (Chart 1.1).

The performance of the Portuguese economy over the past few years seems to have been particularly influenced by several domestic and external shocks which occurred simultaneously. Concerning the external environment, the rise in the oil price to historically high levels and the maintenance of a subdued growth in euro area countries seems to have penalised the Portuguese economy, in particular, given the higher consumption of energy per unit of output (*vis-à-vis* the euro area average) and the geographical distribution of Portuguese exports. In addition, in recent years there has been a growing integration in international trade of emerging economies with low unit production costs and the specialisation of which is particularly competitive with the Portuguese exports' structure.

At the domestic level, the perceived need to correct the excessive deficit position of the Portuguese economy, as well as the uncertainty as to the impact of the measures adopted with that purpose, also contributed to moderate economic activity growth. Moreover, the adjustment in the second half of the 90's of household expenditure and indebtedness to equilibrium levels compatible with a regime characterised by structurally lower financing costs seems to have accounted for a more contained growth of household expenditure in the later period. This evolution is clearly put in evidence by the behaviour of housing investment over the past few years and is partly considered in the projection for private consumption.

The weak dynamics of domestic demand in the current business cycle position is one of the distinctive factors *vis-à-vis* previous recovery periods. This situation reflects the limitations imposed by solvency conditions stemming from the intertemporal budget constraints, which in recent years have become particularly active for both households and general government. Against a background of significant economic slowdown and moderate disposable income growth, private consumption growth in the recent past contributed to the increase in household indebtedness to high levels by European standards. This fact and the ascending profile of interest rates started in December 2005 are likely to limit growth in households' consumption expenditures throughout the projection horizon. As regards general gov-

**Chart 1.1**



ernment, the full pursuit of the ongoing fiscal consolidation process is likely to require the maintenance of the restrictive fiscal policy until the end of the current projection horizon, so as to correct the current fiscal situation of excessive deficit.

Against this background, the rebound in economic activity in 2006 was determined by rather favourable developments in external trade and, in particular, by strong exports growth, which seem to have evolved in line with external demand, following the significant market share losses recorded in previous years. In 2007 and 2008, exports are projected to decelerate, in line with developments in economic activity in the main markets of destination, which should translate into the maintenance of the market share of Portuguese exports. In this context, the acceleration of the Portuguese economy in the projection horizon is based on higher domestic demand growth, largely determined by the recovery of investment, which is likely to record positive growth rates in 2007, although, in annual average terms, growth in this component is almost nil this year. In particular, business investment is expected to show positive growth in the year as a whole. In addition, developments in domestic demand also reflect some acceleration in private consumption, in line with developments in real disposable income, although maintaining lower-than-GDP growth.

Net external borrowing requirements of the Portuguese economy (as measured by the combined current and capital account balance) declined to 7.6 per cent of GDP in 2006 (8.1 per cent in 2005) and are projected to decrease further to 7.3 per cent in 2007 and to 7.2 per cent of GDP in 2008. In the context of a slowdown in external markets, of a maintenance of the oil price at historically high levels and of a deterioration of the income account, determined not only by the rise in interest rates but also by the progressive deterioration of the international investment position of the Portuguese economy, the continuous projected correction of the external imbalance relies on the maintenance of a growth pace of domestic demand lower than that expected for the main markets of destination of Portuguese exports.

Prices, as measured by the Harmonised Index of Consumer Prices (HICP), grew by around 3 per cent in 2006 (2.1 per cent in 2005). This rise in inflation by around 1 percentage point (p.p.) seems to have been determined by the significant acceleration of non-energy import prices and to have also reflected the acceleration in the prices of some unprocessed food, the impact of rises in the tax on tobacco and the lagged effects associated with the rise in the standard value added tax (VAT) rate introduced in July 2005. The current projection points to a decline in inflation in 2007 and 2008 to 2.3 and 2.4 per cent respectively, due to the strong deceleration in energy prices and the fading-out of the base effect related to the rise in the standard VAT rate in mid-2005, against a background of moderate growth in non-energy import prices and labour costs, which are nevertheless likely to grow above expected for the euro area.

In comparison with the autumn 2006 issue of the *Economic Bulletin*, the estimate for GDP growth in 2006 remains unchanged, despite slightly differences in the composition of expenditure (Chart 1.2). The revision of the estimate chiefly reflects the inclusion of information which was meanwhile released, stress being laid on the quarterly national accounts and on the international trade statistics for the third quarter of 2006 published by INE, the Portuguese National Statistical Institute, early last December.

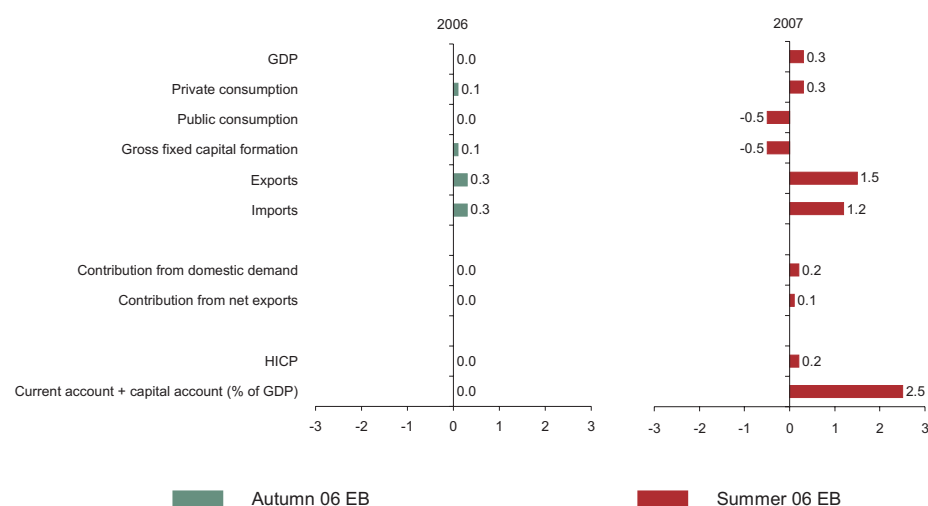
The projection for 2007 represents an upward revision for GDP growth in comparison with that published in the summer 2006 issue of the *Economic Bulletin*, stemming from a higher contribution from both domestic and net external demand. The upward revision of the contribution from domestic demand, 0.2 p.p., is largely determined by the revision of private consumption growth prospects, which may reflect lagged effect from a higher-than-expected growth in households' disposable income. Notwithstanding, the significant upward revision of exports resulting from more favourable developments in external demand for Portuguese goods and services, the contribution from net external demand is



Chart 1.2

### REVISIONS VIS-À-VIS PROJECTIONS IN THE 2006 SUMMER AND AUTUMN ISSUES OF THE *ECONOMIC BULLETIN*

In percentage points



likely to increase by only 0.1 p.p., insofar as imports are also revised significantly upwards, thereby accompanying developments in domestic demand and in exports.

The current estimate for the inflation rate in 2006 remains unchanged compared with that put forward in the autumn 2006 issue of the *Economic Bulletin*. For 2007, the current projection represents an upward revision of the one published in the summer 2006, motivated by higher-than-projected growth in non-energy import prices, which more than offsets the downward revision of energy prices stemming from more favourable developments in oil prices in euro.

## 2. ASSUMPTIONS UNDERLYING PROJECTIONS

Projections presented in this article rely as usual on a set of technical assumptions regarding developments in interest rates, exchange rates and international commodity prices throughout the projection horizon, on the basis of data available up to mid-December 2006. Interest rates and international commodity prices will evolve in line with expectations implied in futures markets, while exchange rates will admittedly remain at the average levels recorded in mid-December 2006.

The demand for goods and services produced in Portugal by the major Portuguese trading partners, the so-called external demand for the Portuguese goods and services, is assumed to evolve in line with average growth in these countries' imports, weighted by the weight of each country as a destination market of Portuguese exports. As regards import developments in non-euro area economies, the assumptions considered in the December 2006 Eurosystem projection exercise were used. For euro area economies, it was taken into account the import developments projected by the respective national central banks in the context of the above projection exercise.

In addition to the technical assumptions above-mentioned, the current projection also includes a series of specific assumptions for the Portuguese economy, stress being laid on those relating to developments in the general government behaviour and in prices subject to regulations.

## 2.1. Interest rates and exchange rates

The technical assumption considered for developments in short and long-term interest rates consists in assuming an evolution in line with expectations implied in futures markets up to the end of the projection horizon. According to this assumption, the short-term interest rate (three-month money market interest rate) will rise from an average value of 3.1 per cent in 2006 to 4.0 per cent in 2007 and 4.1 per cent in 2008.<sup>1</sup> This profile assumes a slight rise in this rate in early 2007 and a virtual stabilisation from then onwards. As far as the long-term interest rate is concerned, the technical assumption considered translates into a slight increase in annual average terms from 3.9 per cent in 2006 to 4.0 in 2007 and 2008.

As usual, exchange rates are assumed to remain at the average levels recorded in mid-December 2006. This technical assumption implies an appreciation of the euro in effective terms by around 3 per cent in 2007, reflecting an appreciation against the US dollar, the Japanese yen and the Swiss franc, which more than offsets the depreciation against the Sterling pound. According to the technical assumption, exchange rates will remain unchanged throughout 2008, at the average 2007 levels.

## 2.2. International prices

Technical assumptions for international commodity price developments up to the end of the projection horizon rely on expectations implied in the respective futures markets.

The use of this assumption implies a virtual stabilisation of the oil price at annual average values close to 65 US dollars per barrel of Brent crude oil in 2006 and 2007 (54 US dollars in 2005), rising further to around 69 US dollars in 2008. Hence, following an increase of over 40 per cent in 2005 and around 20 per cent in 2006, the technical assumption for the evolution of the reference oil price implies that the price will be maintained in 2007 and will increase by approximately 5 per cent in 2008.

As far as non-energy commodities are concerned, expectations implied in futures markets point to annual average growth of prices in US dollars by around 29 per cent in 2006 and 15 per cent in 2007, mirroring of the strong upward profile followed in the course of 2006. Operators in the futures markets for these commodities anticipate an annual average growth by around 4 per cent in 2008.

With regard to price growth in the euro area, according to the results of the Eurosystem projection exercise published in the December 2006 issue of the European Central Bank's (ECB) *Monthly Bulletin*, average annual HICP growth stood in a range of 2.1 to 2.3 per cent in 2006. For 2007, the growth projection points to a range of 1.5 to 2.5 per cent and of 1.3 to 2.5 per cent for 2008. Also, it assumes: (i) a steady growth in profit margins; (ii) the interruption of the upward trend of the oil price recorded in the past few years, which implies a decline in the contribution of the energy component of HICP throughout the whole projection horizon; (iii) slight acceleration in unit labour costs, against a background of stable productivity growth and moderate wage growth, which will increase only marginally in 2008 and (iv) a significant increase in indirect taxes in 2007.<sup>2</sup>

(1) These figures correspond to three months forward interest rates implied in the yield curve, which may include a risk premium in addition to the expectations of market participants on the future levels of short-term interest rates. For further details see "Box: Recent developments in the risk premium of the three-month forward interest rate in the euro area".

(2) According to the estimates published by the ECB, the contribution from indirect taxation to headline HICP should record at 0.5 p.p. in 2007.

### 2.3. Economic activity abroad and external demand

The evolution of the external demand for Portuguese goods and services considered in this exercise relies on assumptions for growth in imports from a group of economies, which are based on the December 2006 Eurosystem projection exercise. These assumptions are based on projections for import growth elaborated by the national central banks of euro area economies, using a common external environment regarding GDP and imports growth in non-euro area economies. Subsequently, the consistency of the aggregate trade flows of goods and services among euro area countries is ensured.

As regards economic activity developments in non-euro area countries, the assumptions considered point to the maintenance of robust growth, notwithstanding a projected slight deceleration from 5.3 per cent in 2006 to 4.8 per cent in 2007 and 2008. In the United States and Japan economic activity is expected to slowdown somewhat, while in emerging Asian countries strong GDP growth is anticipated to continue recording growth rates above the world average growth, sustained by domestic demand growth in these countries. As far as non-euro area European Union (EU) countries are concerned, the current projection considers that economic activity growth will remain strong. In this context, notwithstanding an anticipated slight slowdown in economic activity outside the euro area, growth in external demand for the euro area goods and services is likely to remain high, decelerating from 10.2 per cent in 2006 to 7.1 per cent in 2007 and 6.7 per cent in 2008.

The projection of the December 2006 Eurosystem exercise for the euro area as a whole points to GDP growth in ranges of 2.5 to 2.9 per cent in 2006, 1.7 to 2.7 per cent in 2007 and 1.8 to 2.8 per cent in 2008. This economic activity growth is sustained by both significant export growth and the maintenance of robust domestic demand growth, notwithstanding the negative impact of the rise in indirect taxes in 2007 on developments in private consumption this year.

According to the evolution assumed for economic activity growth in the major Portuguese trading partners, the growth pace of external demand for the Portuguese goods and services is projected to decline throughout the projection horizon, from 9.3 per cent in 2006 to 6.2 per cent in 2007 and 5.9 per cent in 2008. This deceleration is likely to reflect, to a large extent, developments in imports of non-euro area countries over the projection horizon.

### 2.4. Specific assumptions for Portugal

The current projection also relies on a set of specific assumptions for the Portuguese economy, stress being laid on those referring to developments in public finances and prices subject to regulations.

With regard to projections for general government accounts, in accordance with the rule used within the scope of the Eurosystem, account was taken only of those fiscal policy measures already approved in legal terms or specified in sufficient detail. This working assumption conditions, in particular, developments projected for public consumption, namely as regards the possible impacts of the programme for the reorganisation of the public sector ("PRACE") and of the civil servants' mobility regime. In this context, real public consumption is likely to follow a relatively similar evolution to that seen in 2006, stabilising in 2007 and improving slightly in 2008. This essentially stems from a decline in the number of civil servants, in line with the rule of hiring only one employee per each two employees leaving service, from a negligible increase in intermediate consumption in real terms and from savings in conventions and pharmacies, in the wake of the measures introduced in the State Budget for 2007.

Regarding public investment, it is expected to decline in real terms in 2007 and 2008, due to the foreseeable reduction in transfers from the EU within the scope of the new Community Support Frame-

work, which should be only partly offset by the rebound in the public investment that is not co-financed by the European Union.

Concerning the indirect taxation, the current projection includes in 2007 the rise in the average rate of the tax on oil products (ISP) early in the year, as well as the effect of the rise in taxes on tobacco products, in line with the State Budget for 2007. Prices subject to regulations are assumed to follow an evolution close to that observed in the previous years, stress being laid on the increase of around 6 per cent considered for the electricity price in 2007 and the 3.1 per cent increase in actual housing rents also this year.

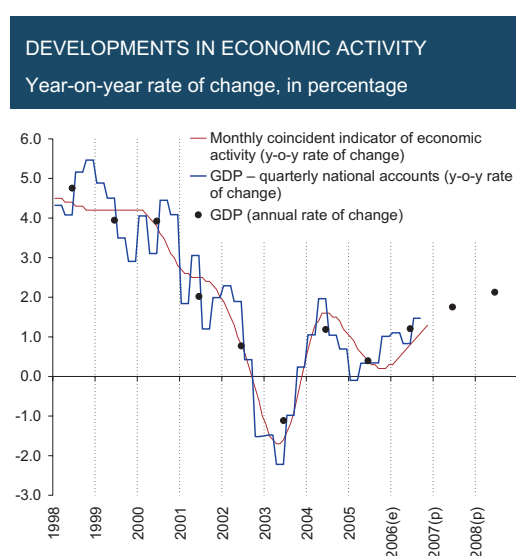
### 3. THE PORTUGUESE ECONOMY: 2007-2008

#### 3.1. Economic activity

According to the projection presented in this article, GDP is estimated to have grown by 1.2 per cent in 2006 (0.4 per cent in 2005), which is similar to the estimate published in the autumn 2006 issue of the *Economic Bulletin*. Over the course of the projection horizon, economic activity is expected to accelerate, with GDP being forecasted to grow by 1.8 per cent in 2007 and by 2.1 per cent in 2008. These developments in economic activity indicate a clear recovery of the pace of growth *vis-à-vis* the recent past, even exceeding the most recent estimates of potential output growth for 2007 and 2008. However, projected GDP growth still implies that the real divergence of the Portuguese economy *vis-à-vis* the euro area will remain unchanged, although it is forecasted that growth of the Portuguese economy will come closer to that recorded in the euro area at the end of the projection horizon.

In the course of 2006, economic activity is estimated to have maintained, in year-on-year terms, the accelerating profile started in the second quarter of 2005 (Chart 3.1.1). This upward profile was temporarily interrupted in the second quarter of 2006, as a result of the dissipation of the base effect observed in the corresponding quarter of 2005, related to the decision to bring forward the purchase of some consumer goods in anticipation of the VAT standard rate increase announced in July 2005. Data

Chart 3.1.1



Sources: INE and Banco de Portugal.

available for a number of indicators, summarised by the coincident indicator of the economic activity trend, point to an acceleration in the course of 2006 (Chart 3.1.1). The current projection indicates that this acceleration is expected to continue up to the end of the projection horizon, albeit at a more moderate pace.

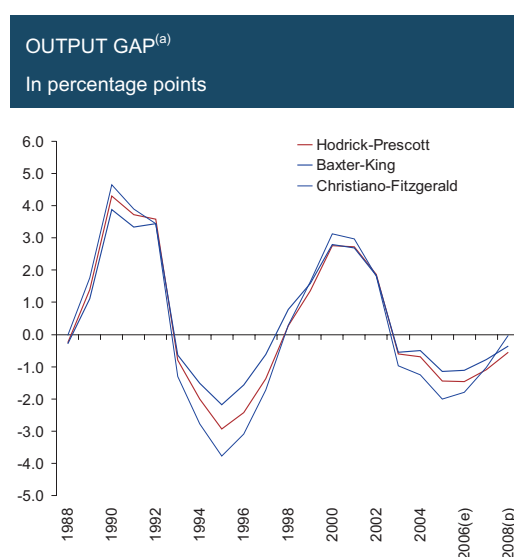
Growth projected for the Portuguese economy exceeds the estimates currently available for the development of potential output over the projection horizon. This implies a gradual narrowing of the output gap, after the peaks reached in 2005-2006 (Chart 3.1.2).

It is estimated that growth in 2006 was characterised by the small contribution of domestic demand (+0.1 p.p.), reflecting a sharp fall in investment and a deceleration in private consumption, while the contribution of net exports stood slightly above +1 p.p., as a result of the significant growth of exports, in parallel with the moderate development of imports (Chart 3.1.3). The present projection includes a gradual recovery of domestic demand and a slowdown in exports, in line with the development of major markets of destination of Portuguese exports. Therefore, the contribution of domestic demand is expected to stand at +1.2 p.p. in 2007 and at +2 p.p. in 2008, while the contribution of net exports is projected to fall to +0.6 p.p. in 2007, and to be only marginally positive in 2008 (+0.1 p.p.). The higher growth of domestic demand in the projection horizon *vis-à-vis* the estimates for 2006 reflects not only the acceleration projected for private consumption, but mainly the resumption of private investment at positive growth rates in the course of the projection horizon.

The comparison of the pace of growth of economic activity and the composition of expenditure across the two periods subsequent to the 1993 and 2003 recessions highlights the weaker buoyancy of the present recovery and the different behaviour of domestic demand in the two recovery stages (Chart 3.1.4).

Concerning economic activity, after the GDP fall in 2003 (-1.1 per cent), it grew slightly more than 1 per cent in 2004, exhibiting a profile similar to that observed after the 1993 recession. However, it slowed down further in 2005, growing only by 0.4 per cent, in contrast with the developments recorded after

Chart 3.1.2



**Note:** (a) For further details on these indicators and on the necessary caution regarding their interpretation, in particular for the most recent years and for the projection horizon, see Almeida, V. and Félix, R. (2006), "Computing Potential Output and the Output Gap for the Portuguese Economy", autumn issue of the *Economic Bulletin*, Banco de Portugal, autumn 2006.

Chart 3.1.3

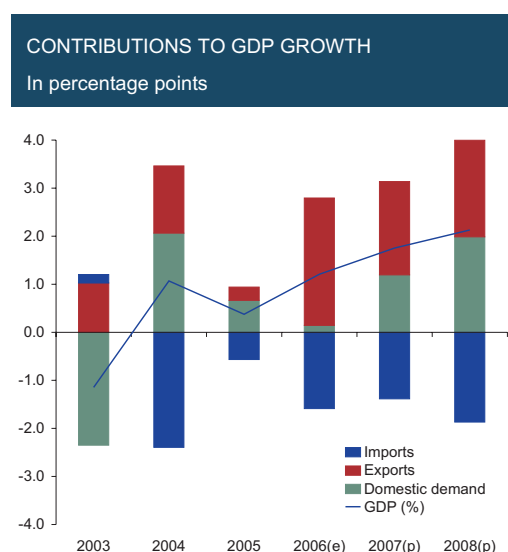
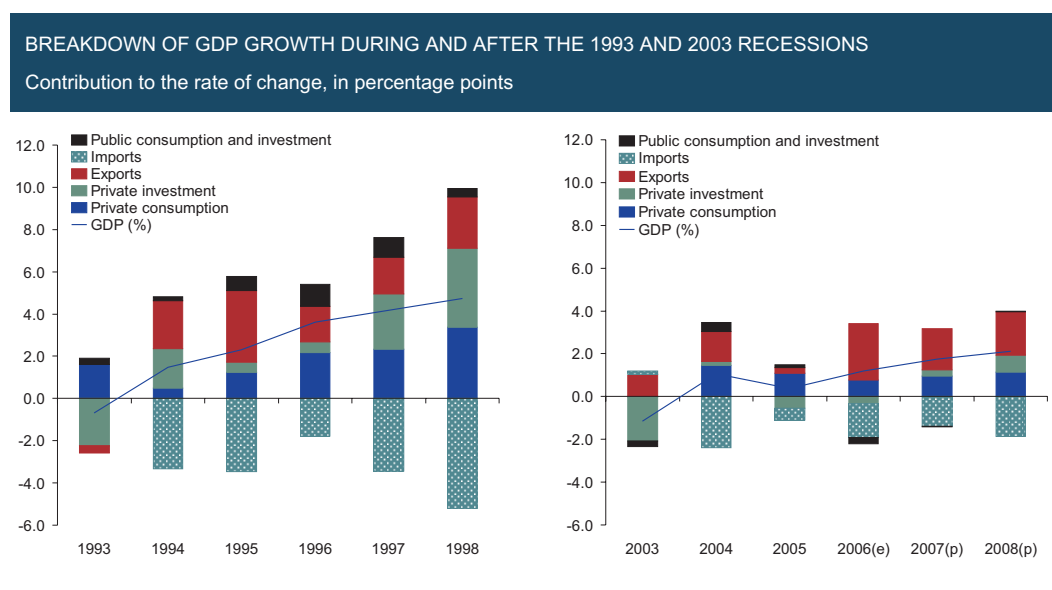


Chart 3.1.4



the 1993 recession episode, when growth of economic activity increased steadily, with GDP growing at a rate above 2 per cent in 1995. The projection presented in this article for the 2007-2008 period points to a gradual increase in GDP growth, reaching approximately 2 per cent in 2008, in contrast to the strength of the recovery observed after the 1993 recession, when GDP growth exceeded 4 per cent in 1997 and 1998.

As regards the composition of aggregate expenditure and the contribution of each component to the growth of economic activity, the current recovery period differs from developments subsequent to the 1993 recession, namely in terms of the lower contribution of domestic demand to growth, since the contribution of exports was only slightly lower.

Turning to households, the indebtedness level as a percentage of the disposable income has continued to increase and this will tend to constrain growth of both private consumption expenditure and housing investment. In addition, the consecutive falls in the level of housing investment are likely to be associated with the strong increase of this type of investment in the second half of the 1990s, which corresponded to an adjustment of the housing stock, in the context of the transition to a regime featured by structurally lower financing costs. Therefore, housing investment is not projected to have a positive contribution before 2008, in contrast to the buoyancy observed after the 1993 recession.

The current fiscal framework of the general government, characterised by an excessive deficit situation, as well as the reforms that are likely to lead to its correction, have strongly restrained growth of both consumption and public investment in 2006. This is anticipated to occur again in forthcoming years, thereby ensuring the full pursuit of the budget consolidation process in course.

Finally, the behaviour of corporate investment has also been different from that observed after the 1993 recession. The consecutive falls in corporate investment in the 2002-2006 period and the forecasted acceleration during the projection horizon shall correspond to an adjustment of the capital stock to an expected trend growth level of demand, which is lower than the one recorded in the period 1994-1998.

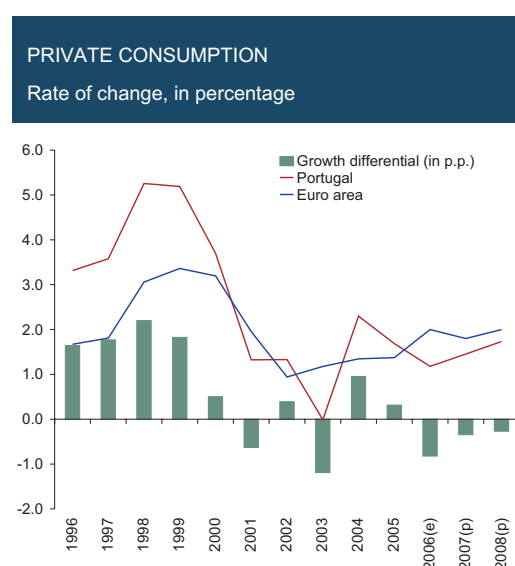
### 3.2. Private consumption

Private consumption is estimated to have decelerated from 1.7 per cent in 2005 to 1.2 per cent in 2006. Contrary to developments in the most recent years, its annual average growth was in line with GDP and lower than that observed in the euro area (Chart 3.2.1). Notwithstanding some recovery, the current projection includes the maintenance of a moderate pace of growth of private consumption, in line with the developments projected for households' real disposable income. Over the projection horizon, private consumption is expected to accelerate to 1.5 and 1.7 per cent in 2007 and 2008 respectively, standing slightly below the levels projected for GDP. Taking as a reference the mid-points of the projection ranges published by the ECB in early December, the growth rate currently projected for private consumption in Portugal will, on average, be lower than in the euro area.

The moderation in households' consumption expenditures after the second half of 2005 is related to the gradual rise in interest rates, the increase in the fiscal burden and the perception of the need to adopt structural measures intended to ensure the correction of the public sector imbalance. Growth of private consumption estimated for 2006 implies an accelerating profile in the second half of the year, with the semi-annual year-on-year rate of change increasing from approximately 0.5 per cent in the first half of the year to around 1.9 per cent in the second half. This profile partly reflects the dissipation of the base effect resulting from the trend of the consumption of durable goods in the second half of 2005, in the wake of the increase in the standard VAT rate. Data available, in particular the coincident indicator of the private consumption trend calculated by Banco de Portugal and the European Commission confidence indicator, also point to an upward profile of private consumption in the second half of 2006 (Chart 3.2.2).

The slight acceleration of private consumption in the course of 2007 and 2008 is associated with gradually more favourable conditions in the labour market, in particular the decline in the unemployment rate, and with an acceleration in real disposable income, determined by the increase in real wages and by the decline in growth of household direct taxation, after the increase observed in 2006. According to data made available by the European Commission, in particular indicators on the economic and finan-

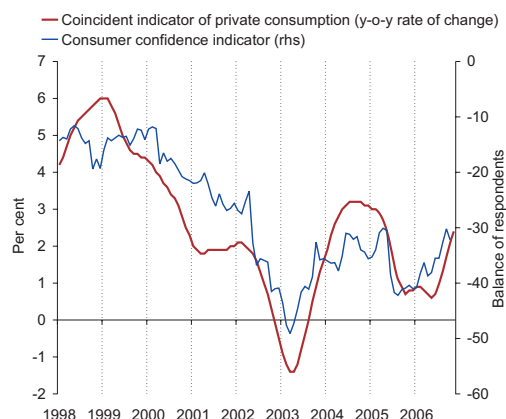
**Chart 3.2.1**



**Note:** For the euro area in 2006, 2007 and 2008, account was taken of the mid-points of the projection ranges published by the ECB in the December 2006 issue of the *Monthly Bulletin*.

Chart 3.2.2

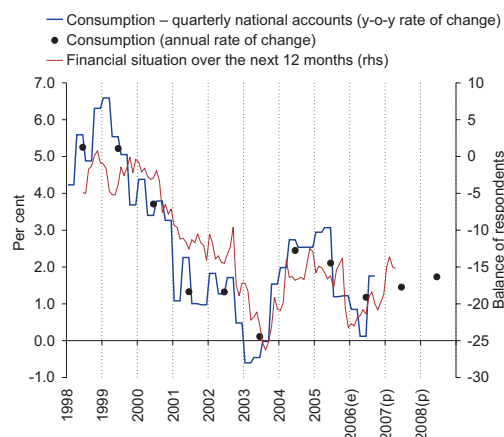
## COINCIDENT INDICATOR OF PRIVATE CONSUMPTION AND CONSUMER CONFIDENCE



Sources: European Commission and Banco de Portugal.

Chart 3.2.3

## PRIVATE CONSUMPTION AND FINANCIAL SITUATION OVER THE NEXT 12 MONTHS



Sources: European Commission, INE and Banco de Portugal.

Note: The series on the financial situation over the next 12 months has a six-month lag, i.e., the values correspond to replies submitted six months earlier.

cial situation of households expected in the coming 12 months, consumer expectations are likely to improve next year (Chart 3.2.3).

Households' consumption decisions over the next 2 years, however, will continue to reflect the limitations imposed by solvency conditions due to inter-temporal budgetary constraints which have turned out to be particularly active in recent years. In the context of a gradual increase in interest rates, consumption is expected to grow in line with real disposable income, in contrast to developments in recent years.

### 3.3. Gross fixed capital formation

Gross fixed capital formation (GFCF) is estimated to have fallen by 3.1 per cent in 2006, after a decline of 2.6 per cent in 2005. Since 2002, the cumulative decline in GFCF reaches approximately 19 per cent, which implies a continued and sharp reduction in the weight of GFCF on GDP (Chart 3.3.1 and Chart 3.3.2). The intra-annual developments of GFCF include a more favourable behaviour at the end of 2006, which is reflected in the improvement in investors' confidence. According to the indicators on the industrial sector published by the European Commission, in particular the overall manufacturing confidence indicator and the production expectations indicator over the next months, investors' expectations have improved in the course of 2006 (Chart 3.3.3).

GFCF is projected to recover in 2007, and to resume positive growth rates, although, in annual average terms, growth of this component is virtually nil. The recovery profile of GFCF started in 2007 is expected to continue in 2008. The investment growth rate is projected to increase significantly to 3.9 per cent, reflecting the favourable evolution projected for housing and corporate investment. Public investment growth rates, in turn, will continue to be negative over the projection horizon, against the background of the necessary correction of the public sector accounts imbalance.



Chart 3.3.1

### BREAKDOWN OF GFCF GROWTH RATE

Contributions for the growth rate (in p.p.)

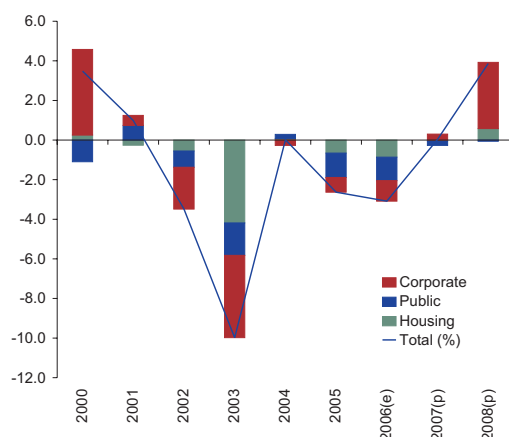
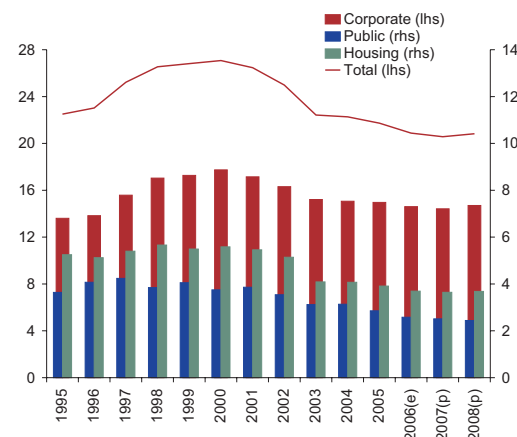


Chart 3.3.2

### INVESTMENT BY INSTITUTIONAL SECTOR

In percentage of GDP



The current projections, after particularly unfavourable developments in GFCF in the recent past, represent an important turnaround in the dynamics of this variable in the near future, wherefore they are subject to an increased level of uncertainty.

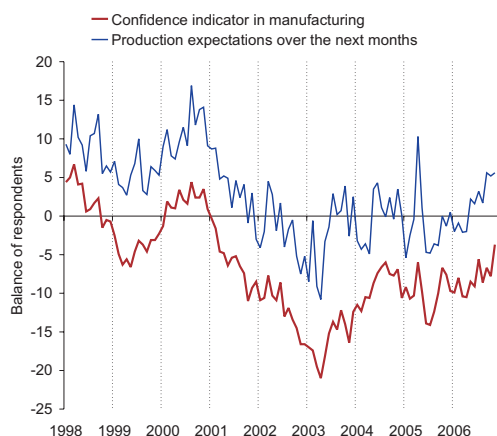
Housing investment is estimated to have fallen further in 2006 (-4.8 per cent), which is expected to continue in 2007 (-0.2 per cent), followed by an increase of 3.3 per cent in 2008.<sup>3</sup> This projection reflects more favourable developments in real disposable income and labour market conditions and an improvement in the households' confidence level. The development of this investment component, however, is still strongly affected by the adjustment process of the very high growth observed in the second half of the 1990s, which corresponded to an adjustment of the housing stock level, against the background of the transition to a regime characterised by structurally lower financing costs. Housing investment is expected to be limited by households' inter-temporal budgetary constraints resulting from the high growth of indebtedness in recent years and from the increase in the debt service as a percentage of disposable income, which has deteriorated due to the gradual interest rate upsurge in the course of 2006. However, financial innovation and growing competition among banking institutions, in particular the extension of deadlines for the redemption of loans and the renegotiation of spreads, have partly mitigated the effects of the transmission of the increase in key interest rates to the debt service of mortgage-backed loans.

Projections for corporate investment point to a growth rate of 0.4 per cent in 2007, after the 1.5 per cent fall estimated for 2006. It is expected to accelerate to 4.8 per cent in 2008. The present projections for the development of corporate investment in 2007 and 2008 are in line with the historical relationship between this component and private GDP growth (Chart 3.3.4). The improvement in demand conditions in the course of 2006 and the favourable development of the budget consolidation process are expected to contribute to the improved confidence level of investors over the whole projection horizon. In 2006, corporate investment decisions have been affected by the uncertainty surrounding the future development of demand, in particular due to the impact of some budget retrenchment measures required for the correction of the public deficit, and the effects of growing international competition in

(3) The cumulative decline in housing investment exceeded 30 per cent in the period 2001-2006.

