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ABBREVIATIONS

3ma	3-month moving average
b.p.	basis points
CPI	Consumer Price Index
ECB	European Central Bank
EUR	Euro
GDP	Gross Domestic Product
GFCF	Gross Fixed Capital Formation
GVA	Gross Value Added
HICP	Harmonized Index of Consumer Prices
INE	*Instituto Nacional de Estatística* (National Statistics Institute)
IRC	Corporate Income Tax
IRS	Personal Income Tax
ISP	Tax on Oil Products
OECD	Organisation for Economic Cooperation and Development
OPEC	Organization of the Petroleum Exporting Countries
p.p.	percentage points
s.r.e.	balances
sa	seasonally adjusted
ULC	Unit Labour Costs
USD	US dollar
VAT	Value Added Tax
y-o-yrc	year-on-year rate of change

ECONOMIC POLICY AND SITUATION

The Portuguese Economy in 2006

THE PORTUGUESE ECONOMY IN 2006

1. INTRODUCTION

Developments in the Portuguese economy in 2006 were generally more favourable than in past years. Economic activity accelerated, boosted by goods and services exports. Labour market conditions recorded a still incipient improvement, with a positive change in employment and a virtual stabilisation of the unemployment rate. The narrowing of the fiscal deficit from 6.0 to 3.9 per cent of GDP was significant and higher than expected. This reflected an improvement in the structural balance, reached in equal parts through a containment of public expenditure and an increase in revenue. Despite these favourable developments, growth in 2006 was still not sufficient to resume real convergence with the euro area.

The annual change in GDP stood at 1.3 per cent, compared with 0.5 per cent in 2005 (Table 1.1). The acceleration of activity was underpinned by the strong expansion of exports, as domestic demand growth came close to zero. The deceleration of domestic demand reflected the moderation of private consumption and the fall in public consumption, which should be seen in the light of the need to correct the existing macroeconomic imbalances in the economy. The renewed drop in investment was the most unfavourable development in 2006.

Table 1.1

MAIN ECONOMIC INDICATORS

Rate of change, in percentage (unless otherwise indicated)

	2005	2006
GDP	0.5	1.3
Private consumption	2.1	1.1
Public consumption	2.0	-0.3
GFCF	-3.1	-2.1
Exports	1.6	9.1
Imports	2.2	4.2
Employment	0.0	0.7
Unemployment rate (as a percentage of the labour force)	7.6	7.7
Fiscal balance (as a percentage of GDP)	6.0	3.9
Net lending (+) / net borrowing (-) of the economy (as a percentage of GDP)	-8.6	-8.7
HICP	2.1	3.0

Sources: *INE* and Banco de Portugal.

The behaviour of domestic expenditure was also influenced by developments in monetary policy, which has become progressively less accommodative. The European Central Bank (ECB) increased gradually its key interest rates, with the minimum bid rate on the main refinancing operations being raised to 3.75 per cent in March 2007, a cumulative change of 175 basis points since December 2005. In turn, the need to consolidate public accounts, which is crucial for sustained economic growth over the medium term, translated into an increase in taxes and a decline in general government consumption and investment expenditure.

The increase in the tax burden and in bank interest rates, against a background of high indebtedness levels and mostly variable rate lending, led to a moderation of household consumption expenditure. Current estimates point to private consumption growth close to 1 per cent, after a change of around 2 per cent in 2005.

Gross fixed capital formation (GFCF) declined by approximately 2 per cent in 2006, bringing the cumulative fall in the past six years to around 15 per cent. The contraction of GFCF reflected the above mentioned unfavourable behaviour of public investment and also the continued reduction of housing investment, which has been going through an adjustment process after high growth in the second half of the 1990's. In turn, corporate investment picked up, increasing by approximately 1 per cent in 2006, in line with the improvement in confidence levels in the industrial sector. However, it is still premature to conclude whether these developments correspond to a sustained reversal in the downward trend recorded in recent years, given that significant uncertainty continued to surround growth prospects for domestic demand, in a context of persisting macroeconomic imbalances in the Portuguese economy.

As referred to above, goods and services exports were the most buoyant component of global demand in 2006. There is however some uncertainty about the sustainability of this performance. Current estimates point to export growth around 9 per cent (close to the change estimated for external demand) compared with below 2 per cent growth in 2005. Available data in nominal terms reveal broadly favourable developments, both by groups of products and geographical markets. With respect to products and due to their relevance in the structure of Portuguese exports, the favourable behaviour of sales of machines and appliances was particularly important, as well as, albeit to a lesser degree, vehicles sales. Exports of fuels and some minerals continued to record exceptionally high growth, associated with constraints in the global refining capacity and with the international price of raw materials. Only exports of clothing and footwear continued to decline, a trend that is likely reflecting changes in the pattern of specialisation of the Portuguese economy, in view of changes in global comparative advantages. An analysis by geographical markets reveals that the largest contributions to export growth in 2006 come from traditional markets, namely Spain, whose positive contribution has become more marked, and the United States and Germany, which recovered significantly from unfavourable developments in recent years. It should be noted however that exports also benefited from the marked growth of sales to markets with a smaller weight, in particular, Angola and Singapore.

Output growth in 2006 benefited from the recovery of activity in manufacturing, in line with developments in goods exports. The increase in output was accompanied by a positive change in employment, which according to data from the INE Labour Force Survey, reached 0.7 per cent for the economy as a whole. Employment growth in the private sector is likely to have exceeded this figure, as employment in the general government sector is estimated to have declined. These developments benefited from the higher demand for labour in manufacturing, where successive job losses had been recorded in the past few years. The growth of productivity per employee in the economy as a whole continued to be very reduced and similar to that recorded in 2006. The growth of employment contributed to a virtual stabilisation of the unemployment rate, which stood at 7.7 per cent in the year as a whole. In the fourth quarter of 2006, the unemployment rate stood at 8.2 per cent, compared with 8.0 per cent in the corre-

sponding quarter of 2006. However, long-term unemployment continued to increase, reaching 51.7 per cent of the total number of unemployed in 2006.

Despite the high levels of the unemployment rate and long-term unemployment, available evidence – which cannot be decoupled from the characteristics of the Portuguese labour market – suggests that wages in the private sector have not shown clear signs of decelerating. The change in real wages per employee in the private sector was close to zero in 2006, in an environment in which inflation recorded a higher-than-expected increase. Measured by the change in the Harmonised Index of Consumer Prices (HICP) average inflation went up from 2.1 to 3.0 per cent in 2006, thereby reversing the downward trend observed since 2001. However, prices decelerated markedly between the first and the second half of the year and at the end of 2006 