Chart 3.3.3

## CONFIDENCE INDICATOR AND PRODUCTION EXPECTATIONS IN MANUFACTURING SECTOR

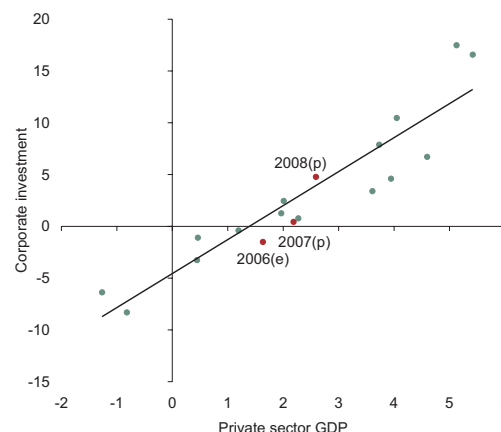


Source: European Commission.

Chart 3.3.4

## CORPORATE INVESTMENT AND PRIVATE GDP

Annual changes in 1991-2006 and projections for 2007-2008, in percentage



some countries with very low unit production costs. This was an additional uncertainty factor with a bearing on external demand developments.

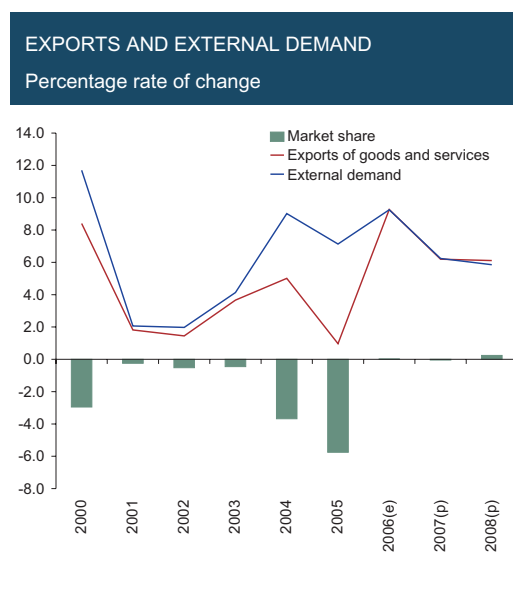
### 3.4. External trade

Similarly to 2006, goods and services exports are likely to remain the most dynamic component of global demand in 2007 and 2008 and to maintain a growth pace in line with that of external demand for Portuguese goods and services.

In 2006 economic activity growth in Portugal was driven by the high buoyancy of exports, which recorded a strong growth rate in the first ten months of the year and a performance pattern quite similar to that of external demand for Portuguese goods and services. This buoyancy is estimated to have lasted until the end of 2006 and the growth pace of overall exports of goods and services is expected to be rather close to that of external demand (Chart 3.4.1). These developments contrast with those seen in the past two years, when Portuguese export companies recorded market share losses in foreign markets, with an estimated cumulative market share loss above 9 p.p in the period 2004-2005.

In 2006 the estimated growth of goods and services exports (9.3 per cent) was chiefly fuelled by strong external demand for Portuguese goods and services, which is estimated to have increased by approximately 9.3 per cent in the year under review. This corresponds to one of the highest growth paces since 1996, only outpaced by 11.7 per cent growth in 2000. It should be noted however that the growth pace of this expenditure aggregate was accompanied by some phenomena, whose sustainability in the future is surrounded by some uncertainty: (i) the still significant contribution to total growth of some specific sectors (oil products, minerals), which took advantage of a particularly favourable juncture that may turn out to be temporary and (ii) the high expansion of exports to markets with a smaller share in overall exports as a whole (Angola, Singapore, Mexico and Brazil). In addition, developments in production in the automobile sector are still subject to some uncertainty which is likely to be affected by the relocation of some automobile manufacturing plants in the European space.

Chart 3.4.1



According to the current projections, developments in goods and services exports as a whole seem to be in line with those in external demand for Portuguese goods and services and therefore in 2007-2008 the market share is projected to remain broadly unchanged. Therefore, exports are expected to decelerate mildly in 2007, due to the smaller growth projected for the demand for imports by Portugal's main trading partners. Current projections point to export growth around 6 per cent, in real terms, in 2007 and 2008, broadly based across both goods and services exports. It should be noted that the growth of tourism exports is projected to be higher than the figure estimated for 2006.

The growth rates of goods and services imports are projected to be 3.5 and 4.7 per cent in 2007 and 2008 respectively. These projections chiefly reflect a performance pattern in line with the historical relationship between imports and global demand weighted by the import content of its several compo-

Chart 3.4.2

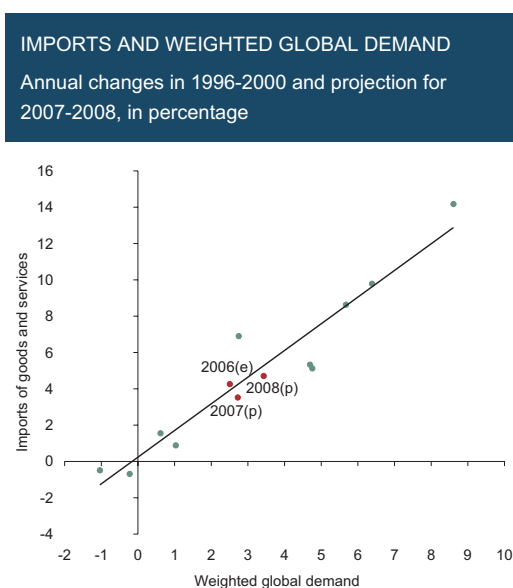
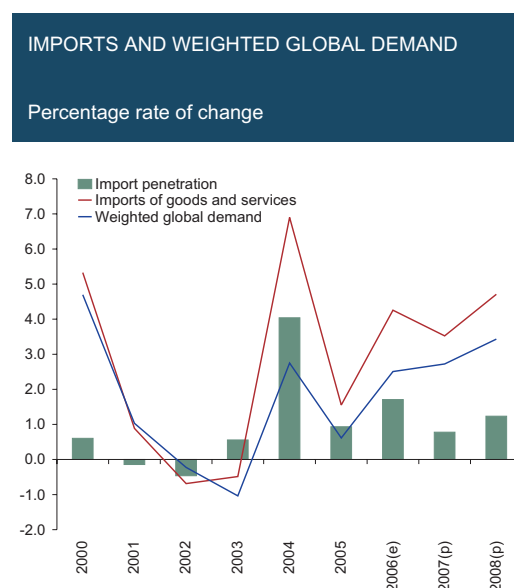


Chart 3.4.3



nents (Chart 3.4.2). Developments foreseen for 2007 represent a slight slowdown compared with 2006, chiefly reflecting a differentiated composition of global demand, with a clear-cut deceleration in exports and the resumption of positive growth rates by corporate investment.

In line with the past few years, in 2007-2008 the import penetration rate in the domestic economy is projected to increase, i.e. import growth is foreseen to be higher than that of global demand weighted by the import content (Chart 3.4.3). This reflects a rise in the import content of the expenditure components (domestic demand and exports) of the domestic economy, mirroring an increasing openness abroad of domestic markets, as a consequence of the deepening of European integration and, in overall terms, of globalisation. In fact, over the past ten years, the weight of imports and exports in GDP increased by around 4 and 3 percentage points respectively.

### 3.5. Current and capital account

According to the current projection, the external borrowing requirements of the Portuguese economy (as measured by the weight of the combined current and capital account on GDP) are likely to decrease over the forecast horizon. External borrowing requirements, after having dropped from 8.1 per cent of GDP in 2005 to 7.6 per cent of GDP in 2006, are projected to decline to 7 per cent of GDP in 2008 (Chart 3.5.1). These developments result from a significant narrowing of the deficit in the trade balance on goods and services, which more than offsets the widening of the income account deficit.

The goods and services account seems to have recorded a slight improvement in 2006, ending the year with a deficit of 7.6 per cent of GDP, compared with a deficit of 8.6 per cent in 2005. This improvement resulted solely from the performance of the trade balance on goods and services excluding energy goods, since energy exchanges are estimated to have contributed to some deterioration of this account, due to the significant rise in oil prices in the course of 2006. The current projection foresees a gradual narrowing of the deficit of the trade balance on goods and services over the projection horizon to 6.4 and 6.0 per cent of GDP in 2007 and 2008 respectively. These developments are likely to be due to a higher growth in the volume of exports than the one projected for the imports, notwithstanding the deceleration assumed for external demand and the expected gradual acceleration of domestic demand and a slight recovery in terms of trade, in a context marked by an interruption of the rising trend of oil prices seen in the past few years. The current level of the external deficit is strongly conditioned by the evolution of oil prices in the past few years and it must be highlighted that the deficit of the trade balance on non-energy goods and services is projected to narrow from 3.5 per cent of GDP in 2006 to 2.4 per cent in 2007 and 2.0 per cent in 2008 (Chart 3.5.2).

In 2006 the income account deficit widened significantly, due to the progressive deterioration of the international investment position of the Portuguese economy over the past few years, which increased with the rise in interest rates. This trend is expected to last over the forecast period – a deterioration of approximately 1 per cent of GDP is foreseen until the end of 2008 – considering the expected successive deficits of the combined current and capital account and the interest rate pattern assumed in the current projection.

The surplus in the combined current transfers and capital account is projected to virtually stagnate at around 2.7 per cent of GDP over the projection horizon (compared with an estimated value of 2.9 per cent of GDP in 2006).

Chart 3.5.1

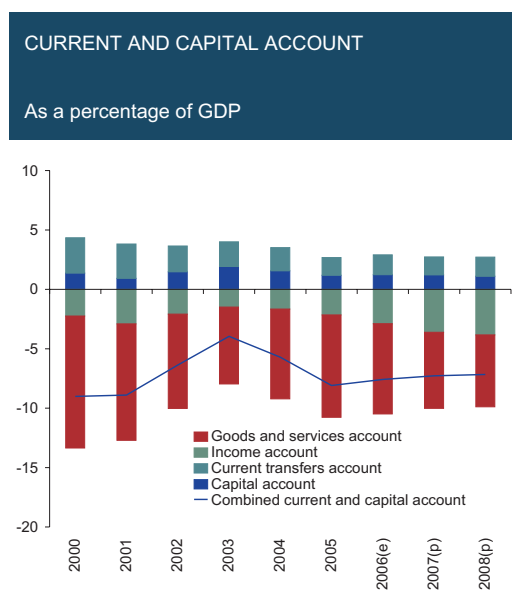
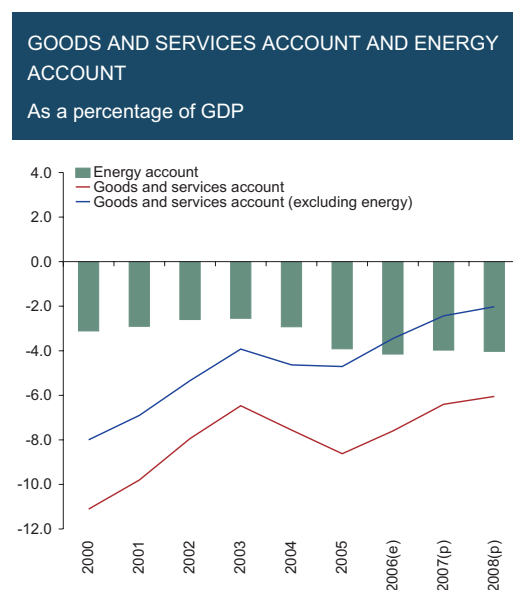


Chart 3.5.2



### 3.6 Inflation

The current projection points to an inflation rate, as measured by the annual rate of change in the HICP, of 2.3 per cent in 2007 and 2.4 per cent in 2008, after 3.0 per cent in 2006 (Table 1.1). Taking as a reference the midpoint of the projection range for euro area inflation, published by the ECB in the December 2006 issue of the *Monthly Bulletin*, the inflation differential *vis-à-vis* the euro area is projected to narrow from 0.9 p.p. in 2006 to 0.3 p.p. in 2007, standing at 0.5 p.p. in 2008<sup>4</sup> (Chart 3.6.1). The persistence of a positive inflation differential seems to be partly related to the maintenance over the projection horizon of a higher growth pace of labour costs in Portugal than that expected for the euro area as a whole.<sup>5</sup>

The projection profile for the annual average rate of change in the HICP in the coming two years is basically associated with the expected performance of the energy component. The interruption of the rising trend seen in the past in oil prices, as well as a marked deceleration in energy prices in the course of 2006, justify an increase in the price of this component of only 0.7 per cent in 2007 and 1.4 per cent in 2008, in annual average terms, compared with an increase of 8.0 per cent in 2006. However, year-on-year, energy prices are expected to remain highly volatile throughout 2007. In particular, it should be noted that the rises announced for the price of electricity – around 6 per cent – and for the tax on oil products, both foreseen for the beginning of 2007, are expected to lead to a temporary rise in the year-on-year rate of change in energy prices.

With regard to the non-energy component of the HICP, the annual average growth rate of these prices is projected to hover around 2.5 per cent, both in 2007 and in 2008, remaining unchanged from 2006 (Chart 3.6.2). This performance pattern is explained, on the one hand, by the current projections for compensation per employee in the private sector, which assume an increase in 2007 and 2008 close to the one recorded in 2006 (in parallel with a slight acceleration in apparent labour productivity). On

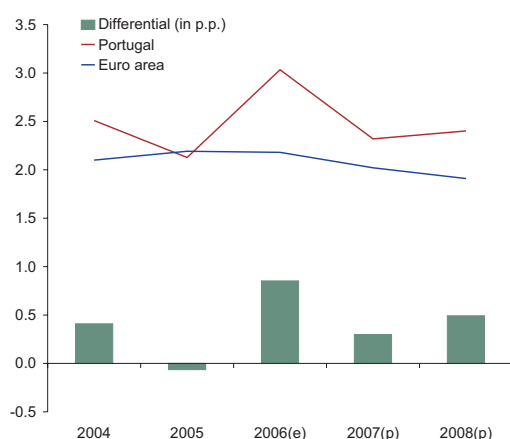
(4) The projections for the euro area inflation are conditioned by the contribution of 0.5 p.p. from indirect taxation for the inflation in 2007, which implies a significant reduction in the differential.

(5) According to the autumn projections from the European Commission the growth in compensation per employee should remain in 2.1, 2.2 and 2.5 per cent in 2006, 2007 and 2008, respectively.

Chart 3.6.1

### INFLATION IN PORTUGAL AND IN THE EURO AREA

Annual average rate of change

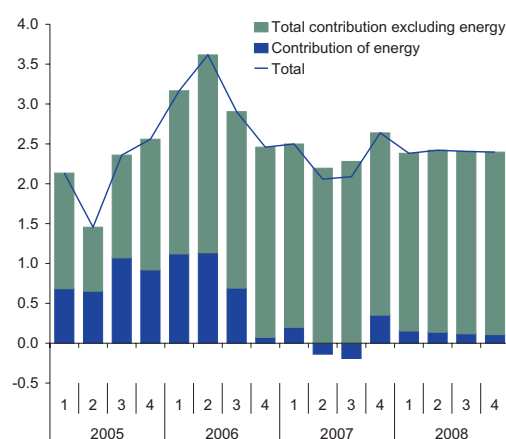


Note: For the euro area in 2006, 2007 and 2008 account was taken of the midpoints of the projection ranges disclosed by the ECB in the December 2006 issue of the *Monthly Bulletin*.

Chart 3.6.2

### INFLATION AND CONTRIBUTION OF ENERGY GOODS

Year-on-year rate of change



the other hand, the rise in import prices of non-energy goods in the coming two years as a whole is expected to be moderate and also similar to that recorded in 2006. These relatively favourable developments in import prices are largely due to the deceleration in the price in euro of non-energy commodities in 2007 and 2008, incorporated in the conditioning assumptions presented in Section 2 (after very high growth rates in 2006), as well as to favourable developments in the export prices of the main suppliers of the Portuguese economy.

## 4. UNCERTAINTY AND RISK ANALYSIS

The main scenario of the current projection is conditional on the assumptions presented in Section 2. The non-materialisation of these assumptions or the emergence of additional factors not incorporated in this projection exercise, but with a direct impact on some variables of that scenario, create risks whose materialisation will bring about a deviation from the projections set out in Table 1.1. This section presents a quantitative assessment of the balance of risks for 2007 and 2008 with regard to GDP and its components, as well as to the inflation rate.<sup>6</sup>

The main external risks surrounding the projections for 2007-2008 relate, on the one hand, to the future behaviour of oil prices, which may be higher than assumed in the main scenario and, on the other, to the effects of an eventual correction of global macroeconomic imbalances, in particular, of the US external deficit. Finally, there is also the risk that the export buoyancy may be lower than assumed in the main scenario.

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

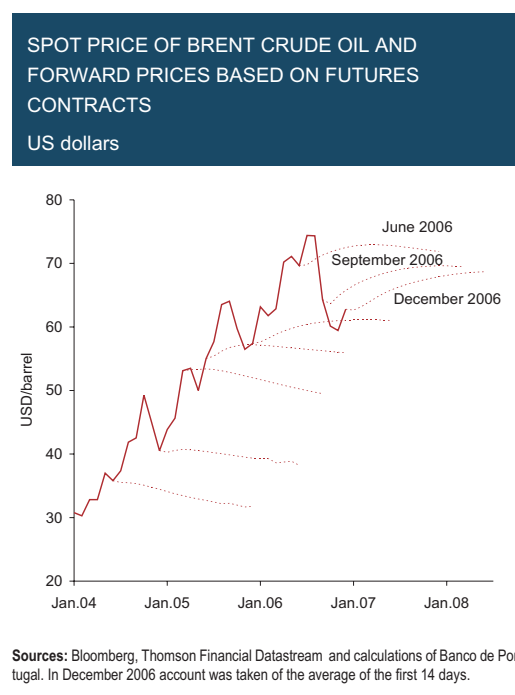
#### 4.1. Risk factors

The conditioning assumption underlying the current projection for the oil price is based on information extracted from futures contracts with different maturities (Chart 4.1.1). However, oil price developments continue to be surrounded by significant uncertainty and, therefore, oil prices may turn out to be higher than assumed in the main scenario. Although this risk is relatively contained, it is based on the high utilisation of the installed productive capacity along the whole production chain of oil, and its by-products, and on the uncertainty resulting from disturbances on the supply side.

With regard to the international juncture, the potential start of a correction of the global macroeconomic imbalances remains a significant risk to developments in the world economy, in particular if this correction embodies an abrupt nature. Although the most likely scenario seems to be that of a gradual adjustment, several economies show sizeable current account imbalances. These may be a large surplus, as in China, or a large deficit, as in the United States. The correction of such imbalances may thus bring about increased risks of expressive capital movements. Should these overall risks materialise, the euro exchange rate may show a tendency towards an appreciation, benefiting from the status of a safe-haven international currency and leading to a loss of competitiveness of the European economies, including the Portuguese economy. A potential appreciation of the euro *vis-à-vis* the US dollar may occur not only in a context of a correction of the trade deficit, but also of an additional contraction of demand in the US, possibly associated with a more intense cooling of the housing market. This may give rise to more moderate growth of the world economy, with an impact in the relevant external demand for the Portuguese economy. All in all, this set of risks creates the possibility of a higher euro exchange rate, both in 2007 and in 2008, as well as of a less buoyant external demand.

Regarding the behaviour of exports, the projected buoyancy embedded in the current projection for 2007 and 2008 may turn out to be more moderate. In 2006, unlike in the previous two years, the behaviour of Portuguese exports was consistent with the maintenance of the country's market share. These developments were underpinned, in part, by strong buoyancy in very specific sectors, as well as by sig-

**Chart 4.1.1**



nificant sales to less usual external markets, a situation which in some cases may not be of a permanent nature. It should be noted that Portuguese exports are still characterised by the strong weight of goods with low technological and human capital content (whose markets have shown weaker growth); in the recent past, the degree of competitiveness has deteriorated, due to competition from the new players in world trade that have lower production unit costs.

## 4.2. Quantification of risk factors

The quantification of the risk factors is based on the definition of several subjective probabilities regarding the non-materialisation of the conditioning assumptions and regarding the emergence of specific impacts on the endogenous variables of the main scenario.

With regard to the price of oil, it was considered that the risks are on the upside, although relatively contained. Thus, it was considered that there is a 45 per cent subjective probability of the price of oil being lower than assumed in the main scenario in 2007 (Table 4.2.1). In addition, for both 2007 and 2008, it was considered that there is a 60 per cent probability of a lower growth in external demand and of an appreciation of the euro exchange rate. In view of eventual losses in market shares in 2007 and 2008, it was considered that export growth, as an endogenous variable, has a 55 per cent probability of falling short of the main scenario in these years.

Taking into account the above-mentioned risk factors, it is possible to quantify the balance of risks to GDP and its components, as well as to the inflation rate (Table 4.2.2 and Charts 4.2.1 and 4.2.2). With regard to economic activity, the risks are biased on the downside.<sup>7</sup> The risks of an appreciation of the euro and of lower external demand pose indirect risks to exports, which are magnified by the direct consideration of lower buoyancy than incorporated in the main scenario. In addition to their direct effects on economic activity, these export developments would give rise to lower domestic demand growth of both consumption and, in particular, of investment, also adding to a higher probability of GDP being lower than assumed in the main scenario.

Regarding the projections for the inflation rate, the risks emerge broadly balanced in 2007 and slightly biased on the downside in 2008. For 2007, the risk of an increase in the price of oil is largely offset by the risk of an appreciation of the euro, giving rise to balanced risks for inflation. In 2008, due to risks regarding economic activity and the direct effects associated with a potential appreciation of the euro exchange rate, the risks for the inflation rate are basically of a smaller increase in prices.

**Table 4.2.1**

SUBJECTIVE PROBABILITIES OF RISK		
In percentage		
	2007	2008
<b>Conditioning variables</b>		
Oil price	45	50
Exchange rate	60	60
External demand	60	60
<b>Endogenous variables</b>		
Exports	55	55

**Table 4.2.2**

PROBABILITY OF AN OUTTURN BELOW THE CENTRAL PROJECTION		
In percentage		
	2007	2008
<b>Gross domestic product</b>	59	58
Private consumption	55	56
GFCF	56	58
Exports	64	64
Imports	60	60
<b>HICP</b>	51	54

(7) A balance of risks on the downside (upside) implies that the probability of the variable in question recording lower than projected figures in the main scenario is higher (lower) than the probability of recording higher than projected figures.



Chart 4.2.1

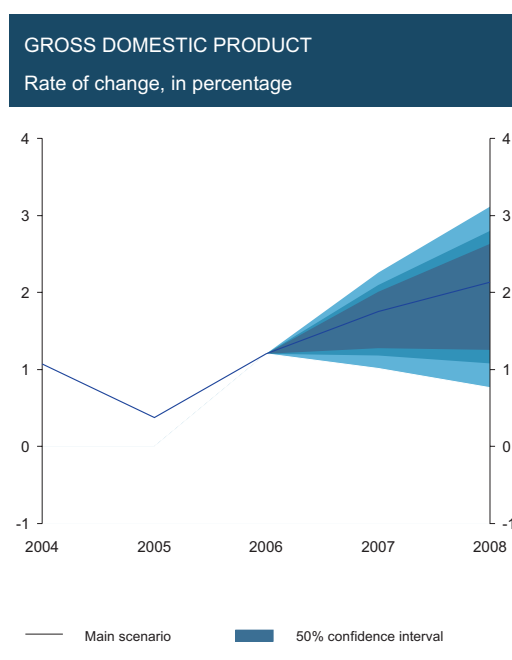
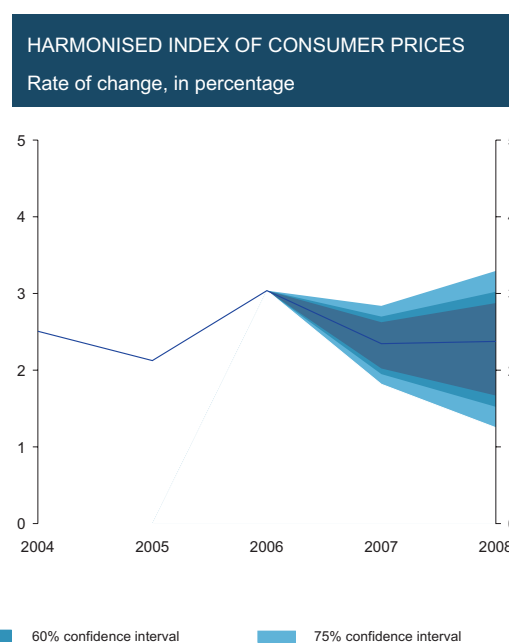


Chart 4.2.2



## 5. CONCLUSION

According to the projections presented in this section, the gradual recovery path of the economic activity, which started in 2006, will continue over the projection horizon. Such developments are supported by a composition of expenditure that is more favourable to the gradual correction of the macroeconomic imbalances, which increased over the first half of this decade and are largely reflected in increased external borrowing requirements and in the ensuing deterioration of the international investment position of the Portuguese economy over that period. The accumulation of such imbalances seems to have been due to the maintenance of high growth in private consumption and in public expenditure that were not compatible with the low growth of domestic supply, in a context of low trend productivity growth.

In the course of 2006, the progressive acceleration of activity was initially based on buoyant exports, boosted by the strong growth of external markets, given that domestic demand stagnated, against a background of private consumption falling back to values more compatible with developments in disposable income and of lower public expenditure in consumption and investment. For 2007 and 2008, projections point to a slowdown in exports in line with developments in demand from the main markets of destination. The progressive acceleration of activity relies, thus, on the gradual pick-up in domestic demand. Such pick-up is associated with a significant recovery in private investment, while private consumption is projected to accelerate moderately in line with developments in disposable income. In turn, the growth rates of public expenditures on consumption and investment are likely to remain close to zero. Against a background marked by the slowdown in the markets of destination of exports, the maintenance of oil prices at historically high levels and a growing income account deficit, this growth pattern, albeit envisaging developments in household and general government expenditures more in line with their current and future financial constraints, it is likely to only permit a gradual decline in the external borrowing requirements of the Portuguese economy.

The projection for the inflation rate points to lower price increases over the forecast horizon, after the strong increase recorded in 2006. The reduction of the inflation rate is largely related to the assumed

stabilisation of oil prices, following the strong growth seen in recent years. Moreover, the unwinding of the effect of the increase in the standard VAT rate in July 2005, the strong deceleration of non-energy commodity prices and subdued developments in import prices are likely to offset possible inflationary pressures associated with the ongoing recovery of economic activity.

As usual, the current projection is not without risks, given that some of its underlying assumptions may not materialise. These risks mainly imply a higher probability of GDP growth being lower than envisaged in the central scenario of the current projection. The possibility of oil prices being higher than expected and the eventual sudden correction of macroeconomic imbalances worldwide would be reflected in a more unfavourable environment for the behaviour of Portuguese exports. This was reflected in risks of an appreciation of the euro exchange rate and more subdued developments in the relevant external demand for the Portuguese economy. In addition, the possible non-occurrence of a number of specific factors that are likely to have contributed to the strong export growth in 2006 may also contribute to a lower growth rate of the Portuguese economy over the projection horizon.

With regard to the inflation rate, the risks are relatively balanced for 2007, while for 2008 the effects related to the possible lower growth of the Portuguese economy, as well as the direct impact associated with the eventual appreciation of the euro exchange rate would tend to contribute to a lower pace of growth of consumer prices.

**Box:** Recent developments in the risk premium of the three-month forward interest rate in the euro area

Since June 2006 the assumptions regarding the short-term interest rate of the Eurosystem's projection exercises have been set according to market expectations. This procedure has also been incorporated in the projection exercises of Banco de Portugal since that date.<sup>1</sup> More specifically, market expectations are proxied by the three-month forward interest rates implied in the yield curve estimated according to the Svensson method (1994).<sup>2</sup> Given that agents are averse to risk, forward interest rates may incorporate a risk premium in addition to market participants' expectations regarding future short-term interest rates. Empirical evidence suggests that this risk premium is variable over time and may be very significant in given periods, namely for horizons over 1 year. In its projections, the Eurosystem opted for using forward rates non-adjusted for the risk premium in the definition of assumptions regarding interest rates. This option was chosen because it can be more easily implemented and communicated, but also because there is no obvious approach for a better estimation of the risk premium. In the euro area this is aggravated by the fact that the sample is of relatively limited size. This box presents estimates for the risk premium of the three-month interest rate over the past year based on two approaches: 1) survey results; and 2) a forecast model of the euro area yield curve estimated by Costa and Galvão (2007).<sup>3</sup>

According to the survey-based approach, the forward premium is calculated as the difference between forward rates and Consensus expectations regarding the three-month interest rate, which are available for the 3-month and 1-year horizons. Chart 1 shows that for the 3-month horizon the risk premium is, in general, relatively low, but for the 1-year horizon it may reach higher values. From late 2005 to mid-2006, the risk premium for the 1-year horizon showed an upward trend, reaching a peak of around 0.5 p.p. in June. Since then, it has declined, standing at very low levels since September.

Chart 2 shows developments in contributions of some factors to recent developments in the risk premium. The decline in the risk premium from September 2006 onwards to values close to zero seems to have been due to the fact that the slope of the yield curve in the euro area became less steep and to the fact that inflation recorded lower than expected values (negative surprise inflation).

In Costa and Galvão (2007), the forward premium is calculated as the difference between the forward rate and the forecast at  $t$  for the interest rate prevailing in the future. The method used consists in an extension of the methodology of Diebold and Li (2006),<sup>4</sup> which is based on the adjustment of the parametric model of Nelson and Siegel (1987)<sup>5</sup> to the yield curve, in order to estimate the curve factors (level, slope and curvature). These factors are subsequently modelled on the basis of a VAR. Finally, the estimates of the VAR are used to compute forecasts of the yield factors, which are used in the Nelson and Siegel regression to obtain interest rate forecasts. Chart 3 shows estimates for the risk premium according to this methodology for the 3-month and 1-year horizons.

For the 3-month horizon, the risk premium is close to zero. The risk premium for the 1-year horizon showed a rising trend in the period under review, moving from negative values of around -0.25 p.p. in September 2005 to around +0.3 p.p. in December 2006.

Chart 4 shows a 90 per cent confidence interval of the estimates of the risk premium for the 1-year horizon. This interval was calculated using the empirical density of the interest rate forecasts obtained with the VAR, i.e. it takes into account that there may be unexpected shocks affecting the yield curve (VAR errors). The confidence interval indicates that, despite the upward trend, the forward premium is not statistically different from zero throughout the whole projection period.

These results confirm that estimates for the forward premium of the three-month rate in the euro area vary depending on the methodology used. In any case, both methodologies suggest that currently the risk of forward interest rates over the 1-year horizon overestimating the true market expectations is relatively low.

(1) See Box 1 entitled "Technical assumption on short-term interest rate developments", summer 2006 issue of the Economic Bulletin of Banco de Portugal.

(2) L. E. O. Svensson (1994), "Estimating and interpreting forward interest rates: Sweden 1992-1994", National Bureau of Economic Research, Working Paper No. 4871.

(3) S. Costa and A. B. Galvão (2007), "The forward premium of euro interest rates", winter 2006 issue of the Economic Bulletin of Banco de Portugal.

(4) F. X. Diebold and C. Li (2006), "Forecasting the term structure of government bond yields", *Journal of Econometrics*, 130: 337-364.

(5) C. R. Nelson and A. F. Siegel (1987), "Parsimonious modelling of yield curves", *Journal of Business*, 60: 473-489.

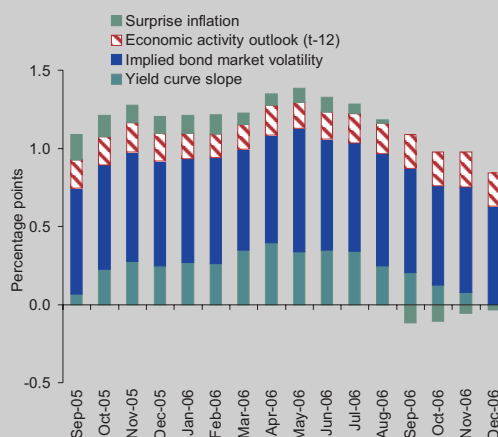
Chart 1

FORWARD RISK PREMIUM OF THE 3-MONTH RATE: DIFFERENCE BETWEEN THE 3 MONTH FORWARD INTEREST RATE AND CONSENSUS EXPECTATIONS



Chart 2

CONTRIBUTIONS TO THE SURVEY-BASED RISK PREMIUM 1-YEAR AHEAD<sup>(a)</sup>



**Note:** (a) Based on a regression of the risk premium of the 3-month rate in the explanatory variables between April 1995 and December 2005. In this regression, data for Germany are used as a proxy for the euro area, given that there are no survey data on euro area interest rate expectations prior to December 2002. For more details, see I. M. Gameiro (2006), "Estimation of the forward risk premium of short-term interest rates based on survey results", *Economic Bulletin*, Autumn, Banco de Portugal.

Chart 3

FORWARD RISK PREMIUM OF THE 3-MONTH RATE



Chart 4

FORWARD RISK PREMIUM OF THE 3-MONTH RATE 1-YEAR AHEAD





## ARTICLES

The Forward Premium of Euro Interest Rates

Relative Export Structures and Vertical Specialization: A Simple Cross-Country Index

The Use of Qualitative Information for Forecasting Exports

The Calculation of Cyclically Adjusted Balances at Banco de Portugal: An update

# THE FORWARD *PREMIUM* OF EURO INTEREST RATES\*

Sónia Costa\*\*

Ana Beatriz Galvão\*\*\*

## 1. INTRODUCTION

The expectations hypothesis is based on the idea that expectations about future interest rates affect the current level of long rates. In these conditions, interest rates expectations may be extracted from the yield curve, which represents interest rates at a given point in time for different maturities. A popular way of extracting market expectations about future interest rates is the computation of the forward rates (i.e., the interest rates contracted today to start in the future) implicit in the yield curve. Such estimates may not be accurate as the forward rate may differ from market expectations by a forward *premium*. In a context of uncertainty, market participants might demand a different return from the expected value to protect themselves from possible surprises.

This paper shows that indeed there is a forward *premium* in the euro area forward rates. We use an extension of the model for forecasting the yield curve of Diebold and Li (2006) to estimate this forward *premium*. The first step of the procedure applies the Nelson and Siegel (1987) regression for computing yield factors (level, slope and curvature). In a second step, these factors are modelled jointly with macroeconomic variables in a vector autoregression (VAR). The estimates of the VAR are used to compute forecasts of the yields factors, which are used in the Nelson and Siegel (1987) regression to obtain yield forecasts. At date  $t$ , the estimate of the  $\tau$ -period forward *premium* for horizon  $h$  is the difference between the implicit forward rate of maturity  $\tau$  contracted in  $t$  to start in  $t + h$  and the forecasts at  $t$  for the yield of maturity  $\tau$  in  $t + h$ .

We also develop a method for calculating confidence intervals for the forward *premium*. The evaluation of the significance of the forward *premium* at each point in time is an important feature of our approach because it helps to decide whether a change in the forward rate is due to a change in the risk *premium* or instead to a change in expected interest rate.

Our sample starts in 1999 and the interest rates consist of euro money market rates and swap rates.<sup>1</sup> The estimation of the risk *premium* using only euro data is not frequently found in the literature.

Our estimates of forward *premium* are positively correlated with the key ECB interest rate. This relation might be explained by the fact that agents change their probability distributions about future interest rates when policy rates are increasing (decreasing) such that they increase (decrease) the probability of future interest rates being larger (smaller) than their actual expected values. Because interest rates higher than expected are bad news, a move of the distribution to the right implies a higher risk *premium*.

\* The views expressed are of the authors and do not necessarily reflect those of the Bank of Portugal. We would like to thank Rita Lourenço for the computation of the option-implied skewnesses and the comments and suggestions made by Isabel Gameiro and João Sousa.

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(1) In Costa and Galvão (2007) we use also a longer set of data which consists of German interest rates in the period before the introduction of the euro. When using that set of data we identify a break in the dynamic correlation between yield factors in the period 2000-2001. Because this break affects the estimates of the forward *premium*, we advice to use only information after 1999 to compute the euro forward premium.

The second section of the paper reviews the definitions of risk *premium* and the expectations hypothesis. The section that follows describes our method to compute the forward *premia*. Section 4 presents empirical results on the biases of the forward rates when forecasting 3-month interest rates. It also shows that this is in part caused by a forward *premium*. Section 5 presents our estimates of the forward *premia*. Section 6 includes some concluding remarks.

## 2. THE EXPECTATIONS HYPOTHESIS AND THE RISK PREMIUM

This section presents notation and concepts that are important to understand the different definitions of risk *premia*. The risk *premium* on interest rates depends on the definition of the expectations hypothesis of the term structure of interest rates employed to compute the risk neutral component of the interest rates.

Cochrane (2001) defines the *yield* of a bond as “the fictional, constant, known, annual, interest rate that justifies the quoted price of a bond, assuming that the bond does not default” (p. 348). From this definition, the gross yield of a zero-coupon bond with maturity  $n$  and price  $P_t^{(n)}$  is  $Y_t^{(n)}$  that satisfies

$$P_t^{(n)} = \frac{1}{[Y_t^{(n)}]^n}. \text{ Assuming that the price of a bond at the maturity date is } 1 (P_t^{(0)} = 1), \text{ the return of holding}$$

a  $n$ -period bond until maturity (return to maturity) corresponds to  $R_t^{(n)} = \frac{1}{P_t^{(n)}}$ . Using these variables in

logs, we can see that the log-yield of a zero-coupon bond  $\left(Y_t^{(n)} = \frac{p_t^{(n)}}{n}\right)$  corresponds to the log-return

per period  $\left(Y_t^{(n)} = \frac{r_t^{(n)}}{n}\right)$ .<sup>2</sup> In addition to the yield and the return to maturity, the holding period return and

the forward rate are also obtained from the log-price of a zero-coupon bond. The *holding period return* is the return from holding a bond with maturity  $n$  over the next period (i.e., from  $t$  to  $t+1$ ):  $hpr_{t+1}^{(n)} = p_{t+1}^{(n-1)} - p_t^{(n)}$ . The *one-period forward rate* is the interest rate contracted today to start in  $n$  periods from now and with maturity in  $n+1$  periods from now, that is,  $f_t^{(n,n+1)} = p_t^{(n)} - p_t^{(n+1)}$ . The one-period forward rate can be also written using the yields as  $f_t^{(n,n+1)} = Y_t^{(n+1)} + n(Y_t^{(n+1)} - Y_t^{(n)})$ .

“The yield curve is a plot of yields of zero-coupon bonds as a function of their maturity” (Cochrane, 2001, p. 352). Most of the times, the yield curve is upward sloping. Based on the definition of the forward rate using the yields, one can show that the one-period-forward rate is above the yield for the same  $n$  if the yield curve is upward sloping.

The expectations hypothesis describes the relationship between returns on zero-coupon bonds of different maturities. It is based on the idea that expectations about future interest rates affect the current level of long rates. As Cox, Ingersoll and Ross (1981) point out there are four different formulations of the expectations hypothesis:

- (i) The yield of a zero-coupon bond that matures in  $n$  periods is equal to the average of the expected one-period yields (yield to maturity hypothesis):

$$Y_t^{(n)} = \frac{1}{n} E_t(Y_t^{(1)} + Y_{t+1}^{(1)} + \dots + Y_{t+n-1}^{(1)})$$

(2) In Cochrane (2001) notation, the yield (and the return) correspond to one plus the interest rate, that is, it corresponds to the gross yield (return). In logs, this distinction is not relevant since  $\ln(1+i) \approx i$ . It is also important to notice that  $Y_t^{(n)}$  corresponds to the continuously compounded interest rate. This is so because the relation between the continuously compounded interest rate ( $i^c$ ) and the price of a bond with maturity  $n$  is  $e^{ni^c} = \frac{1}{P_t^{(n)}}$ , and the relation between  $i^c$  and an annually compounded interest rate ( $i^a$ ) is  $i^c = \ln(1+i^a)$ .

- (ii) The return to maturity of a  $n$ -period bond is equal to the expected return of rolling over a series of single-period bonds (return to maturity hypothesis):

$$r_t^{(n)} = E_t(r_t^{(1)} + r_{t+1}^{(1)} + \dots + r_{t+n-1}^{(1)})$$

- (iii) The one-period forward rate  $n$ -periods ahead is equal to the corresponding expected one-period spot rate (unbiased expectations hypothesis):

$$f_t^{(n, n+1)} = E_t(y_{t+n}^{(1)})$$

- (iv) The expected holding period return of a bond with maturity  $n$  is equal to the current one-period interest rate (local expectations hypothesis):

$$E_t(hpr_{t+1}^{(n)}) = y_t^{(1)}$$

In practice the above relations do not necessarily hold. The difference between the left-hand side and the right-hand side of the above equations is then called the risk *premium*. If the expectations hypothesis holds in its pure form, the risk *premium* will be zero. However, it is generally considered that the expectations hypothesis holds if the risk *premium* is constant over time. For the empirical testing of the expectations hypothesis, the definition (i) is the most popular, because it can be tested using restrictions in a vector autoregression of yields of different maturities and/or using cointegration. The results depend in general on how large  $n$  is. For large  $n$ , the hypothesis of a constant risk *premium* is in general not valid.

The four different formulations of the expectations hypothesis imply different measurements of the (time-varying) risk *premium*. The premium derived from definition (i) is frequently called as yield *premium*, term *premium* or rollover term *premium*. The *premium* arising from definitions (iii) and (iv) are called (one-period) forward *premium* and (one-period) holding *premium*. Finally, the *premium* corresponding to definition (ii) is not usually calculated. The nomenclature of the different risk *premium* is sometimes confusing. In fact, many authors (as, for example, Singleton, 2006) use the name term *premium* to refer generically to risk *premium* because it arises from the existence of different maturities in the yield curve. In this paper we will refer to the *premium* derived from definitions (i) up to (iv) respectively as yield *premium*, return *premium*, one-period forward *premium* and one-period holding *premium*.

In Costa and Galvão (2007) we show that in this particular case, where the variables are in logs and time is discrete, these four different ways of defining the expectations hypothesis are mathematically equivalent. As a consequence the yield *premium* of a bond with maturity  $n$  is equal to its return *premium* divided by  $n$  to the average of the one-period forward *premium*, and to the one-period holding *premium*.

### 3. PROCEDURES FOR THE ESTIMATION OF THE FORWARD *PREMIA*

In the previous section, we described four different ways of writing the expectations hypothesis and their implications for the definition of the risk *premium*. In this section, we describe the method we will use for computing the risk *premium*.

The method used here is an extension of Diebold and Li (2006), which is based on the Nelson and Siegel (1987) parametric yield curve fitting. This method will be applied specifically for the forward *premium*, but it could also be useful to compute the other definitions of risk *premium*. The emphasis on the



forward *premium* arises from the fact that we want to use the information in the yield curve to obtain market forecasts of future interest rates.

In general one might be interested in forecasting interest rates of maturity higher than one period. The  $\tau$ -period forward rate, i.e., the interest rate contracted today to start in  $n$  periods and with maturity in  $n + \tau$  periods, corresponds to:

$$f_t^{(n, n+\tau)} = \frac{1}{\tau} \left[ \tau y_t^{(n+\tau)} + n \left( y_t^{(n+\tau)} - y_t^{(n)} \right) \right] = \frac{1}{\tau} \left[ (n + \tau) y_t^{(n+\tau)} - n y_t^{(n)} \right]. \quad (1)$$

The  $\tau$ -period forward *premium* is:

$$frp_t^{(n, n+\tau)} = f_t^{(n, n+\tau)} - E_t \left( y_{t+n}^{(\tau)} \right). \quad (2)$$

The forward rates  $f_t^{(n, n+\tau)}$  can be computed using the yield (spot) rates  $y_t^{(n+\tau)}$  and  $y_t^{(n)}$ . However, the maturities of observable yields may not match the ones required to compute the forward rates that we are interested. Thus, it is necessary to fit a curve for the observable yields, so that one can use the fitted yields to compute forwards for any desired maturity and horizon. We use the Nelson and Siegel (1987) parametric approach for fitting the yield curve. The Nelson and Siegel equation for the spot rate (yield on zero-coupon bonds) with maturity  $\tau$  at a given point in time  $t$  is:

$$y_t^{(\tau)} = \beta_{1t} + \beta_{2t} \left( \frac{1 - e^{-\theta_t \tau}}{\theta_t \tau} \right) + \beta_{3t} \left( \frac{1 - e^{-\theta_t \tau}}{\theta_t \tau} - e^{-\theta_t \tau} \right), \quad (3)$$

where  $\beta_{1t}$ ,  $\beta_{1t} + \beta_{2t}$  and  $\theta_t$  must all be positive. The parameters  $\beta_{1t}$ ,  $\beta_{2t}$  and  $\beta_{3t}$  are called yield factors and are interpreted as the level ( $L_t$ ), the symmetric of the slope ( $-S_t$ ) and the curvature ( $C_t$ ) of the yield curve.  $\theta_t$  is the parameter that measures the rate of the exponential decay of the loading of the second and the third factors. Smaller  $\theta_t$  implies slower decay. This parameter also defines the maturity at which  $\beta_{3t}$  has larger weight. Following Diebold and Li (2006) we fix  $\theta_t$  in the value that the maturity of almost 3 years has the highest loading for  $\beta_{3t}$ .<sup>3</sup> An advantage of keeping  $\theta_t$  fixed is that the factors can be estimated by the usual least squares formula. Diebold and Li (2006) also argue that the estimates of the factors are more stable over time when  $\theta_t$  is fixed, which is an advantage when one is interested in predicting the yield factors.

For the estimation of the  $\tau$ -period forward *premium*, one also needs  $E_t \left( y_{t+n}^{(\tau)} \right)$ , which can be estimated as a  $n$ -period ahead forecast for the yield with maturity  $\tau$  ( $\hat{y}_{t+h|t}^{(\tau)}$ , where  $h = n$ ). The Nelson and Siegel (1987) approach for fitting the yield curve can be used to forecast yields of different maturities. Using the name of factors and a fixed  $\theta_t$ , the Nelson and Siegel regression for forecasting a yield of maturity  $\tau$  at  $h$ -steps ahead conditional on information at  $t$  is:

$$\hat{y}_{t+h|t}^{(\tau)} = \hat{L}_{t+h|t} - \hat{S}_{t+h|t} \left( \frac{1 - e^{-\bar{\theta} \tau}}{\bar{\theta} \tau} \right) + \hat{C}_{t+h|t} \left( \frac{1 - e^{-\bar{\theta} \tau}}{\bar{\theta} \tau} - e^{-\bar{\theta} \tau} \right). \quad (4)$$

Diebold and Li (2006) suggest the estimation of an autoregressive model of order one (AR(1)) for each factor to be able to compute  $\hat{L}_{t+h|t}$ ,  $\hat{S}_{t+h|t}$  and  $\hat{C}_{t+h|t}$ . However, there is some important dynamic correlation between the slope, the level and the curvature. Thus, we consider a VAR(1) to be more adequate.

(3) In Costa and Galvão (2007) we also use other methods for fitting the yield curve: Nelson and Siegel (1987) without fixed  $\theta_t$  and Svensson (1994). We conclude that the improvement in the fit of the yield curve of using these alternative methods is small. In particular, it is not large enough to reduce significantly the error of using the forward rate for forecasting the interest rates.

Using the estimated factors at each time ( $t = 1, \dots, T$ ), we define a VAR(1) for modelling the vector  $x_t = (\hat{L}_t \ -\hat{S}_t \ \hat{C}_t)'$  as:

$$x_t = c + \Phi_1 x_{t-1} + \varepsilon_t. \quad (5)$$

Conditional on the estimated parameters, we use this VAR to generate  $h$ -step-ahead forecasts as:

$$\hat{x}_{t+h|t} = \left(1 + \hat{\Phi}_1 + \dots + (\hat{\Phi}_1)^{h-1}\right) \hat{c} + (\hat{\Phi}_1)^h x_t. \quad (6)$$

There are several recent papers modelling the relation between factors of the yield curve and some important macroeconomic variables (for example, Ang and Piazzesi, 2003; Diebold *et al.*, 2006; Rudebush and Wu, 2004; Hordahl *et al.*, 2006). One simple way of adding information of macroeconomic variables to predict the factors of the yield curve is to augment the VAR of equation (5) with a small group of variables. We estimate two specifications of the VAR: one with only the yield factors and another including also inflation and real activity growth. These macroeconomic variables were chosen because there is evidence in the literature of a strong dynamic relation between them and yield factors.<sup>4</sup>

An alternative to our approach of estimating the factors in a first step and the dynamic relation of the factors in the second step is the one proposed by Diebold *et al.* (2006). Diebold *et al.* (2006) show how to jointly estimate the yield factors (eq. 3) and the coefficients of a VAR of yield factors and macroeconomic variables (eq. 5), using a state-space representation by Kalman filtering and maximum likelihood estimation. A disadvantage of the joint estimation of the parameters and the three unobserved factors, which are non-linearly related with observable yields, is the challenge in the numerical optimization procedure. In addition, because the yields have a high persistence over time, the time-dependence of the factors may be captured even when the regression is computed independently each time. Another issue is that the three factors explain most of the variation of the yields, implying that the inclusion of the macro variables does not affect the estimation of the factors. However, when using the VAR for forecasting yield factors, it is important to consider the dynamic relation between the macro variables and the yield factors because there is a strong relation between them. With the support of previous statements, our two-step estimation may generate yield forecasts similar to the ones implied by the model of Diebold *et al.* (2006). In addition, the use of a method which is less demanding in computation reduces the problem of using a sample as short as the one available after the euro introduction. Similar two-step approaches have been employed by Carriero *et al.* (2006) and Favero and Kaminska (2006).

Based on forecasts of the yields  $y_{t+h|t}^{(\tau)}$  and on the forward rates, the forward *premia* can be computed with equation (2). However, the computation of the forward *premia* does not give information on whether they are statistically different from zero at each point in time. Even if the expectations hypothesis is rejected for the whole sample, it may be the case that at a specific point in time, it may not be possible to exclude that the forward *premia* may not be statistically significant. We propose a bootstrap procedure for computing the confidence intervals of the estimates of the forward *premia* at each point in time. The procedure, described in detail in Costa e Galvão (2007), is based on the empirical predictive density of  $y_{t+h|t}^{(\tau)}$ , which is the main source of uncertainty on the estimation of the *premia*.

(4) For empirical evidence in the case of euro area or some euro area countries see, for instance, Estrella *et al.* (2003), Moneta (2003), Duarte *et al.* (2005), Hordahl *et al.* (2006) and Cappiello *et al.* (2006).

#### 4. IS THERE A FORWARD PREMIUM?

In this section, we start by evaluating the fit of our method in the estimation of the yield curve. Then we calculate the implied 3-month forward rates and evaluate the bias in forecasting the observed 3-month interest rates. Finally, we compute forecasts for the 3-month interest rates with the method described in the previous section and compare the mean forecast errors with the ones obtained with the forwards.

Our sample starts in January 1999 and ends in June 2006. The interest rate data are EURIBOR rates for maturities 1, 3, 6, 9 and 12 months and euro swap rates for each year between 2 and 10 years. The euro swap rates are from Thomson Financial DataStream. The EURIBOR rates are transformed into continuously compounded rates to be compatible with the Nelson and Siegel (1987) parameterization. The interest rate data correspond to end-of-month values. Inflation is measured by the annual growth rate of the euro area Harmonized Index of Consumer Prices. Real activity growth is measured by the annual growth rate of the euro area industrial production excluding construction. Both series were taken from the Eurostat.

Table 1 presents the square root of the mean of the squared residuals for each maturity of estimating a yield curve with Nelson and Siegel (1987) method, when  $\theta_t$  is kept fixed and equal to 0.0542, implying that the curvature has the largest loading at a 3-year maturity.<sup>5</sup> The worst fit is detected for the one-month maturity and some intermediate maturities (1 and 2 years) but the maximum error is only of 6 basis-points.

Based on the estimated yields and using expression (1), the 3-month forward rates ( $\tau = 3$ ) are computed quarterly for horizons up to three years ( $n$  corresponds to  $h = 3, 6, \dots, 36$ ). Table 2 includes the average forecast errors of using the forwards to predict the 3-month spot interest rates. Both the forward rates and the observed 3-month interest rates ( $y_{t+h}^{(3)}$ ) are transformed to be annually

**Table 1**

FIT OF THE YIELD CURVE WITH NELSON AND SIEGEL (1987) WITH FIXED $\theta$													
Square root of the mean of squared residuals of each maturity.													
$\tau$ (maturity measured in months)													
1	3	6	9	12	24	36	48	60	72	84	96	108	120
0.061	0.039	0.033	0.046	0.052	0.053	0.032	0.030	0.036	0.031	0.017	0.009	0.022	0.036

**Table 2**

MEAN FORECAST ERRORS OF THE 3-MONTH FORWARD RATES <sup>(a)</sup>											
$t+h$ ( $h$ corresponds to the forecasting horizon measured in months)											
$t+3$	$t+6$	$t+9$	$t+12$	$t+15$	$t+18$	$t+21$	$t+24$	$t+27$	$t+30$	$t+33$	$t+36$
<b>0.131</b>	0.278	0.457	0.673	<b>0.900</b>	<b>1.164</b>	<b>1.450</b>	<b>1.741</b>	<b>2.004</b>	<b>2.240</b>	<b>2.426</b>	<b>2.548</b>
(0.061)	(0.149)	(0.262)	(0.365)	(0.441)	(0.464)	(0.450)	(0.414)	(0.374)	(0.327)	(0.297)	(0.294)

**Note:** (a) For example, for a horizon of 12 months it corresponds to the difference between the 3-month forward rate contracted in  $t$  to start in  $t+12$  and the 3-month interest rate observed in  $t+12$ . The values in brackets are standard deviations of the forecast errors computed using the Newey-West estimator with lag truncation  $h-1$ .

(5) The estimates of the curve are obtained with Gauss CML package (with BFGS).

compounded in order to be compatible with the usual form of presentation of these series. The emboldened values of the 3-month horizon and of horizons higher than 1 year mean that the  $t$ -statistics, calculated using the estimates and standard errors, are larger than 2, implying a rejection of the null that the forecast error is equal to zero.

The bias identified when forward rates are directly used as forecasts of future spot rates may be the result of either a forward *premium* or of poor forecasts of the future short-term interest rates, due to unexpected shocks. As a consequence, we evaluate whether the approach for forecasting the yields described in the previous section can generate forecasts of short-term interest that are unbiased. If there is still a failure in predicting at long horizons, we would attribute it to errors in forecasting interest rates. In fact, unexpected changes in interest rates take longer to be incorporated when forecasting long horizons because of the longer time required to observing them.

For computing the forecasts, we estimate the VAR (eq. 5) using only the information of yield factors ( $x_t = (\hat{L}_t - \hat{S}_t \ \hat{C}_t)'$ ) and also adding information of real activity growth ( $g_t$ ) and inflation ( $\pi_t$ ) ( $x_t = (\hat{L}_t - \hat{S}_t \ \hat{C}_t \ g_t \ \pi_t)'$ ). We then use the estimated VAR to generate  $h$ -step-ahead forecasts of the 3-month interest rate (eq. 6 and eq.4 ).

Table 3 presents the mean of the forecast errors in predicting the 3-month interest rates at horizons between 3 and 36 months. The forecasts use full sample information on the estimation of the VAR parameters, but they use information on yields up to  $t$ . The emboldened entries indicate again the rejection of the null that the average forecast error is equal to zero. There is some evidence of bias at long horizons, but the bias is on average three to five times smaller than using the forward. There is also some weak evidence that the inclusion of macroeconomic variables improves the forecasting performance.

Summarizing the results indicate that our approach generates unbiased forecasts at horizons shorter than two and half years and that the forward rates generate biased forecasts for horizons larger than 1 year. This suggests that the bias obtained when using forward rates as forecasts is in part caused by a forward *premium*. For long horizons, part of the bias arises from unexpected changes in interest rates. The estimates of the biases at the 3-year horizon presented in Table 3 suggest that around 1/4 of the bias incurred by the use of forward rates as forecasts is caused by unexpected shocks, while around 3/4 of the bias could be explained by forward *premium*.

**Table 3**

MEAN FORECAST ERRORS OF THE EXTENDED DIEBOLD AND LI (2006) APPROACH <sup>(a)</sup>											
$t+h$ ( $h$ corresponds to the forecasting horizon measured in months)											
$t+3$	$t+6$	$t+9$	$t+12$	$t+15$	$t+18$	$t+21$	$t+24$	$t+27$	$t+30$	$t+33$	$t+36$
-0.008 (0.062)	-0.045 (0.137)	-0.061 (0.237)	-0.040 (0.328)	0.003 (0.396)	0.094 (0.419)	0.223 (0.410)	0.372 (0.380)	0.508 (0.341)	<b>0.629</b> (0.284)	<b>0.713</b> (0.225)	<b>0.743</b> (0.180)
Results with macroeconomic variables											
-0.011 (0.056)	-0.046 (0.105)	-0.064 (0.171)	-0.056 (0.231)	-0.040 (0.279)	0.016 (0.303)	0.105 (0.310)	0.213 (0.302)	0.313 (0.286)	0.403 (0.251)	<b>0.463</b> (0.208)	<b>0.476</b> (0.174)

**Note:** (a) For example, for a horizon of 12 months it corresponds to the difference between the extended Diebold and Li (2006) 12-month ahead forecast of the 3-month interest rate and the 3-month interest rate observed in  $t+12$ . In the results with macroeconomic variables, the VAR employed in the forecast includes in addition to the yield factors inflation and economic growth. The values in brackets are standard deviations of the forecast errors computed using the Newey-West estimator with lag truncation  $h-1$ .

## 5. THE FORWARD *PREMIA* OF EURO INTEREST RATES

The results presented in the last section support the existence of forward *premia* on the euro area 3-month interest rates. In the first part of the present section, we present our estimates of the average forward *premia* for different horizons. In the second part, we evaluate the behaviour of the estimates of the forward *premium* along the sample period. We first compare the estimates with the estimated confidence intervals. Finally, we analyse our estimates in comparison with the key ECB interest rate and the skewness of the option-implied probability distribution of interest rates futures.

### 5.1. Forward *premium* for different horizons

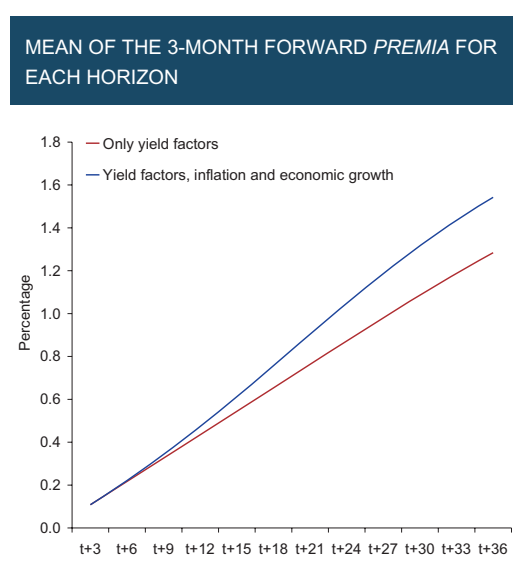
The 3-month forward *premia* for each horizon are calculated as the difference between the implied 3-month forward rates and the forecasts with the extended Diebold and Li (2006) approach of the 3-month interest rate:

$$\hat{frp}_t^{(h, h+3)} = \hat{f}_t^{(h, h+3)} - \hat{y}_{t+h|t}^{(3)}.$$

Chart 1 presents the mean in our sample period of the estimated 3-month forward *premia* for horizons from 3 to 36 months with and without the inclusion of macroeconomic variables. One can see that the forward *premium* monotonically increases with the horizon. The fact that the risk *premia* increase with maturity is a standard result also obtained for German and euro area data in Hordahl *et al* (2006) and Capiello *et al* (2006).

The inclusion of macroeconomic variables increases the average of the estimated forward *premia*. In general, as referred in the evaluation of Table 3, the reductions in the positive bias are marginal. The inclusion of these additional factors leads also to marginal reductions of the variance of the shocks employed in the computation of the confidence intervals for the forward *premia* over time. Therefore, we will present estimates of the forward *premia* only with the inclusion of macroeconomic variables in the remaining of the paper. Our results do not change qualitatively if these variables are removed from the VAR.

Chart 1



## 5.2. Forward *premia* and confidence intervals over time

Chart 2 presents the estimated 3-month forward *premia* for forecasting horizons 3, 12, 24 and 36 and their 90 per cent confidence intervals. The forward *premia* are not significantly different from zero for the 3-month horizon, even though the point estimates are positive. In the remaining forecasting horizons, the forward *premia* are significantly positive in some periods between 1999:6 up and 2002:10, with the duration of these periods being higher for longer horizons. The variability of the forward *premia* increases with the horizon because the variability of the forecast yields with the extended Diebold and Li (2006) approach decreases with the horizon. The finding that the variability of the *premia* increases with the horizon is also obtained by Hordahl *et al* (2006) with an affine term-structure model augmented with a dynamic structural macro model.

The time-varying behaviour of the estimated forward *premia* has some resemblance with the yield *premia* computed by Werner (2006) with an affine term-structure model. For the longest horizons, the *premia* increase in 1999, start to decrease in 2000, and only reverse the downward trend in mid-2005. Our results are also similar to the one-year yield *premium* estimated with data after 1999 by Capiello *et al* (2006). The fact that our measure of forward *premium* does not differ significantly from the ones presented in the literature based on affine term-structure models gives support to the use of our method, which is less demanding in computation.

Chart 2

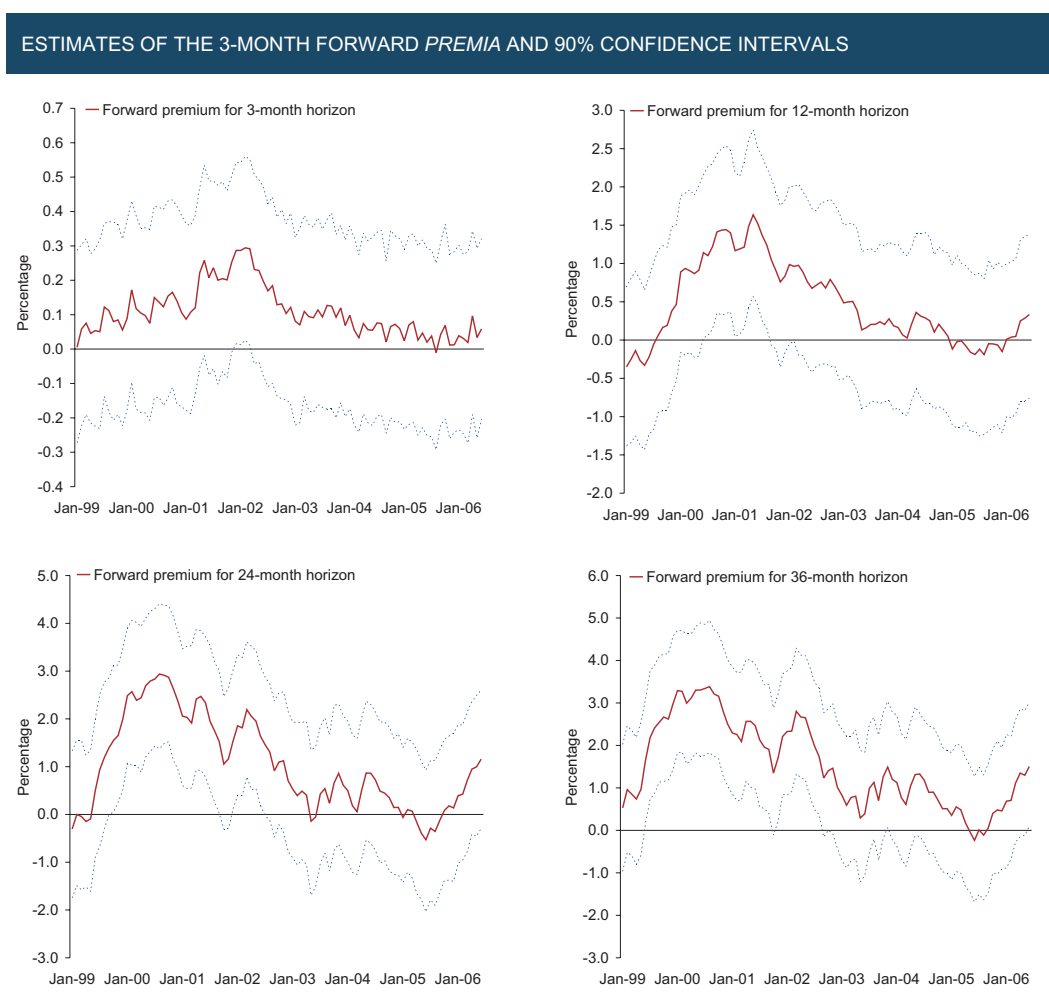


Chart 3 shows that our estimated forward *premia* are positively correlated with the key ECB interest rate. Capiello *et al* (2006) also indicate a positive correlation between the one-year yield *premium* and the level of the short-term interest rate after 1999. An economic interpretation of the relation between the risk *premium* and short-term interest rates may be the existence of a relation between movements in official interest rates and the probability attached by market participants to increases in interest rates in the future in comparison to their actual mean values (Vähämaa, 2004). In particular it is natural to expect that investors will demand a higher protection for potential capital losses if there is an increase in the probability that future interest rates will turn out to be higher than their expected values.

One way to assess this is by looking at the skewness of the distribution of expected future short-term interest rates. This can be done by using options on EURIBOR futures contracts. We calculate the skewness of option-implied probability distribution of the one-year-ahead 3-month EURIBOR futures contracts in our sample period. The option-implied probability distribution is calculated using the one-year-ahead 3-month EURIBOR nearest contract (for example, in January 1999 we use the contract for December 2000, and in February, March and April 1999 the contracts for March 2000). The skewness is measured by the Fisher coefficient, that is, the ratio of the third central moment to the cubed standard deviation. It has a positive (negative) value when the distribution is positively (negatively) skewed, that is, when there is a higher probability that the values stay below (above) the average of the distribution than above (below). Chart 4 shows that the skewness is negatively correlated with the one-year ahead 3-month forward *premium*. When the skewness is decreasing, the probability distribution is moving to the right, implying that the probability associated with future rises in interest rates as compared to their expected values is increasing. It is important to notice that the futures contracts used in the estimation of the distribution might also incorporate a risk *premium*. Therefore, increases in the probability attached to future rises in the interest rates may result either from a review of the risk neutral assessment of the likelihood of future rises or from an increase in the risk aversion.

Chart 3

#### 3-MONTH FORWARD *PREMIA* AND KEY ECB INTEREST RATE

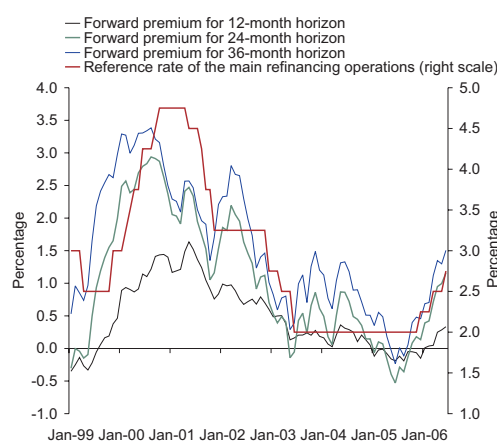
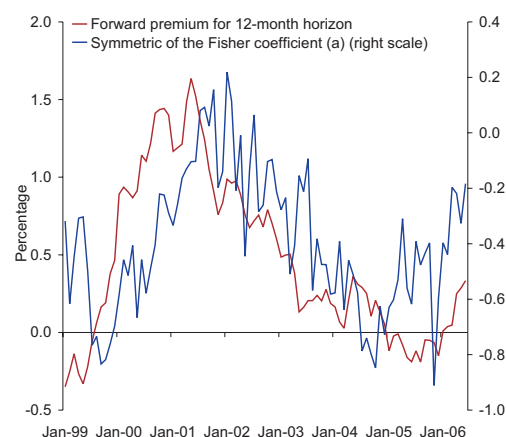


Chart 4

#### 3-MONTH FORWARD *PREMIA* AND SKEWNESS OF THE OPTION-IMPLIED PROBABILITY DISTRIBUTION OF THE 3-MONTH EURIBOR FUTURES CONTRACTS



Note: (a) Fisher coefficient of the option-implied probability distribution of the 3-month EURIBOR futures contracts for  $t+12$ .



## 6. CONCLUDING REMARKS

We present evidence that forward rates are biased forecasts of euro interest rates and that this is, at least in part, associated with the existence of a forward *premium*. Our estimates show that the level of the *premium* and its variability increase with the forecast horizon.

Even though the forward *premium* of horizons from 3 to 36 months are on average positive, the observation of the evolution of the forward *premium* over time together with their confidence intervals indicate that they are significantly equal to zero in some periods of time. The forward *premium* are positively correlated with the policy rates. One reason for this positive relation might be the fact that when monetary policy is tightening, the market perception changes towards attributing a higher probability to the “bad news” scenario that interest rates could be higher than expected.

In addition to these empirical results, this paper contributes with a competitive method to compute the forward *premium* and its confidence interval. These are required to evaluate whether a change in the forward rate is due either to modifications in the compensation for risk or in the market expectations. Our approach is easy to estimate and it is flexible to include information outside the yield curve. It does not impose no-arbitrage restrictions but it is able to capture the time-varying behaviour of the forward *premium* such as the dynamic term structure models by Capiello *et al* (2006) and Werner (2006). Another advantage is that the *premium* and its confidence interval can be computed daily.

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# RELATIVE EXPORT STRUCTURES AND VERTICAL SPECIALIZATION: A SIMPLE CROSS-COUNTRY INDEX\*

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## 1. INTRODUCTION

Over the last decade, international trade has grown on average by more than 8.5 per cent per annum in nominal terms. This paper addresses two types of issues raised by this striking feature of the world economy. Firstly, the entrance of new countries in the world trade system inevitably implied changes in relative export structures, which are interesting to map. Secondly, although the classical determinants of international trade are well-established in the literature, substantial effort has been made to understand the importance of vertical specialization activities, defined as the use of imported inputs to produce goods that are afterwards exported either as final goods or as intermediate goods.

One strand of the empirical trade literature is based on the computation of indices that aim to capture revealed comparative advantages. The most common is the index suggested by Balassa (1965), which uses the world export share in a given sector to “normalize” the respective export share of each country, being particularly suited to perform static analysis. In this article we propose an alternative indicator – the  $B^*$  – with properties suitable to perform a dynamic analysis and with a highly intuitive nature: the share of exports of a given sector in total exports of each country relative to the world unweighted average share. This indicator has shown up as an intermediate calculation in some papers, but it has never been highlighted or interpreted as an alternative index in its own right. For each product category, the behaviour of  $B^*$  bears information on how the overall degree of international trade specialization has evolved over time and identifies the countries that are relatively more specialized in that category. We also argue that, for a country, a simultaneous high  $B^*$  for exports and imports provides indirect evidence of vertical specialization.

The results are derived from the CEPII-Chelem database, which contains information on total world trade flows from 1967 onwards. The overall world trade flows are split into data from individual countries, when available for the entire sample period, or from groups of countries, comprising a total of 79 entities. We use a product breakdown based on four sectors following the OECD classification of manufacturing industries according to technology intensity: high-technology, medium-high-technology, medium-low-technology and low-technology. This classification is based on the analysis of R&D expenditure and output of 12 OECD countries in the period 1991-99 (see OECD (2005)).

The article is organized as follows. In the next section we present the  $B^*$  index and discuss its properties, namely when compared with the Balassa index. In section 3 we examine how the relative export structures of G5 countries and China have changed since the late 60s using the product breakdown previously mentioned. In the period 2000-04 these countries are more specialized than the world unweighted average in high-tech and medium-high-tech goods (the only exception being China in me-

\* This article presents some of the results included in Amador, Cabral and Maria (2007). We would like to thank Marta Abreu, Jorge Correia da Cunha, Paulo Esteves and António Ferreira Machado for comments on an earlier version of the article. The views expressed are of the authors and do not necessarily reflect those of the Bank of Portugal.

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dium-high-tech) and show a non-specialization status in low-tech and medium-low-tech sectors. However, sharp differences between countries exist at a more detailed level. The performance of the Chinese economy in high-tech sectors is specially striking: having started with a lower than average share in total exports, it reaches an export proportion that is more than twice the world unweighted average in the last years. On the contrary, there was a significant reduction of Chinese export proportion of low-tech goods when compared with the world unweighted average. In section 4, the computation of the  $B^*$  index for both exports and imports and the imposition of a restrictive selection criteria allows us to identify the countries in which vertical specialization seems to be relevant. Conditional on this criteria, vertical specialization activities at an aggregate level were found in high-tech industries and, to a lesser extent, in some medium-high-tech (motor vehicles and electrical machinery) and low-tech sectors (textiles, clothing and footwear). These activities appear to have intensified in the last decade. In geographical terms, significant vertical specialization activities are predominantly identified in East Asia, but also in some countries of Europe and North Africa. Section 5 presents some concluding remarks.

## 2. MEASURING INTERNATIONAL TRADE SPECIALIZATION

### 2.1. The Balassa index

Assume that the world economy comprises  $N$  countries and  $m$  sectors. Country  $i$  exports of sector  $j$  are  $x_{ij}$  and total exports of country  $i$  are given by  $X_i = \sum_{j=1}^m x_{ij}$ . World exports of sector  $j$  amount to  $x_{wj} = \sum_{i=1}^N x_{ij}$ , while total world exports can be seen either as the sum of all sectors or as the sum of all countries, i.e.  $X_w = \sum_{j=1}^m x_{wj} = \sum_{i=1}^N X_i$ <sup>1</sup> Using relative export structures, the Balassa index can be written as:

$$B_{ij} = \frac{\frac{x_{ij}}{X_i}}{\frac{x_{wj}}{X_w}} \text{ for all country } i = 1, 2, \dots, N; \text{ and product } j = 1, 2, \dots, m$$

If the share of sector  $j$  in total exports of country  $i$  is higher than the equivalent share of sector  $j$  in world exports, i.e.  $\left(\frac{x_{ij}}{X_i}\right) > \left(\frac{x_{wj}}{X_w}\right)$ , then  $B_{ij} > 1$  and country  $i$  is classified as having a revealed comparative advantage in sector  $j$ . The simplicity and highly intuitive nature of the Balassa index explains its wide utilization. The author is simply using  $\frac{x_{wj}}{X_w}$  to “normalize”  $\frac{x_{ij}}{X_i}$  and proposing a threshold level of 1. Besides this dichotomous feature, dividing countries between those that have and those that do not have a revealed comparative advantage, the Balassa index has also been used as a cardinal and ordinal measure, allowing comparisons between countries in a given sector or across sectors in a given country.<sup>2</sup> The index has a lower bound of  $B_{ij} = 0$  in the extreme case where country  $i$  does not export product  $j$  ( $x_{ij} = 0$ ). In the other extreme situation where country  $i$  is the only exporter in sector  $j$  (international

(1) The definition of the “world” can also be interpreted as any well defined reference area and the number of products as any relevant basket. Balassa (1965) did not use the world as a whole, but an aggregate comprising 6 areas (European Common Market, USA, Canada, UK, Sweden and Japan). Primary products were also excluded from his analysis to ensure that trade patterns reflected comparative advantages and not the impact of subsidies, quotas and other special arrangements.

(2) The comparisons between countries in Balassa (1977) are only based on the rankings of the sectors. The author does not report levels and simply investigates the ranks of the different  $j$  products for each country. Averages across selected groups of industries are also calculated. See also Ballance, Forstner and Murray (1987) and De Benedictis and Tambari (2001, 2004).

monopoly), such that  $\left(\frac{x_{ij}}{x_{wj}}\right) = 1$ , the nature of the Balassa index implies that  $B_{ij} = \frac{X_w}{X_i}$ , thus dependent on the relative dimension of country  $i$ . Given that  $X_i$  and  $X_w$  are, in general, time varying, the upper bound does not only change across countries, but also through time.

## 2.2. A new international product specialization index – the $B^*$

The international product specialization index suggested here simply uses a different “normalization”, i.e. a different denominator. To evaluate the relative export specialization of country  $i$  in sector  $j$ , we suggest the use of

$$B_{ij}^* = \frac{\frac{x_{ij}}{X_i}}{\left(\overline{\mu}_i\right)_j} \text{ for all country } i = 1, 2, \dots, N; \text{ and product } j = 1, 2, \dots, m$$

Where  $\left(\overline{\mu}_i\right)_j \equiv \left(\frac{x_{ij}}{X_i}\right)_j = \frac{1}{N} \sum_{i=1}^N \left(\frac{x_{ij}}{X_i}\right)_j$  is the average export share of sector  $j$  across the different  $i$

countries. Each country  $i = 1, 2, \dots, N$  has a particular share on sector  $j$  exports,  $\frac{x_{ij}}{X_i}$ , and  $\left(\overline{\mu}_i\right)_j$  is the *un-*

*weighted* average of this export share in all countries. As in Balassa index, if country  $i$  does not export product  $j$  ( $x_{ij} = 0$ ), then  $B_{ij}^* = 0$ . The suggested threshold for the new index is also 1. If the share of sector  $j$  in total exports of country  $i$  is higher than the average share of sector  $j$  in the  $N$  economies of the world, i.e.  $\left(\frac{x_{ij}}{X_i}\right)_j > \left(\overline{\mu}_i\right)_j$ , then  $B_{ij}^* > 1$  and this country is classified as being relatively more specialized in

sector  $j$ . In the extreme situation where country  $i$  is an international monopolist in sector  $j$ ,  $B_{ij}^*$  is simply equal to  $N$ . This upper bound is not dependent on the relative dimension of country  $i$  and is not variable across time. In every period, the sum of all indices across countries within each sector  $j$  yields, by construction, the upper bound.<sup>3</sup> Thus, the value of each  $B_{ij}^*$  can be interpreted as the contribution of each country  $i$ , in sector  $j$ , to  $N$ . The level of  $B_{ij}^*$  is therefore clearly dependent on the number of countries or regions under consideration, requiring a wider set of information than the Balassa index.

This international sector specialization index also has the appealing feature that its mean within each sector (cross-country analysis) is always equal to 1, i.e.  $\frac{1}{N} \sum_{i=1}^N B_{ij}^* = 1$ . If a given country  $i$  is relatively specialized in sector  $j$  ( $B_{ij}^* > 1$ ), there must exist another country in the world that is not relatively specialized in the same sector ( $B_{j, c \neq i}^* < 1$ ). Within a time dimension approach, if the level of  $B_{ij}^*$  increases, this will have a unique interpretation: country  $i$  has become relatively more specialized in sector  $j$  than the average of the other countries and this outcome had to be achieved at the expense of lower specialization in some other country.

## 2.3. The Balassa index and the $B^*$

The Balassa index has been subject to several critiques, leading some authors to propose several modified versions. For instance, Laursen (1998) suggests a transformation that produces a symmetric outcome, ranging from -1 to 1 and with a threshold of 0; Proudman and Redding (1997, 2000) suggest

(3) Note that if country  $i$  has an international monopoly in sector  $j$ , then its  $B_{ij}^* = N$ , while the indices of the remaining countries will be nil in this sector.

a transformation that results in a constant mean across the different sectors for a given country. Nevertheless, the popularity of the original index remains in place and the traditional Balassa index has been used extensively in the literature.<sup>4</sup>

As in the Proudman and Redding (1997, 2000) contribution, the product specialization index suggested here has a clear and well-defined link with the original Balassa index. After some algebra, it can be shown that:

$$B_{ij}^* = \frac{B_{ij}}{(\bar{B}_i)_j}$$

where  $(\bar{B}_i)_j = \frac{1}{N} \sum_{i=1}^N B_{ij}$  is simply the cross-country unweighted average of  $B_{ij}$ . Thus, the original Balassa index of country  $i$  in sector  $j$  is just being “re-normalized” by the average index of sector  $j$  across countries. Therefore, if the outcome for a group of countries is clustered around similar levels, be it in the case of  $B_{ij}^*$  or in the case of  $B_{ij}$ , such result only implies that the share of sector  $j$  in total exports is similar in these countries. Note also that if the objective is just to rank the countries across a given sector, there is no need to implement any “normalization”. The share of sector  $j$  in total exports has sufficient information to provide an ordinal rank of the countries.<sup>5</sup> As in the case of the traditional  $B_{ij}$  index, the value of the  $B_{ij}^*$  will not be invariant with respect to the choice of sectoral aggregation, the geographical benchmark considered and the time length chosen. Nevertheless, there are also some important differences that should be highlighted.

One non-negligible difference between the two indices is that the country position relative to the threshold level may change in the two indicators. While the Balassa index “normalizes”  $\frac{x_{ij}}{X_i}$  by  $\frac{x_{Wj}}{X_W}$ , which is a “weighted average” across countries, the  $B_{ij}^*$  “normalizes”  $\frac{x_{ij}}{X_i}$  by an “unweighted average”, in which all countries have the same weight.

More precisely,

$$\frac{\frac{x_{ij}}{X_i}}{\sum_{i=1}^N \alpha_i \frac{x_{ij}}{X_i}} = \begin{cases} B_{ij}^* & \text{if } \alpha_i = \frac{1}{N} & \text{for each country } i, \\ B_{ij} & \text{if } \alpha_i = \frac{X_i}{X_W} & \text{for each country } i. \end{cases}$$

Another relevant difference between the two indices is that they not bear the same cardinal properties. In particular, the levels of the Balassa indices may not be easily comparable through time. Whereas the mean of the Balassa index may be changing in time, the mean of the  $B_{ij}^*$  across countries in a given sector is always constant and equal to 1. The existence of this constant average and a fixed upper bound are relevant characteristics of the  $B_{ij}^*$ , as they facilitate direct comparisons of the magnitude of the different individual indices (cardinal measure).

The different characteristics of the two indices may be further clarified by a simple example. Assume that the world is made up of 2 countries (A and B) and 2 sectors (1 and 2). Country A exports  $x_{A1}$  and  $x_{A2}$ , country B exports  $x_{B1}$  and  $x_{B2}$ . At time  $t = 0$ , assume furthermore that both countries export a non-

(4) See Hinloopen and Marrewick (2001) for a list of references, Widgrén (2005) for a recent application to selected Asian, American and European countries and Shafaeddin (2004) for a study on Chinese exports and imports. Richardson and Zhang (1999) map the US revealed comparative advantage by trading partner and Hinloopen and Marrewick (2004) analyse the dynamics of Chinese comparative advantage. De Benedictis and Tamberi (2001), who discuss in detail the characteristics of both the original  $B_{ij}$  index and the above-mentioned alternative versions, end up using the original mean-varient formulation of the index. Vollrath (1991), who surveys alternative revealed comparative advantage measures, states that, among the measures using only exports, the traditional Balassa index is one of “the most satisfying”.

(5) For further details, see Amador, Cabral and Maria (2007).

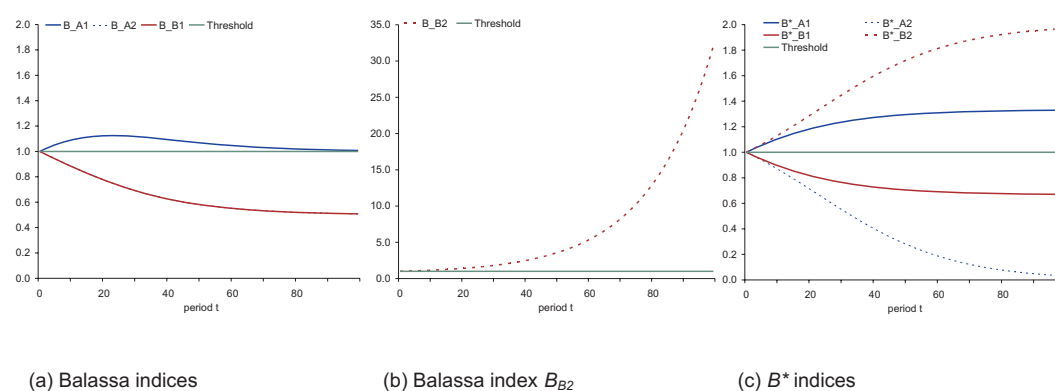
inal value of 100 euros of each sector. At  $t = 0$ , therefore,  $B_{ij} = B_{ij}^* = 1$ , where  $j = 1, 2$  and  $i = A, B$ . Finally, assume that  $x_{A1}$  grows 5% per period and that all other exports remain unchanged at 100 euros. In this case, world exports of sector 1 (i.e.  $x_{w1} = x_{A1} + x_{B1}$ ) are accelerating over time, reaching an export growth that is becoming closer to 5%, as  $x_{A1}/x_{w1}$  tends to 1. On the contrary, world exports of sector 2 remain unchanged at 200 euros (i.e.  $x_{w2} = x_{A2} + x_{B2} = 200$ ). Chart 1 reports the outcome for both indices between  $t = 0$  and  $t = 100$ . In terms of the Balassa indices – see Charts 1(a) and 1(b) – the first conclusion is that the levels, as already mentioned, are not easily comparable. Second, the relative nature of the index implies that its level increases in the case of country A in sector 1 (the only sector where exports are growing) will only be temporary (see the evolution of  $B_{A1}$  in Chart 1(a)). Third, country B in sector 2 will not only exhibit sharper increases, but also an explosive trajectory (Chart 1(b)). Finally,  $B_{A2}$  and  $B_{B1}$  show an identical downward movement. Given the explosive trajectory of the  $B_{B2}$ , the sum (and the average) of all  $B_{ij}$  also follows an explosive trajectory. As for the  $B_{ij}^*$ , on the contrary, the “normalization” used implies that the results are not only comparable, but symmetric and bounded across countries (Chart 1(c)). There are no explosive movements and the index reaches a permanent higher level in the case of country A in sector 1. Country B in sector 2 will also exhibit the highest increase, but this will be obtained at the expense of country A in sector 2. This symmetry also applies to sector 1. Finally, at each point in time, the sum of the  $B_{ij}^*$  by sector remains unchanged at  $N = 2$  (and the average at 1).

As previously mentioned, this new indicator – the  $B^*$  – has shown up in intermediate steps in previous papers, but it has never been highlighted or interpreted as an alternative index in its own right. For instance, to flag industries that have major differences in the cross-country distributions of revealed comparative advantage, Yeats (1985) calculates an inequality index that coincides with the variance of the  $B^*$ . More recently, Hausmann, Hwang and Rodrik (2005) calculate a weighted average of per-capita GDPs, where the weights correspond to the revealed comparative advantage of each country in a given sector. It turns out that these weights are fully equivalent to a further transformation of the  $B_{ij}^*$ . In particular, the weights for the per-capita GDP of each country  $i$  within each sector  $j$  are simply given by

$$\beta_i = \frac{B_{ij}^*}{N}, \text{ where } \sum_{i=1}^N \beta_i = 1.^6$$

Chart 1

THE BEHAVIOUR OF  $B_{ij}$  IN COMPARISON WITH  $B_{ij}^*$  BETWEEN  $t = 0$  AND  $t = 100$



(6) Hausmann *et al.* (2005) called this quantitative index  $PRODY_i$ . It represents the income level associated with that product. Their rationale for using such weights was to ensure that country size did not distort the ranking of goods. Furthermore, the final objective is not to calculate these indices for each good, but to construct an index measuring the income/productivity level that corresponds to a country's export basket (which they call  $EXPLY$ ). This is done by calculating the export-weighted average of all  $PRODY_i$  for that country, where the weights are simply the shares of each product in the country's total exports. See Di Maio and Tamagni (2006) for a recent application of these indices to the Italian economy.

### 3. EXPORT SPECIALIZATION IN THE G5 AND CHINA

The technological content of exports from G5 countries and China will now be examined. The results are derived from the CEPII-Chelem database, which contains information on total world trade flows from 1967 onwards. The overall world trade flows are split into 79 entities, comprising individual countries when its data is available for the entire sample period. Otherwise, countries are grouped into different entities.<sup>7</sup>

Table 1 reports the relative export specialization of these six countries for the 2000-04 period, not only for the main technological categories, but also considering a second breakdown level that includes twenty more detailed sub-sectors. All  $B^*$  indices higher than 2 are highlighted in the table. In the period 2000-04 the six countries selected are more specialized than the world unweighted average in high-tech and medium-high-tech goods (the only exception being China in medium-high-tech) and show below 1 specialization coefficients in low-tech and medium-low-tech sectors in this period. However, sharp differences between countries exist at a more detailed level.

The UK, US, Japan and China all have higher export shares of the high-tech category than the two biggest euro area countries. In particular, France and Germany have lower shares in “Office, accounting and computing machinery” and in “Radio, TV and communications equipment”. On the contrary, the large proportion of the high-tech category in Chinese exports results mainly from these two sectors, in particular “Office, accounting and computing machinery”, as Chinese exports of products like “Aircraft

**Table 1**

RELATIVE PRODUCT SPECIALIZATION OF G5 COUNTRIES AND CHINA						
$B^*$ Indices (based on average export values in the 2000-04 period)						
	US	France	Germany	UK	Japan	China
<b>High Technology Products</b>	<b>2.4</b>	<b>1.6</b>	<b>1.3</b>	<b>2.4</b>	<b>2.0</b>	<b>2.2</b>
Aircraft and spacecraft	8.2	6.6	1.8	6.6	0.5	0.2
Pharmaceuticals	1.6	2.5	1.8	3.0	0.5	0.4
Office, accounting and computing machinery	1.7	0.8	1.0	2.4	2.0	4.2
Radio, TV and communications equipment	1.6	0.9	0.8	1.4	2.5	2.2
Medical, precision and optical instruments	3.8	1.7	2.4	2.5	3.4	1.5
<b>Medium-high Technology Products</b>	<b>1.9</b>	<b>2.0</b>	<b>2.5</b>	<b>1.7</b>	<b>2.5</b>	<b>1.0</b>
Other electrical machinery and apparatus	1.5	1.5	1.7	1.4	2.0	2.1
Motor vehicles, trailers and semi-trailers	2.0	3.0	3.9	2.0	4.1	0.3
Chemicals excl. pharmaceuticals	1.5	1.5	1.4	1.4	1.2	0.6
Railroad equipment and other transport equip.	1.5	1.5	1.8	0.7	5.5	3.4
Other machinery and equipment	2.5	1.9	3.1	2.1	2.9	1.4
<b>Medium-low Technology Products</b>	<b>0.5</b>	<b>0.6</b>	<b>0.6</b>	<b>0.6</b>	<b>0.5</b>	<b>0.5</b>
Coke, refined petroleum prod. and nuclear fuel	0.2	0.2	0.2	0.4	0.0	0.1
Rubber and plastics products	1.3	1.4	1.5	1.1	1.1	1.2
Other non-metallic mineral products	0.7	1.2	1.1	0.8	0.8	1.3
Building and repairing of ships and boats	0.1	0.4	0.2	0.2	1.3	0.4
Basic metals	0.4	0.6	0.6	0.5	0.6	0.3
Fabricated metal products, excl. machinery	1.2	1.3	1.9	1.3	0.9	2.0
<b>Low Technology Products</b>	<b>0.4</b>	<b>0.5</b>	<b>0.3</b>	<b>0.4</b>	<b>0.1</b>	<b>0.9</b>
Other manufacturing and recycling	0.7	0.6	0.6	0.7	0.5	2.3
Wood, pulp, paper and printed products	0.8	0.6	0.7	0.6	0.1	0.3
Food products, beverages and tobacco	0.4	0.7	0.3	0.4	0.0	0.2
Textiles, textile products, leather and footwear	0.2	0.3	0.2	0.2	0.1	1.3

Sources: CEPII-Chelem database and own calculations.

(7) The  $B^*$  indexes for the 79 countries (or groups of countries) for each of the four main technological categories, sorted by the 2000-04 values of  $B^*$ , are shown in the appendix.



and spacecraft” and “Pharmaceuticals” are well below average. Besides China, the UK also has a high export share in “Office, accounting and computing machinery”, while in “Radio, TV and communications equipment” the highest specialization coefficient is Japan’s. The US has the highest specialization coefficient in “Aircraft and spacecraft” products, followed by the UK and France. These two countries have also a relatively higher proportion of “Pharmaceuticals” in total exports. The share of “Medical, precision and optical instruments” in total exports is especially relevant in the US, Japan, and, to a lesser extent, in the UK and Germany. Within the euro area, French exports have a higher overall share of high-tech goods than German exports, mainly due to “Aircraft and spacecraft” products.

As regards the main category of medium-high-tech, the highest export share is in Japan and Germany and the lowest in China. Japan, Germany and France have especially high export shares in “Motor vehicles, trailers and semi-trailers”. The share of “Railroad equipment and other transport equipment”, which includes bicycles and motorcycles, is well above world average in Japanese and Chinese exports. Exports of “Other machinery and equipment” are especially relevant in Germany, Japan and the US.

In terms of medium-low-tech industries, the relative importance of this broad category is very similar in all six countries analysed, and below world unweighted average. Nevertheless, some differences emerge at the second breakdown level. The six countries have above average exports shares in “Rubber and plastics products”, slightly higher in France and Germany than in the other four countries. Exports of “Fabricated metal products, excluding machinery” are also important for these six countries, especially in Germany and China where the shares are around twice the world average. Japan is the only of these countries that is relatively specialized in “Building and repairing of ships and boats”.

Finally, in the low-tech category, Japan has the lowest export proportion of these countries and China the highest, although both are below world unweighted average. However, while Japanese exports have the lowest specialization coefficient in all low-tech sub-sectors, China is the only country where a specialization status emerges, not in the broad category, but in “Textiles, textile products, leather and footwear” and in “Other manufacturing and recycling”, which include goods like furniture, games and toys.

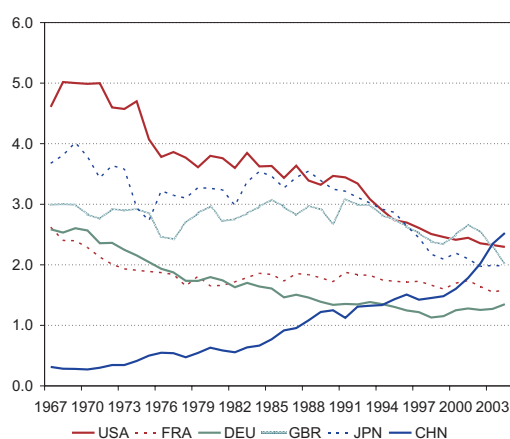
Chart 2 illustrates the relative export specialization of G5 countries and China by displaying the  $B^*$  of each broad technological category over the period 1967-2004. The performance of the Chinese economy in high-tech sectors is specially striking: having started with a lower than average share in total exports, it shows the highest specialization coefficient of the six countries selected in the last years of our sample. This result is in line with the fact that China has an export basket that is significantly more sophisticated than what would be normally expected for a country at its income level and also that it has experienced a high rate of growth in the sophistication of its exports.<sup>8</sup> This pattern may be related with vertical specialization activities, based on inputs imported from other Asian countries.<sup>9</sup> Declining trends of  $B^*$  in the high-tech category are visible in the USA (since the 70s), in Japan and in the UK since the early 90s, bringing the high-tech export share of these countries closer to, although still around twice, the world unweighted average. Following a decrease in the initial years of the sample, France and Germany have maintained their relative specialization in high-tech exports fairly stable in the last 20 years, but always below the other three developed countries considered.

(8) Rodrik (2006) uses the indicator constructed in Hausmann *et al.* (2005). The author provides evidence suggesting that the rapid increase in the overall sophistication of Chinese exports has been an important contributor to China’s recent growth and emphasizes the role of production- and technology-oriented policies of the Chinese government.

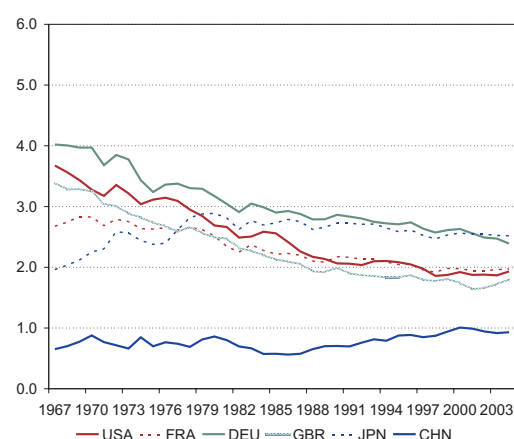
(9) Such products are mostly assembled in China with as yet little “Made in China” technology. Gaulier, Lemoine and Ünal-Kesenci (2005) conclude that China is used as an export base by some advanced Asian economies, which transfer to China the final production and assembly stages of some high-tech and medium-high-tech goods. The final products are then exported directly to the EU and the US markets.



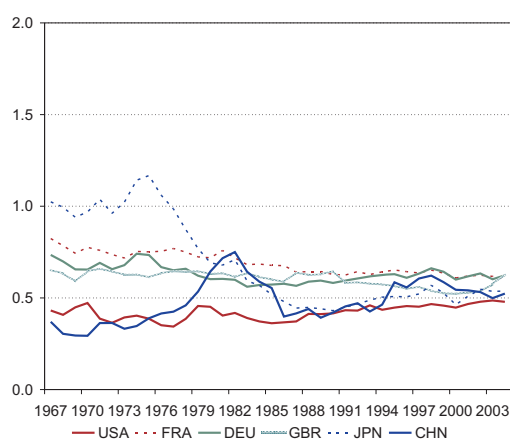
Chart 2

THE  $B_{ij}$  IN G5 COUNTRIES AND CHINA

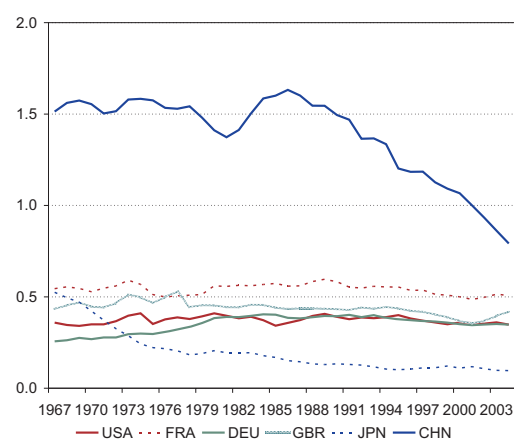
(a) High technology industries



(b) Medium-high technology industries



(c) Medium-low technology industries



(d) Low technology industries

Sources: CEPII-Chelem database and own calculations.

In the medium-high-tech category, there has been a gradual decline of the high specialization of Germany, the US, the UK and France since the beginning of the sample. In Japan, this reduction is less sharp and occurs after a clear increase until the end of the 70s. The share of medium-high-tech products in total Chinese exports has been increasing slowly since the 80s, but it is always much lower than in the other countries analysed.

The relative (non-)specialization of these six countries in medium-low-tech exports displays a very stable pattern in the last 20 years, more clustered around similar levels than in the other product categories.

Lastly, the most distinctive result in the low-tech category is the strong decrease in the specialization of Chinese exports relatively to the world unweighted average. After more than two decades of high specialization, a significant reduction was recorded from the mid 80s onwards. At present, China still shows a percentage of total exports in this category higher than in the other countries considered, but already below the world unweighted average. All other countries have always had a proportion of

low-tech sectors in total exports clearly below the world average, with Japan showing the lowest value since the mid-70s.

#### 4. SOME EVIDENCE ON VERTICAL SPECIALIZATION

One of the major factors underlying the high growth rate of international trade is the division of the production chain, with the different stages of production being performed in different countries.<sup>10</sup> An investigation on the importance of the vertical specialization phenomena across all countries of the world since the late sixties would typically require a substantial amount of information. In this section we compute the  $B^*$  for both exports and imports to provide some evidence of relevant episodes of vertical specialization across countries since 1967.

The estimated kernel densities of  $B_{ijM}^*$  for the four broad technological categories (Chart 3) reveal a degree of symmetry that is clearly in sharp contrast with the kernel densities<sup>11</sup> for  $B_{jX}^*$  (Chart 4), where specialization leads to strong asymmetries between countries. Therefore, assuming a priori that relative consumption preferences are not very different across countries, there is apparently no other major reason for one country to simultaneously export and import much more than the world average, other than the existence of important vertical specialization activities. In short, if  $B_{ijX}^*$  and  $B_{ijM}^*$  are both very high in sector  $j$ , we claim that the (traditional) intra-industry trade in sector  $j$  cannot be the sole explanation for such outcome and that international vertical linkages must play a very important role.

Several important caveats are posed to this strategy of identification. Firstly, it is necessary to establish a threshold for  $B_{ijX}^*$  and  $B_{ijM}^*$  to give us some confidence in terms of tracing situations of vertical specialization (and not simply ordinary intra-industry trade). Secondly, caution must be put on possible abnormal values of the indices and exclude situations where the phenomenon has only become important in a particular period. Thirdly, it is possible that some vertical specialization exists at a detailed product disaggregation, though not showing up at the more aggregate level. This is the case if the detailed product is not sufficiently relevant to affect the broad aggregate. Therefore, we are not identifying a necessary condition for the phenomenon to exist but only situations where the phenomenon is sufficiently important so as to emerge in this simple indicator. Finally, if country  $i$  is a major trade warehouse, imports are, to a large extent, simply associated with subsequent export activities. Such activities will show up in the  $B_{ijX}^*$  and  $B_{ijM}^*$ , but should not be considered as vertical specialization.

For all countries in the database and for the two product breakdown levels, the threshold set for  $B_{ijX}^*$  and  $B_{ijM}^*$  was 2. Therefore, for each  $j$  category, we start by restricting the analysis to countries where the structure of exports and imports is at least twice the average of world countries in any of the selected five-year periods.<sup>12</sup> We excluded countries where large volatility is identified in the indicators due to specific observations (affecting the five-year average), which are typically associated with episodic operations that are very large relative to the size of the economy but have no structural interpretation. Residual categories of manufactured goods are also excluded from the analysis, given their typically irregular behaviour.

Conditional on the definition of the four broad categories, the analysis of the  $B_{ijM}^*$  and  $B_{ijX}^*$  indicates, in general, that: (i) the incidence of vertical specialization varies considerably among the different cate-

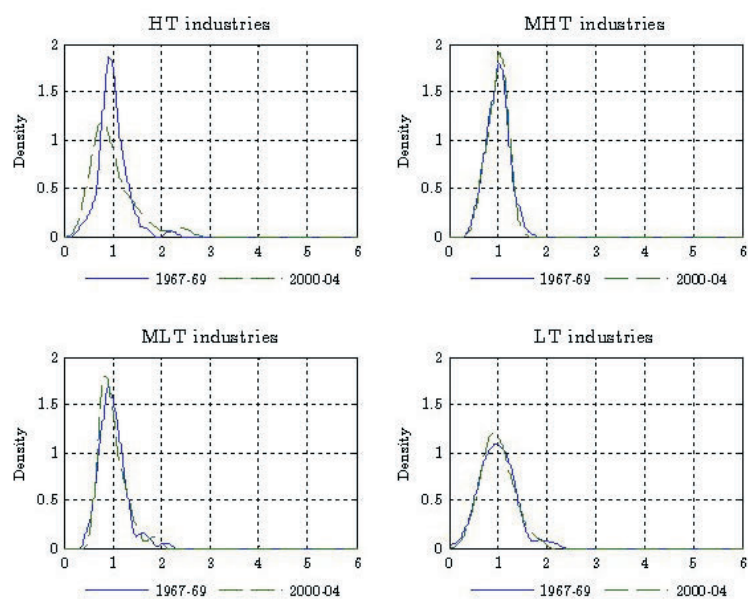
(10) This phenomenon has been labelled quite extensively in the literature: "slicing up the value chain", "outsourcing", "disintegration of production", "fragmentation", "multi-stage production", "intra-product specialization", "production relocation", "segmentation of production", etc. See Hummels, Ishii and Yi (2001) for a discussion.

(11) The Kernel density estimation is a method for adjusting probability density functions from the available observations. For further details, see Amador, Cabral and Maria (2007).

(12) These periods were 1967-69, 1970-74, 1975-79, 1980-84, 1985-89, 1990-94, 1995-99 and 2000-04.

Chart 3

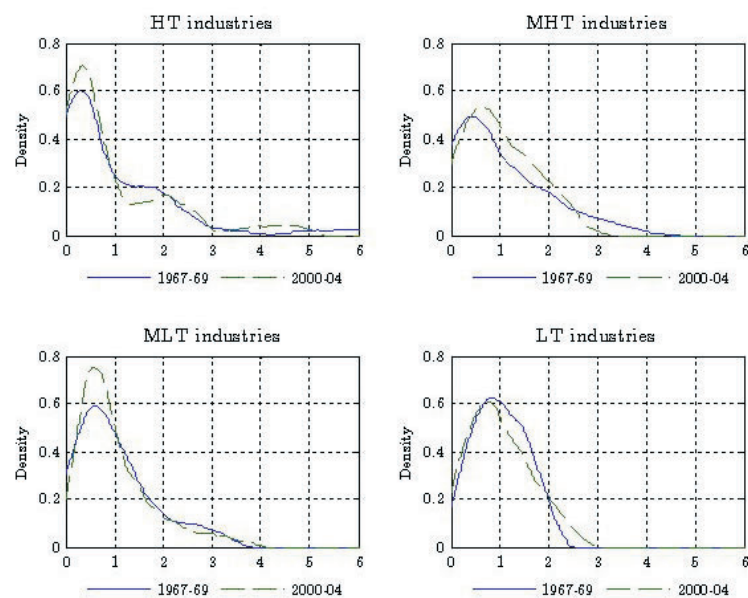
ESTIMATED KERNEL DENSITIES –  $B_{it}^*$



Sources: CEPII-Chelem database and own calculations.

Chart 4

ESTIMATED KERNEL DENSITIES –  $B_{it}^x$



Sources: CEPII-Chelem database and own calculations.

gories; (ii) there is a marked regional pattern; and (iii) the phenomenon has intensified substantially over the last decade.

Table 2 lists the  $B_M^*$  indices of the top 5 countries in each broad technological category in the period 2000-04 and the corresponding  $B_X^*$  indices. It reveals that vertical specialization seems to be predominant in the high-tech category. The countries where these vertical specialization activities are more relevant are Malaysia, Philippines, Singapore, Ireland and Taiwan. The medium-high-tech sector has some countries with high values for  $B_{ijX}^*$  but with levels below the threshold value of 2 for  $B_{ijM}^*$ . This is even more marked in the medium-low-tech category. In fact, this category is dominated by manufacturing products with low transformation like oil products, rubber, other non-metallic minerals, basic metals, probably not suited to vertical specialization activities but very important in the export structure of some countries. Regarding low-tech industries, although the threshold of 2 for both the import and export sides is not reached in any country, there are some countries that exhibit relatively high figures, for instance in Bangladesh and Cambodia, which are commented below.

Using the simple indicator proposed in this article, the empirical evidence of vertical specialization in the high-tech category can be further explored by looking at the behaviour of both the  $B_{ijX}^*$  and the  $B_{ijM}^*$  over time (in the selected countries) and by investigating the products included in the second breakdown level of that category.

Vertical specialization activities are relevant in the high-tech category and have been developing since the beginning of the seventies (Chart 5(a) and 5(b)). With the exception of Taiwan, we find evidence of increased vertical specialization throughout the sample period, with some evidence of stabilization in the last decade. It is notable that Ireland is the only non-Asia country identified in this category. In Taiwan, there has been a decrease since the late sixties, partly resulting from the emergence of other players.<sup>13</sup>

At the second breakdown level of the high-tech category, important vertical specialization activities were found in all five sub-sectors, but particularly relevant in "Radio, TV and communications equip-

**Table 2**

TOP 5 RANKING OF $B_M^*$ (2000-04 average)					
High Technology	$B_M^*$	$B_X^*$	Medium-High Technology	$B_M^*$	$B_X^*$
Malaysia	2.5	4.2	Argentina	1.5	1.1
Philippines	2.4	4.9	Canada	1.4	2.1
Singapore	2.4	4.3	Venezuela	1.3	0.8
Ireland	2.0	3.9	Colombia	1.3	1.1
Taiwan	1.9	3.0	South African Union	1.3	1.5
Medium-Low Technology	$B_M^*$	$B_X^*$	Low Technology	$B_M^*$	$B_X^*$
Others in South Europe	2.0	0.5	Sri Lanka	1.8	2.1
Others in America	1.9	1.4	Bangladesh	1.8	2.5
African LDCs	1.7	1.9	Albania	1.7	2.1
Others in East Asia	1.6	0.9	Cambodia, Laos PDR	1.7	2.5
Cambodia, Lao PDR	1.5	0.1	Tunisia	1.6	1.6

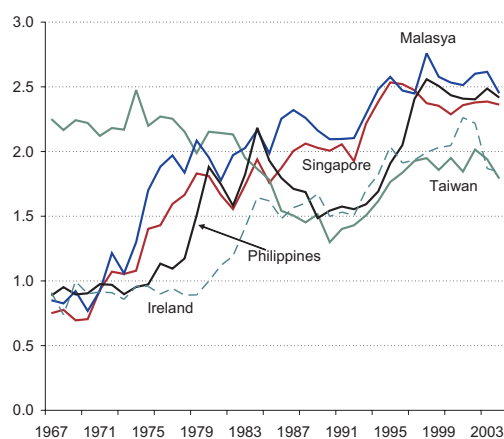
Sources: CEPII-Chelem database and own calculations.

Note: For details on the composition of the geographical zones, see Appendix C of Amador, Cabral and Maria (2007).

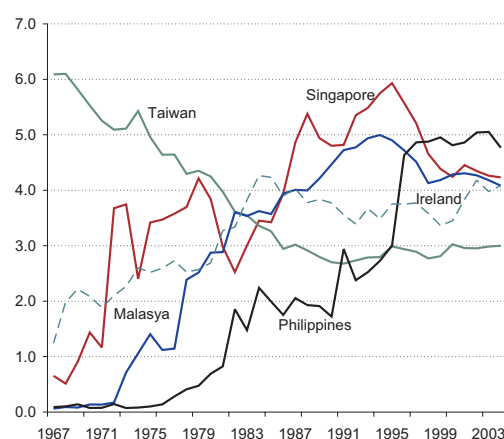
(13) Recall that, given the characteristics of the indicator, there is a mechanical decrease in one country when others emerge as exporters of the good.

Chart 5

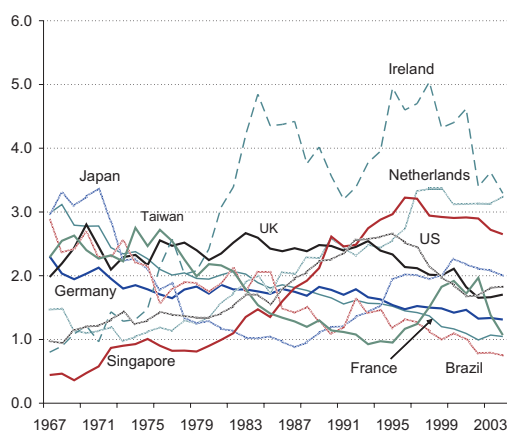
VERTICAL SPECIALIZATION IN HIGH TECHNOLOGY SECTORS



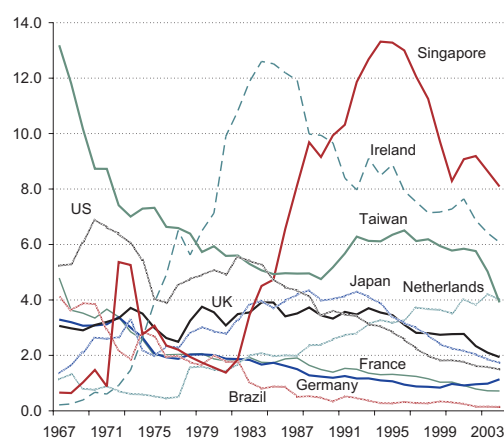
(a) High technology industries –  $B_M^*$



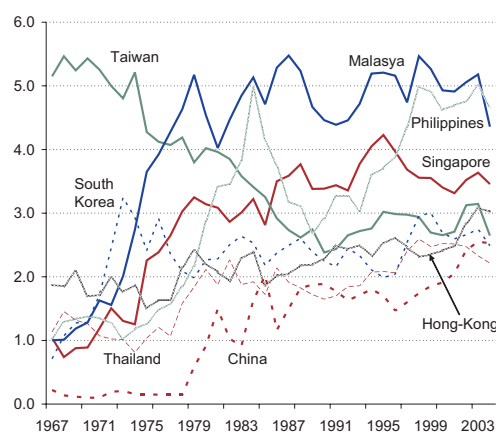
(b) High technology industries –  $B_X^*$



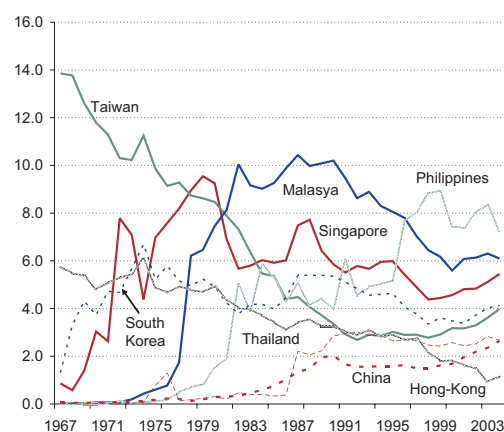
(c) Office, accounting and computing machinery –  $B_M^*$



(d) Office, accounting and computing machinery –  $B_X^*$



(e) Radio, TV and communications equipment –  $B_M^*$

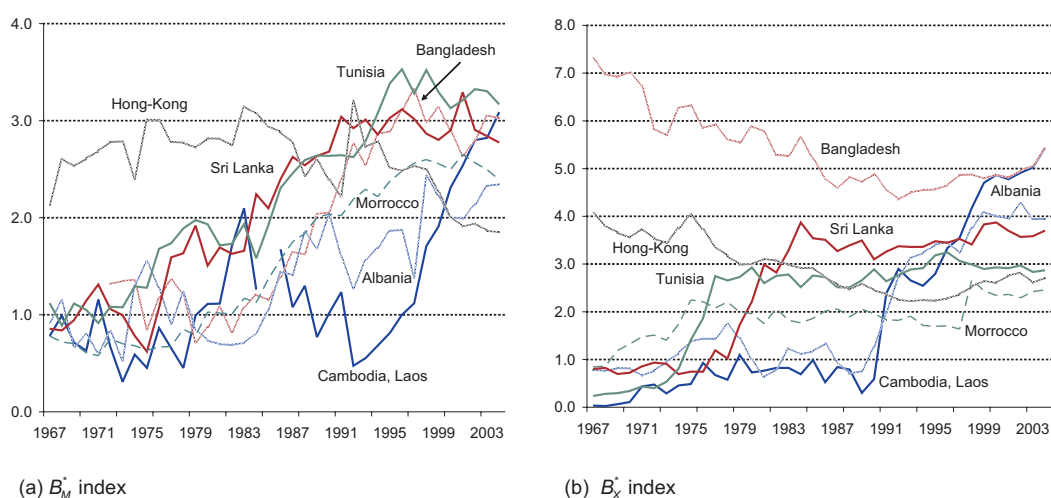


(f) Radio, TV and communications equipment –  $B_X^*$

Sources: CEPII-Chelem database and own calculations.

Chart 6

## VERTICAL SPECIALIZATION IN TEXTILES, TEXTILE PRODUCTS, LEATHER AND FOOTWEAR



Sources: CEPII-Chelem database and own calculations.

ment” and in “Office, accounting and computing machinery”. The latter is especially relevant for some Asian and European countries (Chart 5(c) and 5(d)). Taiwan is a traditionally important player in this sector but the importance of vertical specialization seems to be reducing compared with other countries. On the other hand, Singapore appears to have relevant vertical specialization activities since mid-eighties, with a small decline after the mid-nineties. Ireland recorded sharp increases until the mid-eighties but some decline in vertical specialization occurred afterwards, though maintaining high levels. The Netherlands shows a steady increase in the  $B_M^*$  and  $B_X^*$  indices during this period. Nevertheless, this country is a major European trade warehouse, so part of these transactions may not reflect vertical specialization activities. The other industrialized countries identified - US, France, Germany, UK and Japan - show stable or slightly decreasing vertical specialization activities in this category.

As for “Radio, TV and communications equipment” (Chart 5(e) and 5(f)), all countries selected are located in East Asia. Taiwan shows again a decreasing path in the relevance of vertical specialization activities, Malaysia holds an important position, though stabilizing after the mid-eighties, and a sizeable increase is observable in the Philippines and, to a lesser extent, in China.

Products included in the medium-high-tech category, like most machinery items, are typically characterized by a high degree of heterogeneity. This fact might explain why vertical specialization activities are not identified with this indicator at the aggregate level. However, the application of the chosen threshold of 2 for both  $B_M^*$  and  $B_X^*$  to the sub-sectors of the medium-high-tech category allows us also to detect some well known vertical specialization phenomena, like the “Motor vehicles, trailers and semi-trailers” sector in Canada and US and the effects of *maquiladoras* (labour-intensive assembly operations) on “Other electrical machinery and apparatus” in Mexico.<sup>14</sup>

Within low-tech categories, there is only significant evidence of vertical specialization activities in the “Textiles, textile products, leather and footwear” sector (Chart 6(a) and 6(b)). The countries where it is more important are Bangladesh together with Cambodia and Laos, the latter showing a sharp increase

(14) See Jones, Kierzkowski and Leonard (2002).

since the beginning of the nineties. It is interesting to note that vertical specialization in this sector appears to be also relatively important in North Africa, with countries like Morocco and Tunisia displaying upward trends.

## 5. CONCLUSIONS

In this article we introduced a simple cross-country index of international specialization – the  $B^*$  –, which is suitable to characterize the relative world export structure and to identify the major changes observed since the late sixties.

The  $B^*$  has a highly intuitive nature: it is simply the share of exports of a given sector in total exports of each country, normalized by the world unweighted average share. Given the characteristics of the  $B^*$ , the analysis was based on the comparison of different countries within a given sector, i.e. a cross-country analysis, whereas the more traditional approach on revealed comparative advantages and international product specialization focuses on the evolution of the export structure of a given country or group of countries, i.e. a cross-sector analysis.

In the 2000-04 period G5 countries and China are more specialized than the world unweighted average in high-tech and medium-high-tech goods (the only exception being China in medium-high-tech) and show a non-specialization status in low-tech and medium-low-tech sectors. The time-series analysis of the  $B^*$  reveals that the performance of the Chinese economy in high-tech products is specially striking: having started with a lower than average share in total exports, it has reached an export proportion that is more than twice the world unweighted average in the last years. On the contrary, in the low-tech sector, a significant reduction was recorded from the mid-80s onwards, after more than two decades of high specialization. Nevertheless, China continues to present specialization in some low-tech subsectors, namely “Other manufacturing and recycling” and “Textiles, textile products, leather and footwear”.

The identification of relevant vertical specialization activities was accomplished by computing the  $B^*$  for both exports and imports in the different sectors, for the 79 countries (or group of countries), and by setting a threshold of 2. Although we acknowledge that intra-industry trade may explain relatively high values of both  $B^*$  indicators, it is hard to accept that such trade justifies import structures that are twice the world average. In such cases, vertical specialization activities must be the underlying explanation. Using these criteria, relevant vertical specialization activities at an aggregate level were found in high-tech industries and, to a lesser extent, in some medium-high-tech (motor vehicles and electrical machinery) and low-tech sectors (textiles, clothing and footwear). These activities appear to have intensified in the last decade. In geographical terms, significant vertical specialization activities are predominantly identified in East Asia, but also in some countries of Europe and North Africa.



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## Appendix (continue)

**$B^*$  VALUES FOR 79 COUNTRIES OR GROUPS OF COUNTRIES**  
 (Countries sorted by 2000-04 values of  $B^*$ )

## High technology

	1967-69		2000-04			1967-69		2000-04	
	Rank	$B^*$	Rank	$B^*$		Rank	$B^*$	Rank	$B^*$
Philippines	60	0.11	1	4.91	Poland	9	2.24	41	0.45
Singapore	35	0.71	2	4.29	India	54	0.22	42	0.44
Malaysia	64	0.08	3	4.20	Middle East, no OPEC	19	1.59	43	0.44
Ireland	15	1.84	4	3.91	Turkey	67	0.03	44	0.42
Others in South Europe	28	0.92	5	3.80	Gulf	45	0.44	45	0.40
Taiwan	2	5.99	6	2.98	Bolivia	77	0.01	46	0.36
Switzerland	1	6.76	7	2.54	Romania	53	0.22	47	0.35
South Korea	23	1.15	8	2.43	Former USSR	30	0.89	48	0.35
United Kingdom	6	2.99	9	2.38	Colombia	33	0.79	49	0.34
Israel	29	0.90	10	2.38	Bulgaria	18	1.61	50	0.33
United States	3	4.89	11	2.36	Others in East Asia	46	0.37	51	0.33
Thailand	71	0.03	12	2.23	Kenya	44	0.44	52	0.31
Hungary	10	2.12	13	2.19	Iceland	73	0.02	53	0.30
China, People's Rep.	48	0.29	14	2.15	Sri Lanka	76	0.01	54	0.29
Netherlands	5	3.01	15	2.06	South African Union	47	0.37	55	0.27
Japan	4	3.86	16	2.04	New Zealand	65	0.06	56	0.25
Mexico	22	1.42	17	1.97	African LDCs	61	0.10	57	0.24
Finland	49	0.27	18	1.65	Argentina	36	0.70	58	0.23
France	8	2.46	19	1.63	Uruguay	41	0.58	59	0.22
Sweden	12	1.92	20	1.60	Tunisia	56	0.16	60	0.21
Denmark	17	1.71	21	1.51	Others in Africa	59	0.12	61	0.21
Germany	7	2.58	22	1.28	Ecuador	13	1.89	62	0.17
Hong Kong	11	2.07	23	1.23	Paraguay	79	0.01	63	0.14
Indonesia	66	0.04	24	1.22	Pakistan	51	0.23	64	0.13
BLEU	25	0.99	25	1.06	Egypt	55	0.19	65	0.11
Austria	21	1.47	26	0.93	East Asian LDCs	63	0.09	66	0.10
Canada	16	1.76	27	0.90	Venezuela	68	0.03	67	0.10
Norway	40	0.58	28	0.84	Albania	57	0.15	68	0.07
Former Czechoslovakia	20	1.57	29	0.80	Chile	72	0.02	69	0.06
Brazil	26	0.93	30	0.80	Peru	70	0.03	70	0.04
Australia	43	0.49	31	0.79	Cote d'Ivoire	50	0.24	71	0.04
Italy	14	1.88	32	0.75	Bangladesh	31	0.87	72	0.03
Portugal	27	0.93	33	0.73	Nigeria	78	0.01	73	0.02
Spain	39	0.63	34	0.72	Saudi Arabia	75	0.02	74	0.02
Greece	52	0.22	35	0.72	Brunei Darussalam	69	0.03	75	0.02
Others in America	37	0.67	36	0.70	Cameroon	32	0.79	76	0.02
Morocco	62	0.09	37	0.69	Algeria	58	0.14	77	0.01
Former Yugoslavia	38	0.64	38	0.65	Libyan Arab Jamahiriya	24	1.02	78	0.01
Gabon	42	0.51	39	0.58	Cambodia, Laos	74	0.02	79	0.01
Vietnam	34	0.78	40	0.51					

Sources: CEPII-Chelem database and own calculations.

## Appendix (continued)

**B<sub>x</sub> VALUES FOR 79 COUNTRIES OR GROUPS OF COUNTRIES**  
 (Countries sorted by 2000-04 values of **B<sup>\*</sup>**)

## Medium-high technology

	1967-69		2000-04			1967-69		2000-04	
	Rank	B <sup>*</sup>	Rank	B <sup>*</sup>		Rank	B <sup>*</sup>	Rank	B <sup>*</sup>
Japan	12	2.05	1	2.54	Middle East, no OPEC	25	1.28	41	0.86
Germany	1	4.00	2	2.50	Australia	32	1.01	42	0.85
Saudi Arabia	70	0.06	3	2.31	Gulf	62	0.18	43	0.84
Spain	19	1.76	4	2.25	India	47	0.42	44	0.82
Mexico	29	1.07	5	2.22	Venezuela	69	0.06	45	0.79
Former Czechoslovakia	13	2.03	6	2.15	Greece	35	0.84	46	0.77
Canada	7	2.61	7	2.09	Indonesia	71	0.05	47	0.71
BLEU	11	2.06	8	2.03	New Zealand	68	0.11	48	0.64
Austria	16	1.88	9	1.98	Cote d'Ivoire	44	0.56	49	0.62
France	6	2.76	10	1.97	Singapore	45	0.53	50	0.62
Hungary	20	1.64	11	1.92	Nigeria	77	0.02	51	0.62
Italy	5	2.96	12	1.91	Malaysia	64	0.16	52	0.61
United States	2	3.55	13	1.89	Ecuador	72	0.05	53	0.61
Switzerland	4	3.16	14	1.82	Kenya	37	0.82	54	0.59
Sweden	9	2.29	15	1.79	Egypt	59	0.26	55	0.53
United Kingdom	3	3.32	16	1.72	Others in America	28	1.08	56	0.52
Poland	8	2.48	17	1.71	Others in South Europe	31	1.01	57	0.50
Portugal	39	0.72	18	1.51	Chile	58	0.26	58	0.49
South African Union	27	1.12	19	1.47	Uruguay	60	0.25	59	0.47
South Korea	55	0.29	20	1.47	Philippines	66	0.12	60	0.42
Former Yugoslavia	22	1.51	21	1.46	African LDCs	61	0.19	61	0.38
Netherlands	15	1.89	22	1.41	Hong Kong	48	0.42	62	0.37
Denmark	18	1.84	23	1.37	Algeria	10	2.21	63	0.35
Brazil	41	0.63	24	1.36	Vietnam	49	0.40	64	0.35
Tunisia	14	1.93	25	1.29	East Asian LDCs	73	0.04	65	0.34
Ireland	46	0.46	26	1.27	Gabon	54	0.34	66	0.33
Finland	36	0.83	27	1.23	Others in East Asia	57	0.27	67	0.28
Taiwan	21	1.61	28	1.22	Paraguay	33	0.90	68	0.25
Turkey	50	0.39	29	1.18	Bolivia	65	0.12	69	0.24
Argentina	43	0.56	30	1.13	Cameroon	53	0.35	70	0.21
Colombia	42	0.56	31	1.09	Peru	74	0.03	71	0.20
Thailand	76	0.02	32	1.07	Iceland	78	0.01	72	0.18
Norway	23	1.45	33	1.06	Albania	51	0.38	73	0.17
Romania	26	1.15	34	1.02	Sri Lanka	63	0.16	74	0.16
Morocco	30	1.06	35	1.01	Others in Africa	67	0.12	75	0.12
China, People's Rep.	40	0.71	36	0.95	Pakistan	52	0.38	76	0.11
Former USSR	24	1.34	37	0.93	Bangladesh	79	0.00	77	0.09
Bulgaria	17	1.88	38	0.93	Cambodia, Laos	75	0.02	78	0.02
Libyan Arab Jamahiriya	38	0.80	39	0.90	Brunei Darussalam	56	0.27	79	0.02
Israel	34	0.89	40	0.86					

Sources: CEPII-Chelem database and own calculations.

## Appendix (continued)

 **$B^*$  VALUES FOR 79 COUNTRIES OR GROUPS OF COUNTRIES**(Countries sorted by 2000-04 values of  $B^*$ )**Medium-low technology**

	1967-69		2000-04			1967-69		2000-04	
	Rank	$B^*$	Rank	$B^*$		Rank	$B^*$	Rank	$B^*$
Algeria	60	0.35	1	3.61	Spain	41	0.77	41	0.77
Libyan Arab Jamahiriya	24	1.17	2	3.17	Finland	54	0.50	42	0.77
Nigeria	20	1.34	3	3.02	Austria	31	0.95	43	0.76
Venezuela	3	3.10	4	3.01	Italy	46	0.66	44	0.75
Egypt	66	0.26	5	2.60	Indonesia	5	2.75	45	0.72
Gulf	8	2.30	6	2.48	Canada	47	0.66	46	0.71
Peru	14	1.64	7	2.29	Sweden	38	0.82	47	0.70
Former USSR	17	1.50	8	2.27	Netherlands	43	0.76	48	0.68
African LDCs	10	2.19	9	1.94	Taiwan	53	0.50	49	0.65
Chile	4	2.85	10	1.88	Portugal	61	0.33	50	0.61
Saudi Arabia	1	3.16	11	1.78	Germany	45	0.69	51	0.61
Norway	19	1.42	12	1.74	France	39	0.78	52	0.61
South African Union	34	0.93	13	1.65	Albania	25	1.16	53	0.56
Kenya	13	1.81	14	1.64	United Kingdom	48	0.62	54	0.56
Australia	42	0.77	15	1.52	Hong Kong	70	0.22	55	0.55
Cameroon	18	1.46	16	1.44	China, People's Rep.	62	0.32	56	0.52
Cote d'Ivoire	51	0.55	17	1.42	Japan	30	0.98	57	0.52
Bulgaria	40	0.78	18	1.39	Thailand	23	1.19	58	0.51
Colombia	29	1.06	19	1.38	Others in South Europe	57	0.44	59	0.51
Others in America	16	1.54	20	1.37	Denmark	59	0.41	60	0.51
Greece	37	0.89	21	1.28	Switzerland	67	0.26	61	0.49
Gabon	44	0.74	22	1.13	New Zealand	76	0.07	62	0.47
Middle East, no OPEC	21	1.33	23	1.12	United States	58	0.43	63	0.47
Former Yugoslavia	36	0.90	24	1.10	Hungary	50	0.56	64	0.45
Poland	35	0.91	25	1.09	Uruguay	68	0.25	65	0.42
Romania	26	1.15	26	1.06	Malaysia	7	2.59	66	0.42
Former Czechoslovakia	27	1.10	27	0.99	Sri Lanka	12	2.09	67	0.40
Others in Africa	33	0.94	28	0.98	East Asian LDCs	69	0.25	68	0.39
Turkey	55	0.48	29	0.93	Mexico	32	0.95	69	0.38
Iceland	74	0.11	30	0.91	Israel	56	0.46	70	0.34
Others in East Asia	28	1.06	31	0.90	Morocco	64	0.31	71	0.34
Bolivia	2	3.11	32	0.88	Vietnam	11	2.16	72	0.34
Argentina	73	0.15	33	0.86	Tunisia	49	0.56	73	0.32
Brazil	65	0.30	34	0.85	Paraguay	77	0.03	74	0.19
South Korea	72	0.18	35	0.83	Philippines	71	0.19	75	0.19
Brunei Darussalam	6	2.72	36	0.80	Pakistan	75	0.09	76	0.13
India	52	0.53	37	0.79	Ireland	63	0.32	77	0.10
BLEU	22	1.25	38	0.78	Cambodia, Laos	15	1.60	78	0.06
Singapore	9	2.28	39	0.78	Bangladesh	79	0.00	79	0.04
Ecuador	78	0.01	40	0.77					

Sources: CEPII-Chelem database and own calculations.

## Appendix (continued)

**B<sub>x</sub> VALUES FOR 79 COUNTRIES OR GROUPS OF COUNTRIES**(Countries sorted by 2000-04 values of **B<sup>\*</sup>**)**Low technology**

	1967-69		2000-04			1967-69		2000-04	
	Rank	B <sup>*</sup>	Rank	B <sup>*</sup>		Rank	B <sup>*</sup>	Rank	B <sup>*</sup>
Cambodia, Laos	40	0.97	1	2.50	Denmark	36	1.07	40	0.93
Bangladesh	2	1.88	2	2.47	China, People's Rep.	14	1.55	41	0.90
Pakistan	6	1.78	3	2.36	Former Yugoslavia	42	0.96	42	0.82
Paraguay	9	1.70	4	2.24	Australia	29	1.18	43	0.82
Sri Lanka	56	0.64	5	2.10	Thailand	27	1.23	44	0.81
East Asian LDCs	5	1.79	6	2.08	Finland	22	1.41	45	0.78
Albania	32	1.14	7	2.07	Poland	63	0.56	46	0.78
Brunei Darussalam	75	0.23	8	2.02	Italy	59	0.61	47	0.77
Vietnam	66	0.47	9	1.96	Austria	48	0.76	48	0.66
Uruguay	10	1.69	10	1.95	Canada	51	0.72	49	0.65
New Zealand	3	1.88	11	1.82	South African Union	37	1.06	50	0.60
Others in Africa	26	1.34	12	1.78	Spain	41	0.97	51	0.59
Iceland	1	1.89	13	1.76	Netherlands	49	0.74	52	0.59
Bolivia	78	0.03	14	1.72	BLEU	61	0.57	53	0.57
Others in East Asia	28	1.21	15	1.70	Sweden	52	0.69	54	0.55
Ecuador	7	1.78	16	1.67	Norway	55	0.66	55	0.55
Tunisia	35	1.10	17	1.58	Egypt	8	1.71	56	0.54
Morocco	20	1.48	18	1.54	Others in South Europe	25	1.34	57	0.53
Hong Kong	15	1.54	19	1.54	France	64	0.55	58	0.50
Cameroon	46	0.91	20	1.50	Former Czechoslovakia	57	0.62	59	0.47
India	17	1.51	21	1.44	Former USSR	58	0.62	60	0.46
Gabon	23	1.38	22	1.43	Hungary	38	1.01	61	0.42
Argentina	12	1.66	23	1.31	Mexico	39	0.98	62	0.39
Cote d'Ivoire	21	1.45	24	1.29	United Kingdom	68	0.45	63	0.38
Indonesia	74	0.26	25	1.26	Malaysia	72	0.33	64	0.38
Middle East, no OPEC	54	0.67	26	1.21	Taiwan	50	0.73	65	0.36
Romania	45	0.94	27	1.20	United States	71	0.35	66	0.36
Turkey	13	1.56	28	1.16	Philippines	4	1.80	67	0.36
Others in America	53	0.68	29	1.13	Gulf	67	0.47	68	0.35
Portugal	18	1.49	30	1.08	Germany	73	0.27	69	0.35
Kenya	60	0.60	31	1.06	Ireland	19	1.48	70	0.34
Chile	76	0.15	32	1.05	South Korea	11	1.68	71	0.32
Greece	30	1.18	33	1.05	Switzerland	69	0.39	72	0.32
Bulgaria	47	0.85	34	1.04	Nigeria	33	1.13	73	0.27
African LDCs	62	0.57	35	1.00	Saudi Arabia	79	0.01	74	0.17
Brazil	16	1.53	36	0.99	Venezuela	77	0.04	75	0.15
Israel	24	1.36	37	0.98	Singapore	70	0.37	76	0.11
Colombia	34	1.10	38	0.95	Japan	65	0.49	77	0.11
Peru	44	0.95	39	0.95	Algeria	31	1.15	78	0.03
					Libyan Arab Jamahiriya	43	0.95	79	0.02

Sources: CEPII-Chelem database and own calculations.

# THE USE OF QUALITATIVE INFORMATION FOR FORECASTING EXPORTS \*

Fátima Cardoso\*\*

Cláudia Duarte\*\*

## 1. INTRODUCTION

The analysis of the evolution of external trade, in particular of exports, is very important in the case of small open economies, such as the Portuguese one. However, the release of external trade data, by *Instituto Nacional de Estatística (INE)*<sup>1</sup> only happens about 10 weeks after the end of the reference quarter. Due to this time lag, short-run exports forecasts play an important role in monitoring economic activity. Nevertheless, forecasting exports is not straightforward. Owing to the volatility of this series, forecasting exports entails a particularly high uncertainty level. Moreover, calculating timely forecasts requires the identification of variables that not only may bring useful information for forecasting exports, but are also timely released.

Survey data can be, in this context, particularly helpful for forecasting exports. According to an increasing literature on the use of qualitative data for forecasting quantitative aggregates, surveys are a very important tool for short-run economic analysis and forecasting. For example, Mourougane and Roma (2002), and Mourougane (2006) find evidence that confidence indicators are useful for forecasting, in the short run, the real rate of change of GDP, of some euro area countries (in the first case), and of Canada (in the second case). More recently, Cuenca e Millaruelo (2006) analyse the relevance of considering a set of qualitative indicators for assessing the behaviour of the main macroeconomic aggregates of the euro area. The use of survey data has drawn more and more attention mainly because these data are released with short lags and are not revised. Furthermore, in the case of questions about agents' expectations for the near future, survey series may be seen as leading indicators.

The aim of this article is to assess the role of qualitative information for forecasting the year-on-year rate of change of goods exports, in nominal terms.<sup>2</sup> In particular, for obtaining short-run exports forecasts, we estimate models in which only survey data are exploited (released by the European Commission) referring to the Manufacturing Industry Survey and to the Economic Sentiment Indicator.

The article is organized as follows. Section 2 describes the data. Section 3 presents the selection of an econometric model for the rate of change of Portuguese exports, in nominal terms, based on qualitative indicators, being its performance evaluated through an out-of-sample forecasting exercise. Finally, section 4 concludes.

\* The opinions and findings expressed in this article are those of the authors and do not necessarily coincide with those of the Banco de Portugal. The authors thank António Rua and Paulo Esteves for their suggestions and comments. The usual disclaimer applies.

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(2) Initially both the nominal and the real rate of change were considered. However, further analysis showed that the results for the real rate of change were significantly worse than those for the nominal rate of change. This evidence suggests that, in the cases considered, the entrepreneurs' assessment, underlying their answers to the survey, is more influenced by nominal measures than by volume measures. Therefore, in this article are only presented the results for the year-on-year rate of change of exports, in nominal terms.

## 2. DATA

The database used consists of quarterly series covering the period from the first quarter of 1996 to the second quarter of 2006. The purpose of the analysis is to forecast the year-on-year rate of change of goods exports, in nominal terms, released by *INE*. As it can be seen in Chart 1, this variable denotes some volatility.

For forecasting the developments in exports qualitative series are used, both monthly and quarterly, referring to the Manufacturing Industry Survey, released by the European Commission. This enquiry, within the scope of the harmonised European enquiries, aims at collecting information about entrepreneurs' opinion regarding the evolution of their companies' activity. The survey, monthly delivered to a sample of about 1117 companies, consists of 18 questions (8 monthly and 10 quarterly). These questions can refer to *ex-ante* (next three months) or to *ex-post* periods (reference month or last three months). Considering the definition of the answer collecting period, the evaluation of the reference month is based on the first 20 days of that month.

From the set of 18 questions, it was made an initial selection, being only chosen the questions that are directly related to exports. In particular, the analysis encompasses four questions from the quarterly survey and another four questions from the monthly survey.

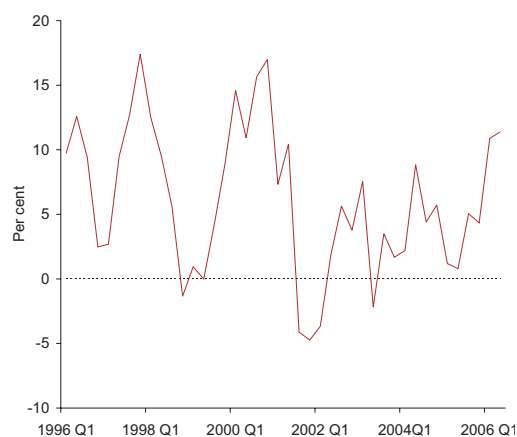
In the case of the quarterly survey, the questions chosen refer to new orders recently received ( $nenc_t$ ), to export expectations for the next months ( $eexp_t$ ) and to the competitive position in the intra- and extra-community markets ( $pci_t$  e  $pce_t$ ). Combining these last two variables, and using as weights the ratio of intra- and extra-community trade to the total external trade, a new variable was built ( $comp_t$ ) which can be interpreted as a global indicator of Portuguese exports competitiveness.

Regarding the monthly survey, the questions analysed refer to the recent production trend ( $prod_t$ ), to total and export order books ( $cenc_t$  e  $cexp_t$ ) and to production expectations for the next months ( $eprod_t$ ).

The qualitative series are presented as balances, defined as the difference between positive and negative answers, and are seasonally adjusted. In addition to the aggregated totals, the variables from

Chart 1

YEAR-ON-YEAR RATE OF CHANGE OF EXPORTS,  
IN NOMINAL TERMS



Source: *INE* (International Trade Statistics).

the Manufacturing Industry Survey are also available disaggregated by economic activities (NACE).<sup>3</sup> The aggregation of the series for each question reflects the weights of each branch (measured by the turnover) in the total. Since, in this case, the aim is modelling and forecasting the year-on-year rate of change of exports, instead of only using the original overall series, it was also considered a set of series resulting from aggregating the disaggregates by economic activity, using as weights the ratios of the exports of each branch to the total exports (henceforth denoted by the suffix  $p$ ).

Furthermore, adding to the variables from the Manufacturing Industry Survey, it was built a new variable, based on the Economic Sentiment Indicators of the several countries of the European Union (EU) ( $pise_t$ ). This variable, which can be seen as a proxy of the external demand of Portuguese exports, is a weighted average of the Economic Sentiment Indicators of the several Members of the EU, whose weights reflect the structure of Portuguese exports disaggregated by destination country.

In the context of a quarterly database, monthly series have to be transformed into quarterly series. In this case, the quarterly figures were obtained by averaging the monthly ones, considering more than one way of distributing the months among the quarters. Traditionally, the first quarter refers to the months of January, February and March, and so on so forth. Moreover, we also considered lags of one month (henceforth denoted by the suffix  $d1$ ), corresponding the first quarter to December, January and February, and of two months (henceforth denoted by the suffix  $d2$ ), with the first quarter equal to the average of November, December and January. This procedure allows testing the existence of several kinds of lags (in months) in the relation between the qualitative variables and exports.

### 3. MODELLING

#### 3.1. First approach: cross correlations analysis

Considering the size of the database, in a first approach, bivariate correlations between the variation of exports and potential explanatory variables were analysed. From the results attained, it is possible to conclude that the correlations calculated from the weighted series, whose weights reflect the disaggregation by NACE of Portuguese exports, are, in general, higher than the correlations from the original data. Taking into account this evidence (subsequently confirmed by robustness checks during model estimation) it was chosen to work with the weighted series, whose weights are based on the Portuguese exports structure.

Analysing the correlations calculated from these series, it is possible to identify three different situations: in the case of export expectations for the next months ( $eexp_t$ ) the highest correlation is registered in a lagged period ( $t-2$ ); for the variables referring to new orders recently received ( $nencp_t$ ), to export order books, contemporaneous and lagged one month ( $cexp_t$  e  $cexpd1p_t$ ) and to the proxy of external demand ( $pise_t$ ) the highest correlation values are registered in the contemporaneous period; in all the other cases the highest value is most commonly registered in the period  $t+1$  (see Table 1). This evidence suggests that the variables  $nencp_t$ ,  $eexp_t$ ,  $cexp_t$ ,  $cexpd1p_t$  e  $pise_t$  may be seen as co-incident indicators (and lead indicator, in the case of  $eexp_t$ ) of the rate of change of exports. Nevertheless, even in the cases where the highest correlation is registered in periods after  $t$ , the value of the correlations in  $t$  and in lagged periods is still reasonably high.

In addition, the analysis of the table suggests that using the series from the monthly survey lagged one and two months does not seem to significantly improve correlations. In fact, the use of lags of less than

(3) NACE – Statistical classification of economic activities in the European Community. Note that, at least at the disaggregation level considered in this article (two-digit), there is a direct correspondence between this classification and the current Portuguese classification of economic activities (CAE).



Table 1

CORRELATION COEFFICIENTS									
	t-4	t-3	t-2	t-1	t	t+1	t+2	t+3	t+4
<b>Manufacturing Industry Survey</b>									
<b>Quarterly survey</b>									
New orders recently received ( <i>nencp<sub>t</sub></i> )	-0.042	0.178	0.428	0.624	0.678	0.631	0.533	0.293	0.123
Export expectations for the next months ( <i>eexp<sub>t</sub></i> )	0.258	0.400	0.552	0.513	0.540	0.431	0.246	0.143	-0.094
Competitive position in the intra-community market ( <i>pci<sub>t</sub></i> )	-0.122	-0.041	0.000	0.410	0.526	0.679	0.695	0.390	0.126
Competitive position in the extra-community market ( <i>pce<sub>t</sub></i> )	0.161	0.195	0.201	0.238	0.497	0.577	0.555	0.317	0.134
Global indicator of competitiveness ( <i>comp<sub>t</sub></i> )	-0.068	0.009	0.049	0.400	0.541	0.686	0.692	0.389	0.131
<b>Monthly survey</b>									
Recent production trend ( <i>prod<sub>t</sub></i> )	0.032	0.239	0.429	0.517	0.591	0.593	0.469	0.448	0.227
Total order books ( <i>cenc<sub>t</sub></i> )	-0.033	0.168	0.368	0.563	0.601	0.616	0.505	0.363	0.262
Export order books ( <i>cexp<sub>t</sub></i> )	-0.216	0.132	0.447	0.683	0.773	0.666	0.446	0.107	-0.085
Production expectations for the next months ( <i>eprod<sub>t</sub></i> )	0.204	0.301	0.475	0.463	0.522	0.563	0.529	0.516	0.314
<b>Lagged one month</b>									
Recent production trend ( <i>prod<sub>t</sub></i> )	-0.042	0.206	0.327	0.508	0.556	0.598	0.512	0.429	0.333
Total order books ( <i>cenc<sub>t</sub></i> )	-0.071	0.103	0.297	0.515	0.594	0.631	0.541	0.403	0.298
Export order books ( <i>cexp<sub>t</sub></i> )	-0.249	0.017	0.349	0.632	0.756	0.728	0.540	0.216	-0.005
Production expectations for the next months ( <i>eprod<sub>t</sub></i> )	0.139	0.311	0.394	0.464	0.489	0.544	0.593	0.489	0.417
<b>Lagged two months</b>									
Recent production trend ( <i>prod<sub>t</sub></i> )	-0.064	0.105	0.274	0.484	0.548	0.612	0.539	0.477	0.388
Total order books ( <i>cenc<sub>t</sub></i> )	-0.102	0.032	0.225	0.445	0.580	0.618	0.592	0.460	0.331
Export order books ( <i>cexpt</i> )	-0.271	-0.110	0.234	0.555	0.716	0.750	0.617	0.312	0.040
Production expectations for the next months ( <i>eprod<sub>t</sub></i> )	0.114	0.254	0.330	0.467	0.437	0.539	0.565	0.533	0.511
<b>Economic Sentiment Indicators</b>									
Proxy of the external demand ( <i>pise<sub>t</sub></i> )	-0.171	0.046	0.325	0.600	0.737	0.704	0.479	0.279	0.062
Lagged one month ( <i>pised1<sub>t</sub></i> )	-0.226	-0.030	0.226	0.519	0.707	0.739	0.559	0.351	0.123
Lagged two months ( <i>pised2<sub>t</sub></i> )	-0.274	-0.107	0.134	0.431	0.661	0.754	0.639	0.411	0.200

**Note:** All correlations are calculated for the weighted series, whose weights reflect the Portuguese exports structure. The values refer to the correlation between the rate of change of exports in the period  $t$  and the qualitative indicators in period  $t + i$  ( $i \in \{-4, \dots, 4\}$ ). The shaded area denotes the highest correlation coefficient.

a quarter (one and two months) does not, in general, increase the correlation with the variation of exports, for lagged and contemporaneous periods.

### 3.2. Model estimation

The aim of this section is to choose the model specification, namely the variables to include, which allows attaining the best results in terms of forecasting the variation of exports. This choice takes into account the principle of parsimony, but, even so, we try to cover an information set as wide as possible.

To represent the rate of change of exports, *Autoregressive Distributed Lags* (ADL) models are considered, with the following form:

$$\theta(L)y_t = \sum_{i=1}^k \delta_i(L)x_{i,t} + \varepsilon_t \quad k = 1, \dots, n$$

in which  $y_t$  is the year-on-year rate of change of Portuguese exports, in nominal terms,  $x_{i,t}$  are the qualitative indicators,  $\theta(L)$  and  $\delta_i(L)$  are lag polynomials and  $\varepsilon_t$  is the residual variable ( $\bar{\varepsilon} = 0$  and standard deviation  $= \sigma^2$ ). For model identification purposes it was used a sample from 1997Q1 to 2004Q2.

Due to the interest in obtaining timely forecasts, during model specification the qualitative variables were only introduced contemporaneously and with lags ( $n = 4$ ). Furthermore, adding to economic interpretation, model selection was based on the Schwarz criterion. Based on this criterion, the model chosen,<sup>4</sup> as follows,<sup>5</sup>

$$\hat{y}_t = -25.34 - 0.44y_{t-4} + 0.19eexp_{t-2} + 0.22cexp_t + 0.34pise_t$$

$\begin{bmatrix} -1.64 \end{bmatrix}$ 
 $\begin{bmatrix} -5.00 \end{bmatrix}$ 
 $\begin{bmatrix} 1.92 \end{bmatrix}$ 
 $\begin{bmatrix} 2.24 \end{bmatrix}$ 
 $\begin{bmatrix} 2.44 \end{bmatrix}$

(1)

Adjusted  $R^2 = 0.79$

Dependent variable standard deviation = 6.33

Residuals standard deviation = 2.88

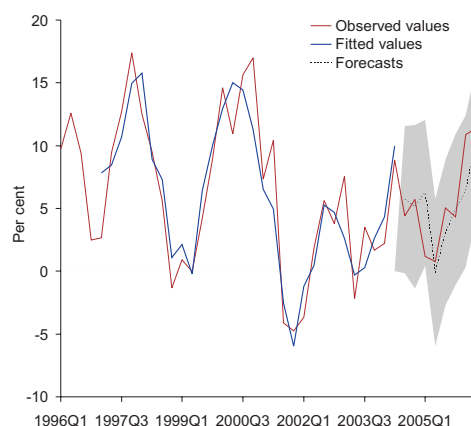
has as regressors: the dependent variable (rate of change of exports) lagged four periods ( $y_{t-4}$ ), which enables the model to capture base effects; from the quarterly survey, export expectations for the next months, lagged two periods ( $eexp_{t-2}$ ); from the monthly survey, export order books ( $cexp_t$ ); and, lastly, the proxy of external demand of Portuguese exports ( $pise_t$ ). There is no evidence of autocorrelation until the order 4 in this model.

Considering the sample that was not used in model identification (2004Q3 to 2006Q2) it was simulated an out-of-sample forecasting exercise. The results of this exercise were evaluated according to the root mean squared forecast error (RMSFE), which, in this case, is 2.60 (see Chart 2).

(4) It is worth noting that other models, with similar results, were obtained. However, the model chosen presented the best fit in-sample and the best forecasting performance.

(5) The t-ratios are presented in square brackets.

Chart 2

YEAR-ON-YEAR RATE OF CHANGE OF EXPORTS,  
IN NOMINAL TERMS

Note: The shaded area corresponds to a 95% confidence interval.

Comparing the model chosen with a univariate benchmark,<sup>6</sup> one concludes that the model with qualitative variables has a better performance, both in-sample and out-of-sample, than the univariate model, which presents a residuals standard deviation equal to 4.59 and a RMSFE of 3.21.

In order to assess the robustness of the model to the sample used it was carried out a sensitivity analysis. According to the results of this analysis, the model appears to be robust to changes in the sample dimension. In particular, when estimating the selected model using the full sample (1997Q1 to 2006Q2) the coefficients remain stable and statistically significant.

Sample: 1997Q1 – 2006Q2

$$\hat{y}_t = -23.55 - 0.44y_{t-4} + 0.17eexp_{t-2} + 0.24cexp_t + 0.33pise_t$$

$$\begin{matrix} [-1.66] & [-5.20] & [2.41] & [2.44] & [2.51] \end{matrix} \quad (2)$$

Adjusted  $R^2 = 0.77$

Residuals standard deviation = 2.81

### 3.3. More timely estimates: indicators with incomplete quarterly information

The selected model, described in the previous section, presents the best forecasting performance, and gives one estimate to the rate of change of exports about 70 days before the release of the official data.

(6) The univariate benchmark has the following specification:

$$\hat{y}_t = 4.50 + 0.62y_{t-1} - 0.32y_{t-4}$$

$$\begin{matrix} [3.07] & [4.59] & [-2.39] \end{matrix}$$

with t-ratios presented in square brackets.

In an attempt to obtain an estimate even earlier, alternative models were estimated in which, starting from the previously selected model (see (1)), the contemporaneous regressors are replaced with equivalent series that result from only considering information about a fraction of the quarter. Obviously, this is possible because, in the model chosen, the contemporaneous variables are from the monthly survey. Therefore, for both these variables (export order books ( $cexp_i$ ) and proxy of external demand ( $pise_i$ )), alternative series were calculated, where the quarterly observations are replaced by the data referring to the first month (henceforth denoted by the suffix  $m1$ ) or to the average of the first two months of the respective quarter (henceforth denoted by the suffix  $m2$ ).

Consequently, it is possible to obtain a first estimate of the quarterly variation of exports from a model with a specification similar to (1) but in which the variables referring to the export book orders ( $cexp_i$ ) and to the proxy of external demand of the Portuguese exports ( $pise_i$ ) are replaced by the corresponding variables with information on the first month of each quarter only ( $cexpm1p_i$  e  $pisem1_i$ ).

$$\hat{y}_t = -26.86 - 0.44y_{t-4} + 0.18eexp_{t-2} + 0.23cexpm1p_t + 0.36pisem1_t$$

$$\begin{matrix} [-2.15] & [-5.00] & [2.18] & [2.39] & [3.12] \end{matrix} \quad (3)$$

In the same way, it can be obtained a second estimate using the variables with information on first two months of each quarter ( $cexpm2p_i$  e  $pisem2_i$ ).

$$\hat{y}_t = -23.74 - 0.44y_{t-4} + 0.18eexp_{t-2} + 0.25cexpm2p_t + 0.33pisem2_t$$

$$\begin{matrix} [-1.64] & [-5.11] & [2.21] & [2.26] & [2.51] \end{matrix} \quad (4)$$

Considering as a third estimate the one obtained from the model initially chosen, that is, from the model in which all indicators refer to complete quarters, Table 2 summarises the estimation and forecasting results over the three stages:

As expected, the results obtained, both for the RMSFE and for the accuracy on predicting direction changes, worsen as less information concerning each quarter is used. Nevertheless, by incurring this slight loss of quality it is possible to obtain more timely estimates. Furthermore, even considering the model with information only for the first month of the quarter, its results are still better than the ones of the univariate model.

The results obtained suggest that it is possible to have more timely forecasts for the variation of exports, without its quality being significantly affected, by using incomplete quarterly information. Moreover, including these variables in the model allows taking into account the monthly data as soon as they are released, without having to wait for gathering information for the whole quarter.

**Table 2**

MODEL COMPARISON			
Models	RMSFE	Matching of the variation sign <sup>(a)</sup> (%)	Forecast timeliness <sup>(b)</sup> (days)
One month information	2.96	70.3	130
Two months information	2.85	73.0	100
Complete quarter information	2.60	73.0	70

**Notes:** (a) The matching of the variation sign measures the number of times that the sign of the variation of the series of interest (which is the rate of change of exports) is equal to the one of the variation of the fitted values and forecasts of the model (in percentage). (b) Forecast timeliness refers to the period of time elapsed between the calculation of the forecast and the release of exports data.

#### 4. FINAL REMARKS

In this article it is assessed the importance of using qualitative data, from opinion surveys, for forecasting exports in the short run. In particular, a model for the quarterly year-on-year rate of change of exports is estimated, considering qualitative series from the Manufacturing Industry Survey, referring to Portugal, and the Economic Sentiment Indicators, referring to the EU countries, both released by the European Commission.

Based on the model selected, some alternative models are also estimated in an attempt to obtain estimates as early as possible, *vis-à-vis* the release of the data. The models presented produce estimates for the evolution of exports between 70 and 130 days before the release of the exports figures.

For the purpose of obtaining timely forecasts for the variation of exports, one concludes that the qualitative information is particularly relevant for this matter and that it provides a leading indication on exports' behaviour. Furthermore, the results obtained point to the stability of the model in relation to the sample used. It should be noted, however, that forecasting exports entails some difficulties due to the volatility of the series.

The favourable results that were achieved, in this case, can be seen as an incentive to further research on the use of this methodology for forecasting other quantitative aggregates.

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# THE CALCULATION OF CYCLICALLY ADJUSTED BALANCES AT BANCO DE PORTUGAL: AN UPDATE\*

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## 1. INTRODUCTION<sup>1</sup>

In recent years, the cyclically adjusted budget balance has gained relevance as one of the indicators used in the assessment of the underlying position of public finances in the European Union Member-states. Indeed, the reform of the Stability and Growth Pact increased the role of the balance adjusted for cyclical effects and temporary measures, when defining, at the “preventive arm” level, the medium-term fiscal objective based on this variable, as well as the annual minimum convergence required for the Member-states that have not yet reached it. As regards the “corrective arm”, the fiscal adjustment imposed to Member-states incurring in excessive deficit situations in the recent period has also been measured in terms of the change in the balance adjusted for cyclical effects and temporary measures.

The difficulties in explaining this indicator to the general public, the diversity of available methodologies, as well as the ex-post revision of cyclically adjusted balances, even if only as a result of the update of the future macroeconomic outlook, are among the factors that have hampered its widespread use. Nonetheless, although estimates used in the European Union framework are those of the European Commission, other international institutions, such as the OECD and the IMF, have been regularly publishing values for cyclically adjusted budget balances. As far as the European System of Central Banks (ESCB) is concerned, a cyclical adjustment methodology was adopted in 2001, which has since then been followed by Banco de Portugal. The values obtained are regularly made public in the Banco de Portugal publications, namely in the *Annual Report* and in the *Economic Bulletin*.

The purpose of this article is to update parameters and to improve some assumptions made by Banco de Portugal in the initial implementation of the ESCB cyclical adjustment methodology. Moreover, it applies the results to the analysis of public finances based on the disaggregated framework developed within the scope of a project involving some central banks, including Banco de Portugal. The text is structured as follows. Section 2 presents an introductory short description of the main features of the ESCB methodology and its application to the Portuguese case. Section 3 includes the updates and improvements of such methodology, as regards both the re-estimation of some elasticities of the fiscal variables with respect to their macroeconomic bases and the adoption of new macroeconomic bases. As a result of these changes, Section 4 shows their impact on the estimation of the cyclically adjusted balances *vis-à-vis* the latest values made public by Banco de Portugal. Section 5 adapts the analysis of public finances based on the disaggregated framework to the new procedures and includes the new results obtained. Finally, Section 6 draws the conclusions.

\* The views expressed are of the author and do not necessarily reflect those of Banco de Portugal. Any error or omission are of her own responsibility. The author would like to thank Marta Abreu, Nuno Alves, Mário Centeno, Jorge Cunha, Ana Cristina Leal, Sara Moreira and Maximiano Pinheiro for comments and suggestions.

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(1) The general government accounts for the 1999-2005 period underlying the preparation of this article were compiled by the National Statistical Institute (INE), on a 2000 National Account basis, within the scope of the September 2006 excessive deficit procedure notification. Data from 1995 to 1998 are Banco de Portugal estimates. In terms of the macroeconomic scenario, the complete set of National Accounts according to the new basis only covers the years from 1999 to 2002, wherefore the data for the years from 1995 to 1998 and from 2003 to 2005 are also Banco de Portugal estimates.

## 2. THE METHODOLOGY OF THE EUROPEAN SYSTEM OF CENTRAL BANKS

Currently, Banco de Portugal calculation of the cyclically adjusted general government balance, regularly made public in the *Economic Bulletin* and in the *Annual Report*, is based on the methodology agreed in the ESCB in 2001 (see Bouthevillain *et al.* (2001) and Neves and Sarmento (2001)).

This methodology assumes that the fiscal variables influenced by the economic cycle have other-than GDP macroeconomic bases that better explain their development. However, in order to determine the semi-elasticity of the budget balance with respect to GDP, these macroeconomic bases must be National Accounts aggregates. It is worth highlighting three aspects related to the selection of the fiscal variables and the respective macroeconomic bases. Firstly, it is assumed that non-tax revenue and the different expenditure components, other than unemployment benefits, are not affected by economic activity. This characteristic is common to the cyclical adjustment methodologies implemented by important international institutions, such as the European Commission, the OECD and the IMF, and results from the difficulty in measuring, in a standardised manner in the different countries and even in one country in different years, the impact of the economic cycle on most public expenditure items and non-tax revenue. Indeed, the institutional structure relevant for budgetary decisions, the type of government, the starting point of the fiscal position, *inter alia*, are factors determining the response of public expenditure to the macroeconomic context. Secondly, the macroeconomic bases are defined in real terms, which means that the effect of actual inflation on public accounts is not taken into consideration. The main difficulties in the quantification of the impact of the price changes on the budget balance emerge on the expenditure side, given that it highly depends on the behaviour of budgetary authorities in response to inflation deviations from initial forecasts. Therefore, although in terms of tax and social contributions revenue it would be more appropriate to consider nominal macroeconomic bases in the cyclical adjustment, this does not happen in the methodologies currently implemented. However, the disaggregated framework mentioned in Section 5 considers this issue to some extent, when assuming that the structural change in each of the items of tax revenue evolves in line with the respective trend macroeconomic base defined in nominal terms. Finally, some items are excluded from the fiscal variables so that the treatment of revenue and expenditure in terms of the cyclical adjustment is consistent. At present, in the Portuguese case, the revenue of the personal income tax (Portuguese acronym: IRS) deriving from final withholding schemes, which stems essentially from interest on financial instruments, and from public sector labour income is excluded from the receipts of taxes on household income. The same occurs with actual contributions to the civil servants pension system and imputed contributions, which are deducted to the total amount of social contributions. Table 1 presents the fiscal variables with a cyclical impact, as well as the respective macroeconomic bases.

Taking into account these considerations, the cyclical component of each of the fiscal variables is calculated according to the following formula:

$$R_i^C = \eta_{R_i, X_i} * \left( \frac{X_i - X_i^t}{X_i^t} \right) * R_i \quad (1)$$

where:

$R_i$  – fiscal variable  $i$ ;

$R_i^C$  – cyclical component of fiscal variable  $i$ ;

$X_i$  – macroeconomic base for fiscal variable  $i$ ;

$X_i^t$  – trend value of the macroeconomic base for fiscal variable  $i$ ;

$\eta_{R_i, X_i}$  – elasticity of fiscal variable  $i$  relative to its macroeconomic base.

The trend values of the macroeconomic bases are obtained by applying the Hodrick-Prescott filter to series extended with forecasts elaborated by each national central bank, so as to avoid a bias at the end of the sample, in which the value for the filter smoothing parameter ( $\lambda$ ) is 30. The estimation of the elasticities in the Portuguese case was chiefly based on the tax codes and is described in detail in Neves and Sarmento (2001)

One of the main advantages of the disaggregated approach suggested by the ESCB *vis-à-vis* the other methodologies for the calculation of cyclically adjusted balances consists in the possibility of taking into account the effects of different compositions of economic growth on public accounts. However, in view of the traditional approach in which the cyclical component depends only on the output gap, it has the disadvantage of not allowing the straightforward calculation of the semi-elasticity of the fiscal balance as a percentage of GDP with respect to real GDP, defined as:

$$\varepsilon_{FB\%GDP, GDP_r} = \frac{\Delta FB\%GDP}{\frac{\Delta GDP_r}{GDP_r}} \quad (2)$$

Nonetheless, in the methodology adopted by the ESCB, this semi-elasticity can be obtained indirectly from the following formula:

$$\varepsilon_{FB\%GDP, GDP_r} = \sum_i \frac{R_i}{GDP} * \eta_{R_i, X_i} * \eta_{X_i, GDP_r} \quad (3)$$

The elasticities of the macroeconomic bases with respect to real GDP ( $\eta_{X_i, GDP_r}$ ) were calculated on the basis of a specific shock scenario, described in detail in Bouthévilain *et al.* (2001). This one is based on National Accounts identities and takes into account six main assumptions: (i) the contribution of net exports to the change in real GDP is nil; (ii) public consumption (including public wages and employment), public investment and subsidies do not react under the shock scenario; (iii) the contribution of consumption of fixed capital to the change in real GDP is negligible; (iv) the gross operating surplus and the private sector wage bill grow at the same rate; (v) private investment evolves similarly to private consumption; (vi) the elasticity of the labour force with respect to real GDP is almost nil. As can be observed in Table 2, based on the results then assumed for the Portuguese case (columns 1 and 2),

**Table 1**

BUDGET VARIABLES AND RESPECTIVE MACROECONOMIC BASES IN ESCB METHODOLOGY	
Taxes on household income (excluding the IRS revenue from final withholding schemes and public sector labour income)	⇒ Private sector wage bill
Taxes on corporate income	⇒ Gross operating surplus
Taxes on production and imports (including European Union own receipts)	⇒ Private consumption
Social contributions (excluding actual contributions of the civil servants pension system and imputed contributions)	⇒ Private sector wage bill
Unemployment benefits	⇒ Number of unemployed



Table 2

## THE SEMI-ELASTICITY OF THE FISCAL BALANCE WITH RESPECT TO GDP IN THE ESCB METHODOLOGY

	Elasticity of the fiscal variable with respect to the macroeconomic base <sup>(a)</sup>	Elasticity of the macroeconomic base with respect to GDP <sup>(a)</sup>	Elasticity of the fiscal variable with respect to GDP	Weight of the fiscal variable on GDP <sup>(b)</sup>	Contribution to the semi-elasticity of the budget balance with respect to GDP
	(1)	(2)	(3)=(1)*(2)	(4)	(5)=(3)*(4)
<b>Taxes on household income</b>			1.37	0.03	0.05
Macroeconomic base: private sector wages	1.69	0.43			
Macroeconomic base: private employment	1.00	0.64			
<b>Taxes on corporate income</b>	1.00	1.07	1.07	0.03	0.04
<b>Taxes on production and imports</b>	1.10	1.31	1.44	0.14	0.20
<b>Social contributions</b>			1.07	0.07	0.08
Macroeconomic base: private sector wages	1.00	0.43			
Macroeconomic base: private employment	1.00	0.64			
<b>Unemployment benefits</b>	1.00	-10.23	-10.23	0.01	-0.07
<b>Total:</b>					<b>0.43</b>

**Notes:** (a) According to Neves and Sarmento (2001) and to the section about Portugal in Bouthevillain *et al.* (2001). (b) The ratios of the fiscal variables to GDP are based on National Accounts and correspond to averages for the 1995-2000 period. In order to obtain ratios that are more consistent with the methodology to calculate cyclically adjusted balances adopted by the ESCB, IRS revenue from final withholding schemes and public sector labour income was excluded in the case of taxes on household income, actual contributions to the civil servants pension system and imputed contributions were deducted from total social contributions, while the European Union own receipts were added to taxes on production and imports.

but with the currently available general government accounts (column 4), the value obtained for the semi-elasticity of the balance with respect to GDP is 0.43.

### 3. UPDATES AND IMPROVEMENTS WITHIN THE SCOPE OF THE ESCB METHODOLOGY

This Section analyses the relationship between the different fiscal variables assumed to be influenced by the economic cycle and the respective macroeconomic bases in the 1995-2005 period. In some cases, it is suggested to change and update the procedures adopted by Neves and Sarmento (2001). Concerning the estimation of elasticities, three key points are worthy of note. Firstly, the period considered in the analysis covers chiefly one economic cycle and is therefore short in terms of the actual number of observations. However, the possibility of starting the analysis in some earlier year is hindered by the fact that the introduction of the main taxes in the current Portuguese tax system occurred chiefly until the late 1980s/early 1990s, as well as by the absence of a retropolation of National Accounts on a 2000 basis for the period prior to 1995. Secondly, since the objective is to determine the cyclical elasticities of the fiscal variables, regressions are based on series of different taxes and social contributions adjusted for the effects of permanent or temporary discretionary measures. Nonetheless, it is not possible to disregard the effects of possible structural changes that may have occurred, but, in view of the short period of the analysis, they are not expected to be significant. Lastly, it is worth stressing that the specification of the regressions is deemed appropriate for the purpose of the elasticity estimation to be used in the cyclical adjustment of the budget balance within the scope of the ESCB methodology and, as such, is not necessarily based on the explanatory variables which would allow the best possible fit to data observed.

### 3.1. Taxes on household income

The estimation of the elasticity of taxes on household income with respect to the private sector wage bill is described in detail in Neves and Sarmento (2001) and was based on data made available by the tax administration relative to a sample of taxpayers in 1998. The values obtained (1.69 for private sector wages and 1.0 for private employment) will not be updated in this article. However, in spite of the discretionary measures taken in recent years, which had an impact on the structure and progressivity of the tax, the estimated elasticity is a reasonably good proxy for the behaviour of this tax revenue in the 1995-2005 period, particularly in the most recent years.

Chart 1 presents the growth rates of revenue from taxes on household income, resulting chiefly from the IRS, excluding the revenue from final withholding schemes and from public sector labour income. This series was adjusted taking into account the estimated impact on IRS of the main temporary or permanent discretionary measures implemented from 2000 to 2004.<sup>2</sup> Worthy of note among these are: the effect of the tax rate cuts and the introduction of a new bracket in 2001, as a result of the income tax reform in 2000; the above-inflation update of the tax withholding tables in 2002, with an opposite impact on tax revenue in 2002 and 2003; the reduction in the tax rates included in the 2005 Budget, only partly reflected in the update of the tax withholding tables in that year; the extraordinary settlement of tax arrears in late 2002 and early 2003; the securitisation of tax credits in 2003. Chart 1 also includes a series constructed from the estimated elasticity and the development of the respective macroeconomic base, according to the following formula:

$$\hat{R}_{Taxes\ hous.\ inc.}^e = 169 * \left( \hat{W}_{priv} - \hat{U}_{IRS} - \hat{E}_{priv} \right) + \hat{U}_{IRS} + \hat{E}_{priv} \quad (4)$$

where:

$\hat{R}_{Taxes\ hous.\ inc.}^e$  – Estimated growth rate of taxes on household income (excluding the IRS derived from final withholding schemes and public sector labour income);

$\hat{W}_{priv}$  – Growth rate of the private sector wage bill, net of social contributions;

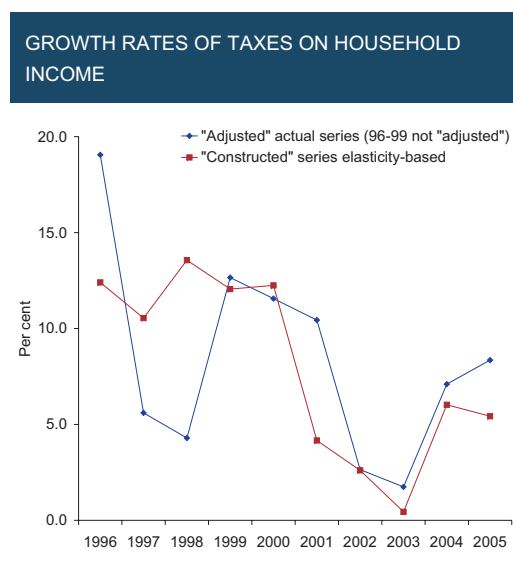
$\hat{U}_{IRS}$  – Annual update of the IRS brackets and other parameters that usually coincide with the update of the tax withholding tables;

$\hat{E}_{priv}$  – Growth rate of private employment.

Equation (4) indicates that the effect of progressivity, via the IRS structure, will only be reflected in the collection of these taxes when the development of wages differs from the update of the IRS brackets and other parameters. In effect, this should account for a significant part of the very marked difference between the two series presented in Chart 1 in 1997 and 1998, when the IRS brackets and other parameters were updated in line with expected inflation but private sector wages grew significantly above such values. In 1996, the opposite effect may be explained by the settlement of debt arrears within the scope of the Mateus plan. Finally, the divergence of the two series in 2005, with a more favourable behaviour of revenue from taxes on household income than estimated taking into account the elasticity, may partly illustrate the impact increased effectiveness of tax administration in the collection of these taxes.

(2) IRS changes introduced from 1995 to 1999 were not explicitly considered in this analysis due to difficulties in the quantification of their effects.

Chart 1



### 3.2. Taxes on corporate income

Taxes on corporate income, mainly composed by the Corporate Income Tax (Portuguese acronym: IRC) show a very volatile behaviour over time, which makes extremely difficult to select an appropriate macroeconomic base to model its development. Indeed, in Portugal, IRC revenue is highly dependent on the development of profits in some large corporations that are naturally the main contributors to this tax collection. In addition, the fact that the variable profit is not one of the aggregates compiled in the elaboration of the National Accounts and the method itself for the calculation of this tax receipts, in particular the possibility of deducting losses from previous years, make it even more difficult to establish a relationship with the macroeconomic scenario. Neves and Sarmento (2001) used gross operating surplus as a proxy to corporate profits and, given the proportionality of the tax, assumed an elasticity of revenue with respect to its macroeconomic base equal to one.

Chart 2 shows the growth rates of revenue from taxes on corporate income in the 1996-2005 period, adjusted for the effects of the main temporary and permanent tax policy measures. It could be referred, as examples, the IRC rate cuts from 36 to 34 per cent (1997), from 34 to 32 per cent (2000), from 32 to 30 (2002) and from 30 to 25 per cent (2004), the change in the percentage used to calculate pre-payments (2000) and a number of other changes related to special pre-payments. In the years when gross operating surplus growth rates are available, the resulting developments seem to suggest that private GDP is a more suitable variable to capture the dynamics of revenue from taxes on corporate income. After the choice of the new macroeconomic base, defined in real terms, the revenue elasticity was obtained from the estimation of equation (5) by ordinary least squares, using data from 1995 to 2005, and its value corresponded to  $\beta_{\text{Taxes corp. inc.}} = 3.14$ .

$$\Delta \ln(R_{\text{Taxes corp. inc.}}^{\text{cor}})_t - \Delta \ln(GDP_{\text{priv.}}^{\text{deflator}})_t = \beta_{\text{Taxes corp. inc.}} \Delta \ln(GDP_{\text{priv.}}^{\text{real}})_t + \varepsilon_t \quad (5)$$

where:

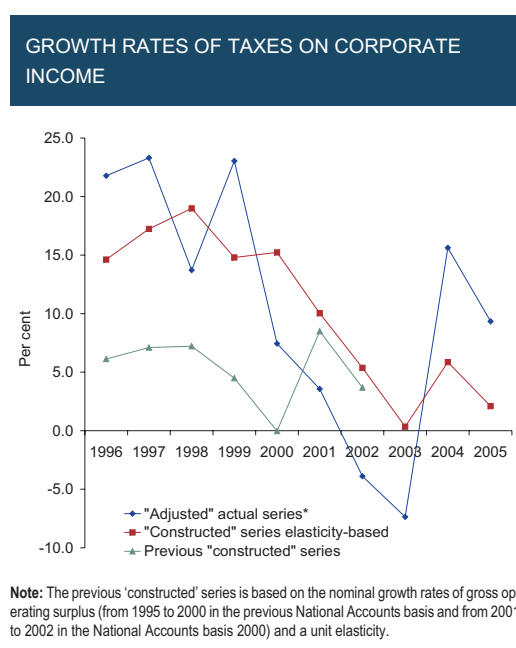
$R_{\text{Taxes corp. inc.}}^{\text{cor}}$  – Revenue from taxes on corporate income adjusted for the effects of tax policy measures;

$GDP_{\text{priv.}}^{\text{deflator}}$  – Private GDP deflator;

$GDP_{priv.}^{real}$  – Real private GDP.

Three aspects should be highlighted in this estimation. Firstly, the specification of equation (5) assumes a unit elasticity with respect to the private GDP deflator, which captures the fact that revenue from these taxes actually depends on a nominal base. Secondly, the period used in the analysis includes the year 2005, although this one was much affected by effectiveness gains in tax collection of a non-cyclical nature and difficult to quantify. However, the inclusion of this observation does not change significantly the value obtained for the elasticity. Finally, a result for the elasticity higher than one does not reflect any progressivity in this tax, but only the use of a macroeconomic variable to capture the cyclical effect with an average growth clearly below the one of tax receipts. It should also be noted that the series of taxes on corporate income receipts based on the estimated elasticity presents less volatility than the actual series, as can be confirmed in Chart 2.

Chart 2



### 3.3. Taxes on production and imports

Neves and Sarmento (2001) adopted a procedure based on the data from the Survey of Household Budgets for 25 categories of consumer goods and the respective tax rates, which allowed the estimation of a value of 1.1 for the elasticity of taxes on production and imports, as a whole, with respect to private consumption. This article estimates individual elasticities for the main taxes on production and imports, i.e., the Value Added Tax (VAT), the Tax on Oil Products and the Car Tax, while other taxes are considered together.

As regards VAT, the estimation of the elasticity with respect to real private consumption was based on equation (6), using the data for the revenue of this tax from 1995 to 2005, adjusted for the impact of the main discretionary changes implemented in this period. Among these, it should be highlighted the introduction of an intermediate rate of 12 per cent in 1996 and the rise in the standard rate from 17 to 19 per cent in 2002 and to 21 per cent in 2005. The growth rates adjusted for these effects are presented in Chart 3. Given that the VAT is a tax on the sales of goods and services, it depends not only on the quantity of goods and services traded, but also on their price. Therefore, equation (6) assumes that a 1

per cent increase in the private consumption deflator is proportionally reflected in VAT revenue. The value obtained for the elasticity,  $\beta_{VAT}=1.69$ , points to a more-than-proportional effect on revenue. This may imply that in periods of economic expansion (recession) the households tend to change their consumption pattern towards more (less) goods taxed at the standard rate and less (more) subject to the reduced rate. Moreover, in the period under review, other structural factors have occurred, such as the modernisation of the distribution circuits, whose positive effect cannot be quantified, and, as such, may lead to some overestimation of the elasticity with respect to the economic cycle. Nevertheless, actual and elasticity-based growth rates are relatively close, even in most recent years, as can be seen in Chart 3.

$$\Delta \ln(R_{VAT}^{cor})_t - \Delta \ln(C^{deflator})_t = \beta_{VAT} \Delta \ln(C^{real})_t + \varepsilon_t \quad (6)$$

where:

$R_{VAT}^{cor}$  – VAT revenue, including European Union own receipts, adjusted for the effects of tax policy measures;

$C^{deflator}$  – Private consumption deflator;

$C^{real}$  – Real consumption deflator.

As regards the Tax on Oil Products, changes in tax rates were frequent between 1995 and 2005. However, taking into account the quantities of fuel consumed, the elimination of its effects on the series used in the estimation of the elasticity is quite straightforward (Chart 4). However, two aspects should be highlighted. On the one hand, private consumption of services and non-durable goods measured in real terms is deemed to be an appropriate, but not perfect, macroeconomic base for the quantities of fuel consumed. On the other hand, tax revenue does not depend on actual prices, since is defined in monetary units per litre of fuel consumed. The elasticity of revenue from the Tax on Oil Products with respect to real private consumption of services and non-durable goods ( $\beta_{TOP}$ ) estimated for the 1995-2005 period is 1.07. In most recent years, in particular from 2003 to 2005, the series constructed on the basis of the estimated elasticity seems to overestimate the tax revenue actual growth. This result should be mainly explained by the fact that the volume of private consumption of services and non-durable goods does not accurately reflect the quantities of fuel sold. To a lesser extent, it may also

Chart 3

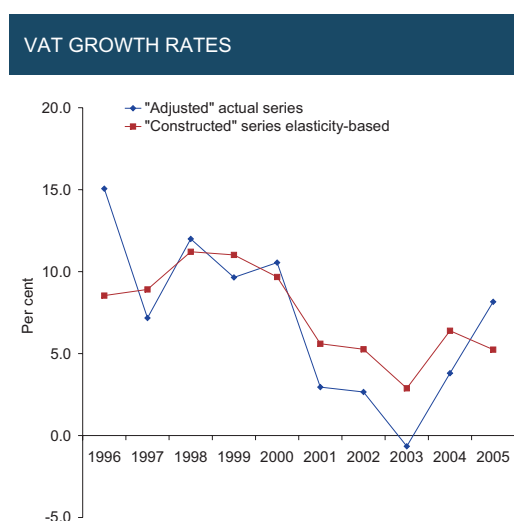
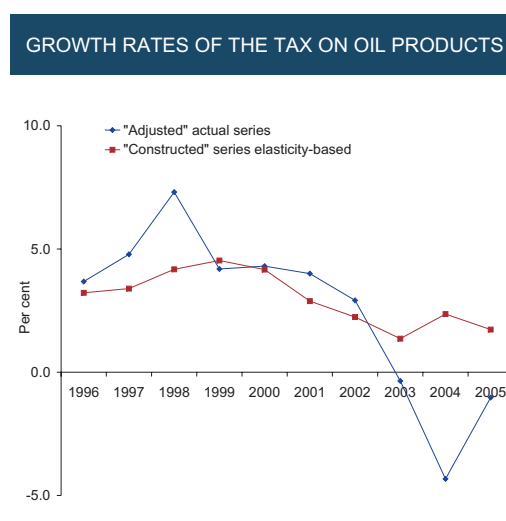


Chart 4



be influenced by changes in the composition of vehicles in circulation, with a growing share of diesel vehicles, as this fuel is taxed at lower rates.

$$\Delta \ln(R_{TOP}^{cor})_t = \beta_{TOP} \Delta \ln(C_{non-durables}^{real})_t + \varepsilon_t \quad (7)$$

where:

$R_{TOP}^{cor}$  – Revenue from the Tax on Oil Products adjusted for the effects of tax policy measures;

$C_{non-durables}^{real}$  – Private consumption of services and non-durable goods measured in real terms.

The Car Tax, on its turn, depends on certain characteristics of the vehicles, such as the cylinder capacity in cubic centimetres. It is established in tables that are updated every year in the State Budget Law, usually in line with expected inflation. Therefore, revenue from this tax derives chiefly from the number of vehicles sold and their quality, measured by the private consumption of durable goods in real terms for the purpose of calculating the elasticity, and from expected inflation considered in the different State Budgets, which justifies the specification of equation (8). In addition, changes in the tax structure, similarly to changes introduced in other taxes, may justify the correction of the observed series via the impact of such measures. However, in the period analysed, these were not significant, and the most relevant occurred in 2001 with an increase in the taxation on off-road vehicles. From the estimation of equation (8) for the 1995-2005 period, based on ordinary least squares, resulted an elasticity of  $\beta_{CT}=1.33$ , which brings the growth of the estimated series based on the elasticity reasonably closer to the one of actual revenue, as can be observed in Chart 5.

$$\Delta \ln(R_{CT}) - \Delta \ln(Inf^{budg.}) = \beta_{CT} \Delta \ln(C_{durables}^{real})_t + \varepsilon_t \quad (8)$$

where:

$R_{CT}$  – Actual revenue from the Car Tax;

$Inf^{budg.}$  – Price index constructed on the basis of the expected inflation included in the State Budget;

$C_{durables}^{real}$  – Private consumption of durable goods measured in real terms.

Finally, as regards other taxes on production and imports, a unit elasticity was assumed with respect to real private consumption. In effect, this aggregate includes a number of taxes, much different in their incidence and calculation. Stress should be laid, for their relevance, on the Tax on Tobacco, the Stamp Tax, the Municipal Tax on Real Estate and the Municipal Tax on Real Estate Transactions.<sup>3</sup> In addition, in the period under analysis, the structure and rates of these taxes were subject to some changes, whose individual effects are difficult to estimate. As a result, in parallel with the impact of the price level on the revenue of these taxes, the growth of this aggregate usually exceeds the one estimated on the basis of a unit elasticity, as illustrated in Chart 6. In most recent years, the difference between both series is partly explained by the increase in the Tax on Tobacco included in the different State Budgets, as well as by the reform of taxation on real estate. The latter, on account of the updates of the values of the properties to be used for tax purposes, has been behind the strong rise in revenue from the Municipal Tax on Real Estate.

Table 3 summarises the values estimated and assumed for the elasticities of the different taxes on production and imports with respect to their bases and real private consumption, as well as the calculation

(3) The Stamp Tax receipt related with banking operations is reclassified as tax on income and property in National Accounts. It should also be highlighted that revenue from taxes on property is recorded as tax on production and imports in National Accounts, but it is classified under direct taxes in Public Accounts.

Chart 5

## GROWTH RATES OF THE CAR TAX

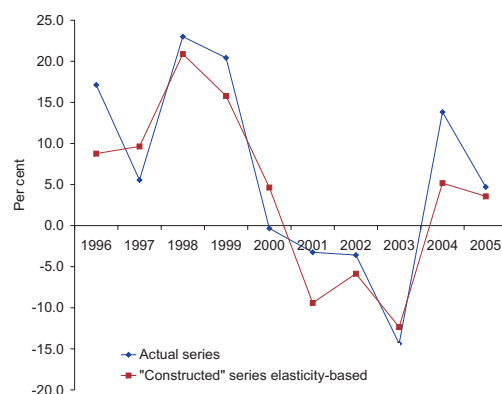


Chart 6

## GROWTH RATES OF OTHER TAXES ON PRODUCTION AND IMPORTS

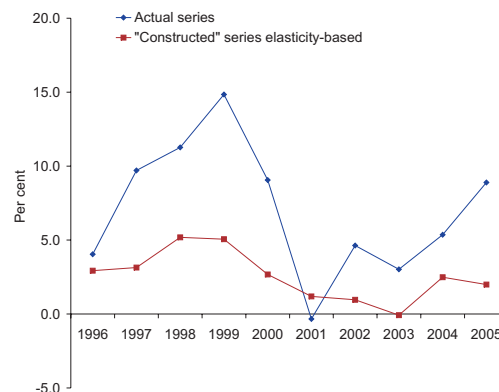


Table 3

## THE ELASTICITY OF TAXES ON PRODUCTION AND IMPORTS

Taxes on production and imports	Elasticity with respect to the base	Elasticity with respect to private consumption <sup>(a)</sup>	Average weight on total taxes on production and imports <sup>(a)</sup>	Total elasticity of taxes on production and imports with respect to private consumption
VAT	1.69	1.69	0.55	1.30
Tax on oil products	1.07	0.83	0.16	
Car tax	1.33	0.17	0.06	
Other	1.00	1.00	0.23	

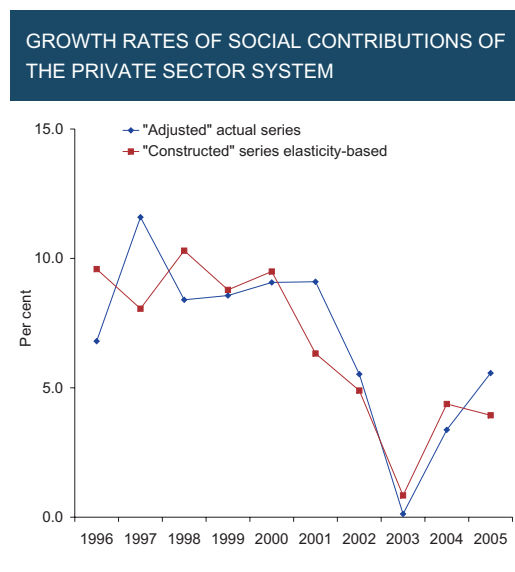
Note: (a) Based on average weights from 1995 to 2005.

of an aggregate elasticity for these taxes as a whole. This aggregate elasticity stands at 1.3, above the 1.1 value considered in Neves and Sarmento (2001).

### 3.4. Social contributions

As presented in Section 2, when applying the ESCB cyclical adjustment methodology, only social contributions of the private sector system are deemed to be affected by economic activity, so that the treatment of public revenue is consistent with that of expenditure. As far as the elasticity is concerned, given the existence of single rates for the share of employers (23.75 per cent) and of employees (11 per cent), Neves and Sarmento (2001) assumed that the behaviour of revenue from these contributions with respect to the private sector real wage bill was proportional. As illustrated in Chart 7, this assumption seems to replicate rather closely the actual growth in private sector social contributions in the period analysed and, as such, it will be maintained. With regard to tax policy measures or other factors which may distort the relationship with the macroeconomic base, the series in the chart was only adjusted for the extraordinary effect of a State's payment to Social Security in 2004, regarding social contributions the State committed to pay on behalf of small farmers between 2001 and 2003.

Chart 7



### 3.5. Unemployment benefits

In most EU Member States the cyclical component of unemployment, within the framework of the ESCB methodology, is obtained with the Hodrick-Prescott filter. However, in the Portuguese case, the unemployment gap was estimated on the basis of the difference between actual unemployment and natural unemployment, since conclusions from a number of empirical studies for Portugal point to reasonably stable values for the natural rate of unemployment since the beginning of the 1980s (see equation (9)). In this context, Neves and Sarmento (2001) assumed a natural rate of unemployment of 5.0 per cent, as well as the proportionality between expenditure on unemployment benefits and the number of unemployed.

$$\text{Unemployed gap} = \frac{\text{no. unemployed} - \text{natural rate of unemployment} * \text{labour force}}{\text{natural rate of unemployment} * \text{labour force}} \quad (9)$$

In Portugal, data on the number of unemployed registered in the Employment and Professional Training Institute (Portuguese acronym: IEFP) are available on a regular basis. This series, which in the past showed a rather volatile difference *vis-à-vis* the number of unemployed in the economy obtained on the basis of the Labour Force Survey, is currently more accurate to explain the developments in expenditure on unemployment benefits. In fact, in recent years, changes in the rules for granting these benefits and in the monitoring by employment offices of job seeking efforts by the unemployed rendered this variable a good indicator for developments in expenditure on unemployment benefits.

Chart 8 shows that in most years under analysis, as anticipated, rates of change in unemployment benefits stand above those in the number of registered unemployed, which illustrates a positive growth in the average unemployment benefit, in line with wage developments. Nevertheless, in addition to the effect of the change in the structure of unemployment throughout the period and in the related benefits, the difference between the two series is also affected by changes introduced in the meantime in the rules for granting unemployment benefits.

The use of the number of registered unemployed requires changes in the trend number of unemployed taken into account in the cyclical adjustment. In fact, as illustrated in Chart 9, the ratio of the number of registered unemployed (calculated on the basis of IEFP data) to the labour force is clearly higher than



Chart 8

## GROWTH RATES OF UNEMPLOYMENT BENEFITS AND THE NUMBER OF UNEMPLOYED

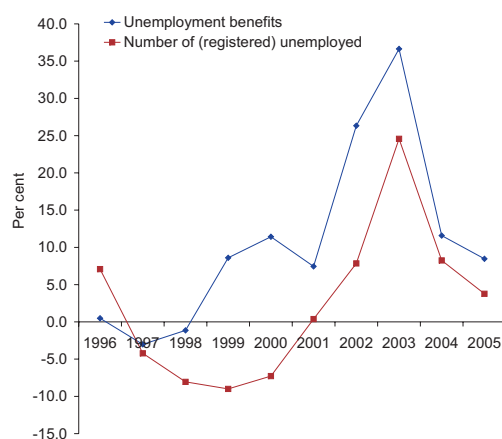
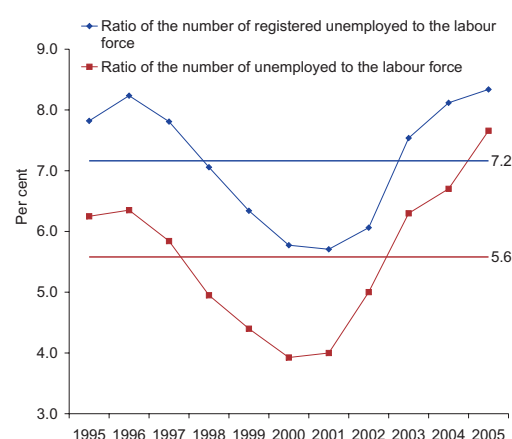


Chart 9

## RATIOS OF THE NUMBER OF UNEMPLOYED TO THE LABOUR FORCE



the one based on the number of unemployed in the economy (calculated according to the Labour Force Survey results), and points to an average value of 7.2 per cent between 1995 and 2005, compared with 5.6 per cent in the case of unemployed in the economy. This latter value is higher than that considered by Neves and Sarmiento (2001) for the natural unemployment rate, although it is quite in line with the reassessment made by Dias *et al.* (2004). These authors, by using quarterly data from 1983 to 2003 and alternative approaches, obtained average estimates for the NAIRU<sup>4</sup> at around 5.5 per cent. Hence, in the practical implementation of the cyclically adjusted balances' methodology, the gap in the number of unemployed will be calculated on the basis of the difference between the number of registered unemployed and the average number of unemployed equal to 7.2. per cent of the labour force.

### 3.6. Semi-elasticity of the budget balance

The change in some elasticities of fiscal variables *vis-à-vis* their macroeconomic bases, elaborated throughout this Section, allows the update of the budget balance's semi-elasticity with respect to GDP. In this context, it is also convenient to revise the elasticities of macroeconomic bases with respect to GDP, based on the currently available National Accounts data and drawing on the shock scenario specified by Bouthevillain *et al.* (2001). As mentioned in Section 2, this exercise is based on the relationship among the different macroeconomic bases via National Accounts' identities and, as such, its calculation does not require a simulation using a macroeconomic model. Table 4 shows the results obtained and points to a semi-elasticity of 0.50. This increase from the previous estimate (0.43) reflects the increase in the elasticities of budget variables *vis-à-vis* the respective macroeconomic bases, since the updating of the sensitivities of the different macroeconomic bases with respect to GDP would by itself lead to a decline in the semi-elasticity. In addition, it should be noted that the current estimate for the semi-elasticity is very close to the values currently used by the European Commission (0.45) and the OECD (0.46).

(4) Non-accelerating inflation rate of unemployment, i.e. an unemployment rate that is compatible with a constant inflation rate.

Table 4

THE UPDATED SEMI-ELASTICITY OF THE BUDGET BALANCE WITH RESPECT TO GDP IN THE ESCB METHODOLOGY

	Elasticity of the fiscal variable with respect to the macroeconomic base	Elasticity of the macroeconomic base with respect to GDP	Elasticity of the fiscal variable with respect to GDP	Weight of the fiscal variable on GDP <sup>(a)</sup>	Contribution to the semi-elasticity of the budget balance with respect to GDP
	(1)	(2)	(3)=(1)*(2)	(4)	(5)=(3)*(4)
<b>Taxes on household income</b>			1.33	0.04	0.05
Macroeconomic base: private sector wages	1.69	0.49			
Macroeconomic base: private employment	1.00	0.51			
<b>Taxes on corporate income</b>	3.14	1.15	3.61	0.03	0.12
<b>Taxes on production and imports</b>	1.30	1.15	1.49	0.14	0.21
<b>Social contributions</b>			0.99	0.07	0.07
Macroeconomic base: private sector wages	1.00	0.49			
Macroeconomic base: private employment	1.00	0.51			
<b>Unemployment benefits</b>	1.00	-5.79	-5.79	0.01	-0.05
				<b>Total:</b>	<b>0.50</b>

**Note:** (a) The ratios of the fiscal variables to GDP are based on National Accounts and correspond to averages for the 1995-2005 period. In order to obtain ratios that are more consistent with the methodology to calculate cyclically adjusted balances adopted by the ESCB, IRS revenue from final withholding schemes and public sector labour income was excluded in the case of taxes on household income, actual contributions to the civil servants pension system and imputed contributions were deducted from total social contributions, while the European Union own receipts were added to taxes on production and imports.

#### 4. CYCLICALLY ADJUSTED BALANCES

On the basis of the methodology implemented by Neves and Sarmento (2001), Banco de Portugal had already changed the macroeconomic bases of corporate income taxes and unemployment benefits to, respectively, private GDP and the number of registered unemployed. *Vis-à-vis* the figures now presented, the elasticity of corporate income taxes was higher and the average share of registered unemployed with respect to the labour force was lower. Therefore, the differences between the latest version of cyclically adjusted balances made public by Banco de Portugal (in the Autumn 2006 issue of the *Economic Bulletin*) and that which would result from the update of parameters carried out in this article are not very significant as can be seen in Table 5. The revision of the total balance adjusted for cyclical effects and temporary measures reaches at the most an absolute value of 0.3 percentage points of GDP in 2005, standing below that figure in all other years considered in this analysis. The differences regarding the change in the primary balance adjusted for cyclical effects and temporary measures, an indicator that is commonly used to assess the fiscal policy stance, are negligible. Overall, changes introduced in this article mainly entail a reduction of the cyclical component, which is less positive (negative) during strong (weak) economic growth periods (Chart 10). This results from the lower elasticity of taxes on corporate income, which more than offsets the higher elasticity of taxes on production and imports as whole with regard to private consumption and the increase in the average share of registered unemployed with respect to the labour force (Chart 11).

Chart 12 illustrates the effect of the composition of economic growth on the cyclical component of the budget balance, defined as the difference between the cyclical component calculated using the ESCB methodology, in line with the update described previously, and that obtained through the application of the 0.5 semi-elasticity of the budget balance with respect to GDP to the output gap. It should be noted that a positive value for this effect means that the behaviour of the different macroeconomic bases as a whole, given their fiscal elasticities, was more favourable to the balance than the one which would re-

Table 5

CYCLICALLY ADJUSTED BALANCES: COMPARISON WITH THE LATEST FIGURES MADE PUBLIC											
As a percentage of GDP											
	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
<b>Cyclically adjusted total balance, excluding temporary measures</b>											
Previous	-3.8	-3.3	-2.9	-2.9	-3.5	-4.7	-5.5	-4.9	-4.8	-4.7	-5.2
Revised	-4.0	-3.4	-2.9	-3.0	-3.6	-4.7	-5.4	-4.8	-4.9	-4.9	-5.5
<i>Difference: revised-previous</i>	-0.2	-0.1	-0.1	0.0	-0.1	0.0	0.1	0.0	-0.1	-0.2	-0.3
<b>Change in the cyclically adjusted primary balance, excluding temporary measures</b>											
Previous		-0.3	-0.6	-0.8	-0.8	-1.2	-0.8	0.5	0.0	0.0	-0.4
Revised		-0.2	-0.6	-0.7	-0.9	-1.1	-0.7	0.4	-0.1	-0.1	-0.5
<i>Difference: revised-previous</i>		0.0	0.1	0.0	-0.1	0.1	0.1	-0.1	-0.1	-0.1	-0.1

Chart 10

OUTPUT GAP AND THE REVISION OF THE CYCLICAL COMPONENT OF THE BUDGET BALANCE

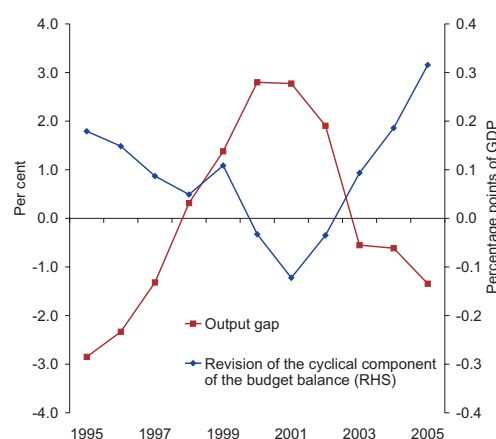
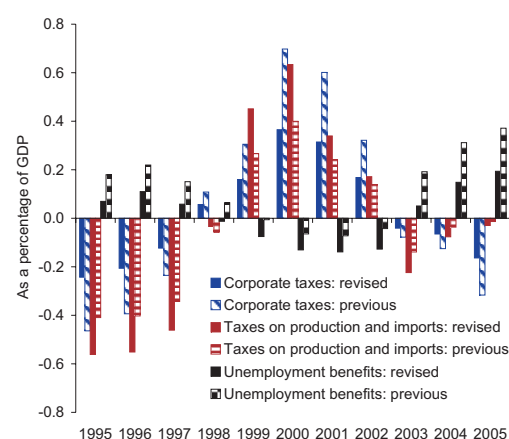


Chart 11

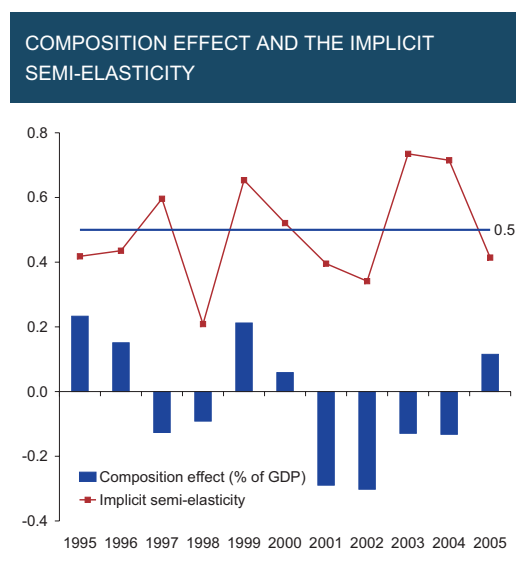
REVISED CYCLICAL COMPONENTS



sult from a macroeconomic scenario featuring a 'balanced' growth of the various GDP components. In the period under review, this effect reached a maximum absolute value of around 0.3 per cent of GDP, i.e. of a fairly small magnitude.

Moreover, Chart 12 also illustrates the semi-elasticity of the budget balance with respect to GDP implicit in the cyclical component of the balance obtained by applying the ESCB methodology. Given that the composition effect is calculated as previously described, the fact of it being positive (negative) only translates into a semi-elasticity above (below) 0.5 if the output gap is positive, as explained in equations (10) and (11). On average, in the period analysed, the implicit semi-elasticity is in fact very close to the 0.5 value estimated in subsection 3.6, in spite of the non-zero cumulative value of composition effects.

Chart 12



$$\text{Composition effect} = \text{Cyclical component}_{\text{ESCB}} - 0.5 * \text{output gap} \quad (10)$$

$$\text{Implicit semi-elasticity} = \frac{\text{Cyclical component}_{\text{ESCB}}}{\text{output gap}} \quad (11)$$

## 5. THE APPLICATION OF THE DISAGGREGATED FRAMEWORK

The update of some of the parameters considered in the cyclical adjustment methodology used by ESCB allows for an improvement of the disaggregated framework for assessing public finances introduced by Kremer *et al.* (2006). This approach was recently applied to the analysis of the 2005 fiscal developments in the 2005 *Annual Report* of Banco de Portugal.<sup>5</sup>

In analytical terms, this approach is based on the analysis of the change in the ratio of the main revenue and expenditure items to nominal trend GDP, excluding the effects of the economic cycle and temporary measures. With regard to taxes and social contributions, the change in their structural ratios is broken down, for every item, into four explanatory factors: (i) the fiscal drag, which given nominal growth of the trend macroeconomic base, corresponds to the automatic effect on tax revenue resulting from an elasticity of the fiscal item *vis-à-vis* the respective base not equal to one; (ii) the decoupling of the macroeconomic base from GDP that accounts for the effect of the growth differential between the trend macroeconomic base and nominal trend GDP on tax revenue; (iii) legislation changes, whose fiscal impact corresponds to official estimates or, in their absence, is calculated on the basis of data available; and (iv) the residual, which allows to quantify the part of the developments in structural ratios of taxes and social contributions that is not explained by the previous three factors. The residual component is an important element of this framework and it may contribute to a better understanding of past developments, by indicating the quantitative importance of particular unsystematic events. It may also show favourable or unfavourable trends in specific fiscal items. Moreover, it may reveal the need to reassess the impact of legislation changes or fiscal elasticities.

(5) See "Box 6.1 A disaggregated framework for the analysis of public finances", 2005 *Annual Report*, Banco de Portugal.

Beyond the adjustments resulting from the new cyclically adjusted figures for the different fiscal items, the breakdown of taxes on production and imports into the categories defined in this article may also be included. Table 6 shows the structure used in the disaggregated framework, incorporating all updates and improvements.<sup>6</sup>

Three factors are particularly relevant regarding this structure. Firstly, the effects of legislation changes considered correspond to those assumed in Section 3 for the estimation of elasticities and the graphical display of results. Secondly, the impact of the fiscal elasticity in the case of VAT, the Tax on Oil Products and the Car Tax is nil, although the elasticities used in the calculation of the cyclical component of the budget balance are above one. Indeed, the small number of observations considered, as well as the insufficient breakdown of the different cyclical and non-cyclical factors that influence revenue from these taxes, do not allow, in structural terms, to assume that revenue reacts more than proportionally to trend values of the respective macroeconomic bases. This procedure corresponded to that initially adopted in the implementation of the disaggregated framework for taxes on production and imports as a whole, which also presented a cyclical elasticity higher than one. Finally, in the case of the Tax on Oil Products, the effect of the decoupling of the macroeconomic base from GDP is likely to be systematically negative, given that, in addition to the impact of changes in the average tax rates, fully regarded as a legislation change, tax revenue seems to depend only on the consumption of fuel, whose developments are measured by the volume of the private consumption of services and non-durable goods. By contrast, in the case of the Car Tax, it is assumed that the annual update of the tables of this tax, proxied by the private consumption deflator of durable goods, is part of the tax base and, as such, its effect on the change in the structural ratio of the revenue is captured in the decoupling of the macroeconomic base from GDP.

With regard to results, and focusing the analysis on the residuals of the breakdown of taxes on production and imports, mention should be made to: (i) the very favourable behaviour of VAT revenue, in particular from 1996 to 2000, which may be partly due to the factors mentioned in subsection 3.3; (ii) the residuals of the Tax on Oil Products and the Car Tax that are virtually nil for all years, indicating that legislation changes with identified impact, macroeconomic bases chosen and estimated elasticities explain very satisfactorily developments observed during this period; (iii) the positive residual in almost every year of other taxes on production and imports, as expected, given that legislation changes in these taxes, which tend to lead to an increase in taxation, were not explicitly considered in this analysis.

(6) It should be referred that, *vis-à-vis* the figures shown in Box 6.1 of the 2005 *Annual Report* of Banco de Portugal, Table 6 takes into account the revised general government accounts, compiled within the framework of the excessive deficit procedure notification of September 2006.

Table 6

CHANGES IN GENERAL GOVERNMENT BALANCES, REVENUE AND EXPENDITURE, ADJUSTED FOR CYCLICAL EFFECTS AND TEMPORARY MEASURES										
As a percentage of trend nominal GDP										
	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
<b>Actual balance (improvement +, deterioration -) <sup>(a)</sup></b>	<b>0.7</b>	<b>1.1</b>	<b>0.5</b>	<b>0.2</b>	<b>-0.2</b>	<b>-1.4</b>	<b>1.4</b>	<b>-0.1</b>	<b>-0.3</b>	<b>-2.9</b>
Cyclical component	0.2	0.2	0.9	0.8	0.6	-0.4	-0.4	-1.1	0.0	-0.1
Temporary measures	0.0	0.4	-0.4	0.0	0.3	-0.3	1.3	1.0	-0.2	-2.1
<b>Structural balance (improvement +, deterioration -)</b>	<b>0.5</b>	<b>0.4</b>	<b>-0.1</b>	<b>-0.7</b>	<b>-1.2</b>	<b>-0.7</b>	<b>0.6</b>	<b>0.1</b>	<b>0.0</b>	<b>-0.6</b>
Interest payments	-0.7	-1.0	-0.7	-0.2	0.0	0.0	-0.2	-0.2	-0.1	0.0
<i>due to changes in the average interest rate on public debt</i>	-0.8	-0.8	-0.4	-0.1	0.0	-0.1	-0.3	-0.3	-0.1	-0.1
<i>due to changes in the debt stock</i>	0.1	-0.2	-0.2	-0.1	0.0	0.1	0.1	0.1	0.1	0.2
<b>Structural primary balance (improvement +, deterioration -)</b>	<b>-0.2</b>	<b>-0.6</b>	<b>-0.7</b>	<b>-0.9</b>	<b>-1.1</b>	<b>-0.7</b>	<b>0.4</b>	<b>-0.1</b>	<b>-0.1</b>	<b>-0.5</b>
<b>Total revenue</b>	<b>1.5</b>	<b>-0.2</b>	<b>0.0</b>	<b>0.9</b>	<b>-0.2</b>	<b>0.3</b>	<b>0.5</b>	<b>-0.3</b>	<b>0.9</b>	<b>0.3</b>
<b>Taxes on household income</b>	<b>0.2</b>	<b>-0.2</b>	<b>-0.2</b>	<b>0.0</b>	<b>0.3</b>	<b>0.0</b>	<b>-0.3</b>	<b>0.1</b>	<b>-0.1</b>	<b>0.1</b>
Fiscal drag	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.0
Decoupling of the macroeconomic base from GDP	0.1	0.0	0.0	0.0	0.0	0.0	0.0	-0.1	0.0	0.0
Legislation changes	0.0	0.0	0.0	0.0	0.0	-0.3	-0.3	0.3	0.0	-0.1
Residual	0.0	-0.3	-0.3	-0.1	0.2	0.1	-0.1	-0.1	-0.1	0.1
<b>Taxes on corporate income</b>	<b>0.3</b>	<b>0.3</b>	<b>-0.2</b>	<b>0.4</b>	<b>0.1</b>	<b>-0.4</b>	<b>-0.1</b>	<b>-0.6</b>	<b>0.6</b>	<b>0.0</b>
Fiscal drag	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Decoupling of the macroeconomic base from GDP	0.1	0.0	0.0	0.0	0.0	-0.1	0.0	0.0	0.0	0.0
Legislation changes	0.0	0.0	-0.2	0.0	0.3	-0.2	0.0	-0.1	0.1	-0.4
Residual	0.3	0.4	0.0	0.3	-0.2	-0.1	-0.1	-0.5	0.5	0.5
<b>VAT</b>	<b>0.4</b>	<b>-0.1</b>	<b>0.2</b>	<b>0.0</b>	<b>0.2</b>	<b>0.0</b>	<b>0.3</b>	<b>0.2</b>	<b>0.0</b>	<b>0.6</b>
Fiscal drag	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Decoupling of the macroeconomic base from GDP	0.2	-0.1	0.0	-0.1	0.0	0.0	0.0	0.0	0.1	0.0
Legislation changes	-0.3	0.0	0.0	0.0	0.0	0.0	0.3	0.3	0.0	0.3
Residual	0.6	0.0	0.2	0.1	0.3	0.0	0.0	-0.2	0.0	0.3
<b>Tax on oil products</b>	<b>0.0</b>	<b>-0.2</b>	<b>0.1</b>	<b>-0.2</b>	<b>-0.6</b>	<b>0.3</b>	<b>0.3</b>	<b>0.1</b>	<b>-0.1</b>	<b>-0.1</b>
Impact of budget elasticity	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Decoupling of the macroeconomic base from GDP	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	0.0	0.0	0.0
Legislation changes	0.0	-0.1	0.1	-0.1	-0.6	0.3	0.3	0.1	0.1	0.0
Residual	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	-0.1	-0.1
<b>Car tax</b>	<b>0.1</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>-0.1</b>	<b>0.0</b>	<b>0.0</b>	<b>-0.1</b>	<b>0.0</b>	<b>0.0</b>
Fiscal drag	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Decoupling of the macroeconomic base from GDP	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Legislation changes	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Residual	0.0	0.0	0.0	0.0	-0.1	0.1	0.0	0.0	0.0	0.0
<b>Other taxes on production and imports</b>	<b>-0.1</b>	<b>0.1</b>	<b>0.1</b>	<b>0.1</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.1</b>	<b>0.0</b>	<b>0.2</b>
Fiscal drag	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Decoupling of the macroeconomic base from GDP	0.1	0.0	0.0	-0.1	0.0	0.0	0.0	0.0	0.0	0.0
Legislation changes	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Residual	-0.1	0.1	0.1	0.2	0.0	0.1	0.0	0.1	-0.1	0.2
<b>Social contributions</b>	<b>0.0</b>	<b>0.3</b>	<b>0.1</b>	<b>0.1</b>	<b>0.5</b>	<b>0.2</b>	<b>0.2</b>	<b>0.5</b>	<b>0.2</b>	<b>0.1</b>
Fiscal drag	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Decoupling of the macroeconomic base from GDP	0.2	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	0.0	-0.1
Legislation changes	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Residual	-0.2	0.4	0.2	0.2	0.6	0.3	0.3	0.6	0.1	0.2
<i>Memo item: included in expenditure <sup>(b)</sup></i>	<i>0.1</i>	<i>0.0</i>	<i>0.1</i>	<i>0.0</i>	<i>0.3</i>	<i>0.0</i>	<i>0.2</i>	<i>0.3</i>	<i>0.3</i>	<i>0.0</i>
<b>Total taxes and social contributions</b>	<b>1.0</b>	<b>0.2</b>	<b>0.1</b>	<b>0.5</b>	<b>0.4</b>	<b>0.1</b>	<b>0.2</b>	<b>0.3</b>	<b>0.6</b>	<b>0.9</b>
Fiscal drag	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.0
Decoupling of the macroeconomic base from GDP	0.6	-0.3	-0.3	-0.3	-0.3	-0.3	-0.3	-0.2	0.0	-0.1
Legislation changes	-0.3	-0.1	-0.1	-0.1	-0.3	-0.2	0.4	0.6	0.2	-0.3
Residual	0.6	0.5	0.4	0.7	0.8	0.5	0.1	-0.1	0.3	1.2
<i>Memo item: included in expenditure <sup>(b)</sup></i>	<i>0.1</i>	<i>0.0</i>	<i>0.1</i>	<i>0.0</i>	<i>0.3</i>	<i>0.0</i>	<i>0.2</i>	<i>0.3</i>	<i>0.3</i>	<i>0.0</i>
<b>Other revenue</b>	<b>0.5</b>	<b>-0.4</b>	<b>-0.1</b>	<b>0.4</b>	<b>-0.6</b>	<b>0.1</b>	<b>0.3</b>	<b>-0.6</b>	<b>0.3</b>	<b>-0.6</b>
of which: from the EU <sup>(c)</sup>	0.5	-0.4	0.0	0.2	-0.6	0.3	0.3	-0.2	-0.2	-0.1
<b>Primary expenditure</b>	<b>1.7</b>	<b>0.4</b>	<b>0.7</b>	<b>1.7</b>	<b>0.9</b>	<b>1.0</b>	<b>0.1</b>	<b>-0.2</b>	<b>0.9</b>	<b>0.8</b>
Social payments	0.3	0.1	0.3	0.4	0.7	0.4	0.6	1.8	0.4	0.8
of which: Pension payments	0.1	0.1	0.1	0.2	0.4	0.3	0.3	0.5	0.5	0.5
Unemployment benefits	-0.1	0.0	0.0	0.1	0.1	0.0	0.1	0.1	0.0	0.0
Social benefits in kind	0.1	0.1	0.0	0.1	0.0	0.1	0.1	1.1	0.0	0.4
Compensation of employees	0.2	0.2	0.3	0.6	0.7	0.1	0.3	-0.9	0.1	0.1
Intermediate consumption	0.1	-0.1	-0.1	0.3	0.3	0.0	-0.2	-0.5	0.2	0.0
Subsidies	0.2	-0.2	0.3	0.2	-0.5	0.1	0.2	0.2	-0.3	0.1
Investment	0.4	0.2	-0.3	0.3	-0.3	0.1	-0.4	-0.5	0.0	-0.3
Other expenditure <sup>(d)</sup>	0.5	0.3	0.2	-0.1	-0.1	0.2	-0.3	-0.4	0.6	0.0

Notes: (a) Change in the actual balance, the cyclical component and the effects of temporary measures as a percentage of nominal GDP. Due to differences in the denominator, the change in the structural balance as a percentage of nominal trend GDP may differ slightly from the change in the ratio of actual balance excluding cyclical effects and temporary measures to nominal GDP. (b) Part of the residual of actual social contributions relating with social contributions of the civil servants system and imputed social contributions, both recorded on the expenditure side under the item compensation of employees. (c) Includes other current revenue, sales and capital revenue. (d) Includes other current primary and capital expenditure.

## 6. CONCLUSIONS

The analysis of National Accounts data is very important for understanding the relationship between fiscal variables affected by the economic cycle in the ESCB methodology and the respective macroeconomic bases. In the case of taxes on corporate income, this analysis led to the conclusion that private GDP, although shifting away from the actual base of these taxes, is able to capture revenue developments more accurately. Given that this macroeconomic variable growth is, on average, below that of revenue from taxes on corporate income, the new estimate for the elasticity of revenue, based on a series from 1995 to 2005 adjusted for the effects of discretionary measures, is higher than one.

As regards taxes on production and imports, which up until now had been dealt with as a whole in studies on the cyclical adjustment of fiscal variables, the present article explains the developments of the main taxes – VAT, Tax on Oil Products, and Car Tax – using the most appropriate National Accounts aggregates. Therefore, similarly to the description made above when commenting taxes on corporate income, elasticities were estimated for the three taxes with respect to private consumption, private consumption of services and non-durable goods and private consumption of durable goods, respectively. The values obtained were, in all cases, above one. As regards the remaining part, consisting of very different taxes, a unit elasticity with respect to private consumption was assumed. As a whole, the new elasticity of taxes on production and imports with respect to private consumption reflects a more significant response of this revenue to the economic cycle than that initially assumed in the implementation of this methodology.

Turning to unemployment benefits, the changes introduced over recent years made it possible that the series of the number of unemployed registered in the IEFP currently describes more appropriately its development than the number of unemployed obtained from the Labour Force Survey. In the calculation of the cyclical component, it was also necessary to adjust accordingly the average value of the ratio of the registered number of unemployed to the labour force.

In this article, the elasticities of taxes on household income and social contributions of the private sector system were kept unchanged *vis-à-vis* the assumptions considered in the initial implementation of the ESCB cyclical adjustment methodology. Actually, it was confirmed that they explain the developments of these items of revenue much satisfactorily, in particular in the most recent period.

As a whole, the changes introduced led to a negligible increase in the semi-elasticity of the budget balance as a percentage of GDP with respect to GDP, when compared to the value obtained when repeating the procedures adopted in 2001. Indeed, although the revision of the elasticities indicate more sensitivity regarding the respective macroeconomic bases, an update of the elasticities of the macroeconomic bases with respect to GDP points in the opposite direction and partly offsets the initial effect. Presently, the value obtained for the semi-elasticity of the budget balance is 0.50, standing relatively close to the ones used by the European Commission and the OECD.

Banco de Portugal had already introduced some of the above-mentioned changes in the calculation of the cyclically adjusted balances. Therefore, in view of the latest figures made public, the revisions of the total balance adjusted for cyclical effects and temporary measures, an indicator usually used in the assessment of the underlying budgetary position, are relatively negligible in the period under review. Differences in the change of the primary balance adjusted for cyclical effects and temporary measures are also insignificant. As regards the latest estimations made public, the cyclical component of the balance is now of a smaller magnitude, i.e., less positive (negative) in periods of strong (weak) economic growth.

Improvements introduced in the calculation of the cyclically adjusted balances also make it possible to further develop the analysis based on the disaggregated framework of public finances. This article il-

illustrates, in particular, the advantages of the breakdown of taxes on production and imports for a better understanding of the fiscal developments in the last few years.

Experience in recent years has revealed that, regarding the calculation of the cyclically adjusted balances, a higher number of observations and the deeper knowledge of data on public finances and the macroeconomic scenario allows updating the procedures previously adopted, with unambiguous gains in analytical terms. Against this background, further updates are likely to occur in the future.

## REFERENCES

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- Dias *et al.* (2004), "Revisiting the NAIRU estimates for the Portuguese economy", June issue of the *Economic Bulletin*, Banco de Portugal.
- Kremer *et al.* (2006), "A disaggregated framework for the analysis of structural developments in public finances", European Central Bank *Working Paper Series* no. 579, January.
- Neves, Pedro and Sarmento, Luís (2001), "The use of cyclically adjusted balances at Banco de Portugal", September issue of the *Economic Bulletin*, Banco de Portugal.





## CHRONOLOGY OF MAJOR FINANCIAL MEASURES

January to December 2006

## January

- 3 January (Circular Letter No 1/06/DSBDR)  
Expresses Banco de Portugal's availability to launch the (informal) application procedure for the use of internal rating systems (credit risk) as well as standard approaches and advanced mediation (operational risk), in the context of the future transposition into national law of Directives 93/6/EEC and 200/12/EC.
- 9 January (Opinion of the European Central Bank 2005/C 323/10, Official Journal of the European Union No 323, Series C)  
Opinion of the European Central Bank at the request of the Council of the European Union on a proposal for a directive of the European Parliament and of the Council amending Directive 2004/39/EC on markets in financial instruments as regards certain deadlines (CON/2005/53).
- 16 January (Instruction of Banco de Portugal No 33/2005, BNPB No 1/2006)  
Amends Instruction No 23/2004, on accounting reporting prepared according to International Accounting Standards (IAS) and Adjusted Accounting Standards (AAS).
- 16 January (Instruction of Banco de Portugal No 34/2005, BNPB No 1/2006)  
Amends Instruction No 18/2005, on the reporting of financial statements and other items for the presentation of accounts of institutions that adopt International Accounting Standards (IAS) and Adjusted Accounting Standards (AAS).
- 16 January (Instruction of Banco de Portugal No 35/2005, BNPB No 1/2006)  
Establishes the accounting items to be reported to Banco de Portugal by institutions adopting IAS and AAS, in addition to those required by Instructions No 23/2004 and No 18/2005.
- 16 January (Instruction of Banco de Portugal No 36/2005, BNPB No 1/2006)  
Amends Instruction No 19/97, updating the list of Zona A countries, for the purpose of the solvency ratio.
- 19 January (Circular Letter No 2/2006/DPG)  
Urges all card issuers to check whether their regulations comply with the minimum standard general provisions for the use of bank cards, substantiated in regulatory provisions as set out in paragraphs 6 to 8 of Notice of Banco de Portugal No 11/2001, of 20 November.
- 20 January Circular Letter No 12/06/DSBDR)  
Provides clarification on the impact framework of the recognition of liabilities with long-service rewards for active staff, resulting from the transition to International Accounting Standards (IAS) or Adjusted Accounting Standards (AAS).

## February

- 15 February 2006 (Circular-letter no. 5/2006/DPG)  
Clarifies doubts as to the opening of bank deposit accounts by individuals who are not engaged in a professional activity. In the view of Banco de Portugal, such fact shall not constitute a valid ground for refusal by credit institutions.
- 15 February (Instruction of Banco de Portugal No 2/2006 Official Gazette No 3)  
Amends Instruction No 4/2002, introducing a new data reporting to Banco de Portugal, as regards the coverage of the commitment to pay retirement and survivors pensions.

<ul style="list-style-type: none"> <li>• 15 February (Circular Letter of Banco de Portugal No 12/2006/DSB)</li> </ul>	Clarifies doubts as to the accounting framework of commitments to pay seniority bonuses to the active staff.
<ul style="list-style-type: none"> <li>• 21 February (Law No 3/2006 of 21 February (Series I-A, No 37)</li> </ul>	Authorises the Government to issue legislation in the field of consumers' rights, in order to transpose into national law Directive 2002/65/CE of 23 September concerning the distance marketing of consumer financial services.
<b>March</b>	
<ul style="list-style-type: none"> <li>• 10 March (Circular Letter No 32/06/DSBDR)</li> </ul>	Provides clarification on the items recognised under the concept of 'fixed assets' for the purpose of the limits established in Notice No 5/2003.
<ul style="list-style-type: none"> <li>• 15 March (Decree-Law No 52/2006 Official Gazette No 53 Series I, A)</li> </ul>	Transposes into national law Directive 2003/6/CE on insider dealing and market manipulation (market abuse), and Directive 2003/71/CE on the prospectus to be published when securities are offered to the public or admitted to trading.
<ul style="list-style-type: none"> <li>• 15 March (Instruction of Banco de Portugal No 3/2006 Official Gazette No 3/2006)</li> </ul>	Introduces changes in Instruction No 19/2005 on interest rate risk in the banking book.
<ul style="list-style-type: none"> <li>• 15 March (Instruction of Banco de Portugal No 4/2006, BNPB No 3/2006)</li> </ul>	Rewords subparagraph b) of the explanatory notes to Part I - Minimum provisioning levels, in the Annex to Instruction No 9/2003, published in Official Gazette No 5 of 5 May 2005.
<ul style="list-style-type: none"> <li>• 20 March (Decree-Law No 59/2006 Official Gazette No 56 Series I, A)</li> </ul>	Lays down the new system applicable to mortgage bonds and to mortgage credit institutions, as well as to public-sector collateralised bonds. Revokes Decree-Law No 125/90 of 16 April.
<ul style="list-style-type: none"> <li>• 24 March (Notice of Banco de Portugal No 1/2006, Official Gazette No 66, Series I - B)</li> </ul>	Amends Notice No 10/94 of 18 November, defining with a higher degree of accuracy the values of the asset items that shall be taken into consideration in the calculation of the large exposures of institutions subject to the supervision of Banco de Portugal.
<ul style="list-style-type: none"> <li>• 29 March (Decree-Law No 76-A/2006 Official Gazette No 63 Series I, A)</li> </ul>	Introduces changes, <i>inter alia</i> , in the Code of Commercial Companies.
<ul style="list-style-type: none"> <li>• 31 March (Circular Letter No 34/06/DSBDR)</li> </ul>	Provides clarification on a number of provisions introduced by Notice No 2/2005 in Notice No 12/92, on the calculation method.
<b>April</b>	
<ul style="list-style-type: none"> <li>• 3 April (Circular Letter of Banco de Portugal No 6/2006/DPG)</li> </ul>	Recommends that all credit institutions insert the expiry date in each cheque supplied to their clients. For the purpose, they shall also disclose the set of good practices approved by Comissão de Coordenação Interbancária para os Sistemas de Pagamento - CISP (Interbank Coordination Commission for Payment Systems). This measure shall be implemented within a maximum period of three months.

- 4 April (Notice of Banco de Portugal No 2/2006, Official Gazette No 74, Series I - B) Establishes with a higher degree of accuracy the conditions under which the provisions for general credit risks may be considered positive items of consolidated own funds, amending Notice No 12/92 of 29 December.
- 4 April (Law No 10/2006 Official Gazette No 67, Series I - A) Authorises the government to extend the breach of regulations regime applicable to the insurance activity to holding companies subject to the supervision of Instituto de Seguros de Portugal (Portuguese Insurance Institute) and to mixed financial companies regarding the violation of the legal and regulatory rules governing the supplementary supervision of financial conglomerates. This authorisation is valid for a period of 180 days.
- 6 April (Joint Decision No 357/2006 of the Presidency of the Council of Ministers; Ministry of Finance and Public Administration; Ministry of Justice; et. al., Official Gazette No 83, Series II) In accordance with the provisions laid down in Article 4 (1) of Regulation (EC) No 2006/2004 of the European Parliament and of the Council of 27 October, designates the Consumer Institute as the single liaison office responsible for the coordination of the application of the said regulation, as well as the competent authorities with specific powers to enforce consumer protection legislation within their specific field of competence.
- 10 April (Circular Letter No 37/06/DSBDR) On the understanding of Banco de Portugal of the classification - for purposes of calculating the solvency ratio - of undrawn credit facilities referred to in Part II of the annex to Notice No 1/93.

## May

- 9 May (Notice of Banco de Portugal No 3/2006, Official Gazette No. 89, Series I - B) Lays down that credit institutions and financial companies shall have an internal control system covering the definition of their organisational structure, the methods and the procedures required for the achievement of the objectives set out in paragraph 6 of this Notice, in order to minimise the financial, operational, legal and reputational risks - including the risk of fraud, irregularities and errors - guaranteeing their timely prevention and detection. Revokes Instruction No 72/96 of 17 June.
- 15 May (Regulation No 67/2006 of the Ministry of Finance and Public Administration and Instituto de Seguros de Portugal (Portuguese Insurance Institute) (Legal Provision No 4/2006-R), Official Gazette No 105, Series II) Amends legal provision No 5/2005-R of 18 March, which defined the subjective scope and the enforcement regime of international accounting standards (IAS) adopted in accordance with the provisions laid down in Article 3 of Regulation (EC) No 1606/2002 of the European Parliament and of the Council of 19 July.
- 17 May (Circular Letter No 50/06/DSBDR) Informs credit institutions and financial companies on the structure and powers of the auditing board referred to in Notice No 3/2006, taking into account the entry into force, on 30 June 2006, of Decree-Law No 76-A/2006 of 29 March.
- 24 May (Circular Letter No 51/06/DSBDR) Provides clarification on the treatment to be given - for the purpose of calculating own funds on a consolidated basis - to unrealised gains on investment property and other tangible fixed assets at the date of transition to International Accounting Standards.
- 25 May (Circular Letter No 52/06/DSBDR) Provides clarification on the recognition of provisions for general credit risks as a positive item of own funds, under paragraph 3 (1) (9-a) of Notice No 12/92.

- 29 May (Decree-Law No 95/2006 of the Ministry of Finance and Public Administration of 29 May, Official Gazette, Series I)

Establishes the legal framework applicable to distance contracts for consumer financial services, transposing into Portuguese law Directive No 2002/65/EC of the European Parliament and of the Council of 23 September 2002 concerning the distance marketing of consumer financial services. Pre-contractual information and distance financial services contracts shall subsidiarily be regulated by Decree-Law No 7/2004 of 7 January and the Securities Code, approved by Decree-Law No 486/99 of 13 November. This Decree-Law shall enter into force 30 days following its publication.
- 29 May (Law No 18/2006, Official Gazette No 103, Series I - A)

Authorises the government to legislate in the field of reorganisation and winding up of credit institutions and financial companies within the scope of the transposition of Directive No 2001/24/EC of the European Parliament and of the Council of 4 April 2001 on the reorganisation and winding up of credit institutions. This legislative authorisation is valid for a period of 120 days.
- 7 June (Circular Letter No 59/06/DSBDR)

Informs that, exceptionally, institutions subject to supervision on a consolidated basis may send up to 31 October 2006 their individual internal control reports as well as the group internal control report, including the respective opinions, envisaged in Notice No 3/2006.
- 14 June (Directive 2006/46/EC of the Parliament and of the Council, OJ L 224)

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. The Member States shall bring into force the laws, regulations and administrative provisions relating to the implementation of Directive 2006/46/EC by 5 September 2008 and communicate to the Commission the text of the main provisions of the internal law approved regarding the issues regulated by this directive, which in turn shall enter into force on the 20th day following its publication in the Official Journal of the European Union.
- 14 June (Directive of the Parliament and of the Council 2006/48/EC, OJ L 177)

Relating to the taking up and pursuit of the business of credit institutions.
- 14 June (Directive of the Parliament and of the Council 2006/49/EC, OJ L 177)

On the capital adequacy of investment funds and credit institutions.
- 16 June (Instruction of Banco de Portugal No 6/2006, BNPB No 6/2006)

Determines, for the purpose of implementing paragraph 3 (1) (10) of Notice No 12/92 of 29 December, that only revaluation reserves recorded in individual accounts, as a result of the revaluation of fixed assets pursuant to the provisions of tax legislation, can be considered a positive item of own funds.
- 16 June (Circular Letter No 4/2006/DMR)

Updates data disclosed in January 2006 on the Eurosystem credit assessment framework for non-marketable assets, presenting as an annex a note entitled 'Eurosystem collateral framework: new details on the Eurosystem credit assessment framework for non-marketable debt instruments'.

- 19 June (Circular Letter No 23/05/DSBDR) Provides clarification on the deadlines for the settlement of situations where real estate has been repossessed by the lender because the respective owner has defaulted on the loan.

## July

- 12 July (Circular-Letter no 21/2006/DET) Releases pertinent data relating to the implementation of the Framework for the detection of counterfeits and fitness sorting by credit institutions and other professional cash handlers, which was published in Circular-Letter no 9/2005/DET of 17 March.
- 17 July (Instruction of Banco de Portugal No 8/2006, BNPB No 7/2006) Exempts from country-risk provisioning the assets corresponding to "B loans" granted by Corporación Andina de Fomento.
- 31 July (Decree-Law No 145/2006, Official Gazette No 146, Series I) Transposes into Portuguese law Directive 2002/87/EC on the supplementary supervision of credit institutions, insurance undertakings and investment firms in a financial conglomerate, and Directive 2005/1/EC relating to the establishment of a new organisational structure for financial services.

## August

- 3 August (Guideline of the European Central Bank ECB/2006/11, OJ 221) Amending Guideline ECB/2005/16 on a Trans-European Automated Real-time Gross settlement Express Transfer system (TARGET).
- 4 August (Circular Letter No 75/06/DSBDR) Informs that the FATF - Financial Action Task Force on Money Laundering - decided to remove Nigeria from its list of non-cooperative countries and territories. It also decided to call on credit and financial institutions to scrutinise transactions with persons, businesses or banks in Myanmar. Revokes Circular Letter No 133/2005/DSB of 29 November. Revoked by Circular Letter No 91/06/DSBDR of 31 October.
- 8 August (Notice of Banco de Portugal no 4/2006, Official Gazette no 152 Series I) Amending Notice No 6/2003 of 15 January, regarding the deadlines and publication form of the accounts of institutions subject to the supervision of the Banco de Portugal. This Notice shall be applicable to the publication of accounts relating to the 2006 fiscal year. Corrected by Corrigendum No 61/2006 of 28 August, in the Official Gazette No 175, Series I, of 11 September 2006.
- 10 August (Commission Directive 2006/73/EC, OJ L 241). Implementing Directive 2004/39/EC of the European Parliament and of the Council as regards organisational requirements and operating conditions for investment firms and credit institutions providing investment services. Member States shall adopt and implement by 31 January 2007 the laws, regulations and administrative provisions necessary to comply with this Directive, and shall apply those provisions from 1 November 2007 onwards.
- 10 August (Commission Regulation (EC) No 1287/2006, OJ L 241). Implementing Directive 2004/39/EC of the European Parliament and of the Council as regards record-keeping obligations of investment firms, transaction reporting, market transparency and admission of financial instruments to trading. This Regulation shall apply from 1 November 2007, except Article 11 and Article 34 (5) and (6), which shall apply from 1 June 2007.

- 5 September (Decision No 17901/2006 of 17 July 2006 of the Ministry of Finance and Public Administration; Justice Ministry; Official Gazette No 171-Series II C)

- 12 September (Circular Letter of Banco de Portugal No 22/06/DSBDR)

- 14 September 2006 (Circular Letter No 30/2006/DET)

- 15 September (Instruction of Banco de Portugal No 9/2006, BNPB No 9/2006)

- 20 September (Instruction of Banco de Portugal No 10/2006, distributed with Circular Letter No 82/2006/DSB)

- 27 September (Instruction of Banco de Portugal No 11/2006, distributed with Circular Letter No 86/2006/DSB)

- 27 September (Instruction of Banco de Portugal No 12/2006, distributed with Circular Letter No 86/2006/DSB)

- 28 September (Decision No 24405/2006 of 28 September 2006 of the Ministry of Finance and Public Administration. Minister's Office, Official Gazette No 229 Series II)

- 2 October 2006 (Notice of Banco de Portugal No 5, Official Gazette No 196, Series I)

## September

Sets up a working group for the transposition of the directive on money laundering and terrorist financing, which prepares the legislation implementing this directive and ensures the fulfilment of the deadline for transposition. The representatives of Banco de Portugal in this working group shall be Ms. Graça Damião and Ms. Célia Ramos.

Clarifies doubts on the interpretation of the provisions of No 3 of Notice No 1/2005 as regards the accounting of external commissions and costs relating to the contracting of credit operations.

Makes known the Euro Check Web Site (ECWS), which was developed within the scope of the obligations resulting from Council Regulation (EC) No 1338/2001 of 28 June 2001 laying down measures necessary for the protection of the euro against counterfeiting. The ECWS was specifically designed for use by professional cash handlers. In accordance with this Circular Letter, the Banco de Portugal shall be provided with information particulars on the respective access managers by 31 October 2006.

Reporting of financial statements and other items for the presentation of accounts of institutions adopting IAS and AAS (amending Instruction No 18/2005).

Report on the system for the prevention of money laundering - branches in Portugal of credit institutions and financial companies (excluding investment firms) having their head office in other European Union Member States (amending Instruction No 24/2002).

Setting of the contributory rate for the Deposit Guarantee Fund in 2007.

Limit for the irrevocable payment commitments applicable to contributions to the Deposit Guarantee Fund in 2007.

Under the provisions of paragraph 1 of Article 63 of the Organic Law of Banco de Portugal (Law No 5/98 of 31 January), approves the changes introduced in the Chart of Accounts of Banco de Portugal. Where required, these changes shall be applied to the 2005 annual accounts.

## October

In accordance with the provisions laid down in paragraph 1 of Article 22 of Decree-Law No 59/2006 of 20 March, provides for the regime applicable to the evaluation, by an expert, of real estate given as a guarantee of credit associated with mortgage bonds, as well as for the verification rules that credit institutions must use in the evaluation of mortgaged property.



- 2 October 2006 (Notice of Banco de Portugal No 6/2006, Official Gazette No 196, Series I)

Pursuant to the provisions laid down in Article 15, in paragraph 4 of Article 19 and in Article 23 of Decree-Law No 59/2006 of 20 March, regulates some issues regarding the prudential regime applicable to mortgage bonds and public sector collateralised bonds (obrigações sobre o sector público) and establishes the reporting requirements on liquidity risk and interest rate risk.
- 2 October 2006 (Notice of Banco de Portugal No 7/2006, Official Gazette No 196, Series I)

In accordance with the provisions laid down in paragraph 5 of Article 19 of Decree-Law No 59/2006 of 20 March, establishes the weighting coefficient that, for the purpose of calculating the solvency ratio, shall be applicable by credit institutions on the assets items represented by mortgage bonds or by public sector collateralised bonds.
- 2 October 2006 (Notice of Banco de Portugal No 8/2006, Official Gazette No 196, Series I - E)

In accordance with the provisions laid down in paragraph 5 of Article 4 and in paragraph 1 of Article 5 of Decree-Law No 59/2006 of 20 March, establishes the procedure to be adopted in the case of winding-up or liquidation of a credit institution issuing mortgage bonds or public sector collateralised bonds with regard to the management of claims or other assets used as a guarantee of the bonds and defines the conditions under which the owners of mortgage bonds or public sector collateralised bonds may have access to the code key.
- 10 October (Instruction of Banco de Portugal No 13/2006 of 10 de October -disclosed with Circular Letter No 88/2006/DSB)

Makes known the documents and information that institutions must send to the Banco de Portugal for the issue of mortgage bonds or public sector collateralised bonds.
- 12 October 2006 (Regulation No 6/2006 of the Ministry of Finance and Public Administration and of the Securities Market Commission, Official Gazette No 208, Series II - C)

Provides for the regime applicable to independent analysts, to credit institutions that are not registered with the Securities Market Commission for the exercise of financial intermediation activities, and to any entity the principal activity of which is the preparation or disclosure of investment recommendations, or which within the scope of its activity issues or discloses the investment recommendations provided for in Article 12-A of the Securities Code. Corrected by Corrigendum No 1662/2006 of 30 October, Official Gazette No 216, Series II - C of 9 November 2006.
- 12 October 2006 (Circular Letter of Banco de Portugal No 35/2006/DET)

Within the scope of the powers entrusted to the Banco de Portugal under the *Regime Excepcional de Regularização Tributária* - RERT (Exceptional Regime of Tax Settlement), approved by Law No 39-A/2005 of 29 July and in compliance with the provisions laid down in the Decision No 1195/06-XVII of 29 September of the Secretary of State for Tax Affairs, informs about the procedures to be complied with by credit institutions regarding the obligation of those participating in the present regime to confirm the maintenance of the ownership of the Portuguese government securities that enabled them to benefit from reduced taxation.
- 13 October (Circular Letter No 89/06/DSBDR of 13 October 2006)

Clarifies the specific prudential rules governing the discretionary and individual portfolio management on behalf of third parties, an activity which may now be carried out by securities investment fund management companies (Portuguese acronym: SGFIM), under the terms and conditions of the legal framework of collective investment



- 20 October (Instruction No 14/2006 of 20 October distributed with Circular Letter No 90/2006/DSB)
  - 25 de October (Decree-Law No 199/2006 of the Ministry of Finance and Public Administration, Official Gazette No 206, Series I)
  - 30 October (Circular Letter No 36/2006/DET)
  - 31 October (Circular Letter No 91/06/DSBDR)

undertakings (RJOIC), approved by Decree-Law No 252/2003 of 17 October.

Lays down that the Banco de Portugal must be provided with information particulars on companies that form part of the composition of consolidation relevant for supervision on a consolidated basis.

Regulates the winding up of credit institutions and financial companies having their head office in Portugal as well as of their branches set up in another European Union Member State and transposes into Portuguese law Directive 2001/24/EC of the European Parliament and of the Council of 4 April 2001 on the reorganisation and winding up of credit institutions. Refers to the Legal Framework of Credit Institutions and Financial Companies, approved by Decree-Law No 298/92 of 31 December 1992, for the application of reorganisation measures to credit institutions and financial companies.

Lays down the conditions for the exchange of Slovenian tolar banknotes for euro banknotes and coins, taking into account the tasks of the national central banks of the Eurosystem, within the scope of the Guideline of the European Central Bank of 24 July 2006 on the exchange of banknotes after the irrevocable fixing of exchange rates in connection with the introduction of the euro (ECB/2006/10), with reference to the introduction of the euro in Slovenia on 1 January 2007

Informes that the FATF - Financial Action Task Force on Money Laundering - decided to remove Myanmar from its list of non-cooperative countries and territories. It also notes that all jurisdictions listed as non-cooperative countries and territories in 2000 and 2001 were progressively removed from the above-mentioned list, after having recorded significant progress in the reinforcement of their national systems to prevent and combat money laundering. Revokes Circular Letter No 75/2006/DSBDR of 4 August.
- 3 November (Notice of Banco de Portugal No 9/2006 Official Gazette No 217 Series I)
  - 10 November (Notice of Banco de Portugal No 10/2006 Official Gazette No 222 Series I)
  - 15 November (Instruction of Banco de Portugal No 15/2006 BNP 11/2006)

Introduces changes in paragraph 8 (1) of Notice No 1/95 of 17 February, which adds a paragraph 4 (B) and a sub-paragraph (d) to the above 8 (1), changing the information to be reported as regards the rounding of interest rates applied in credit operations. It also replaces Annexes I and II with the same Annexes of this notice, which enters into force 30 days following its publication.

Revokes Notice No 11/92 of 26 August, published in the Official Gazette No 207 Series II, of 8 September 1992, which had already been tacitly revoked by Decree-Law No 69/2004 of 25 March.

Revokes Instruction No 3/2002, published in the BNP No 2 of 15 February 2002.

## November

## December

- 4 December (Notice of Banco de Portugal No 11/2006 Official Gazette No 232 Series I) Amends Notice No 1/99 of 15 January, adapting it to the provisions of Decree-Law No 295/2003 of 21 November.



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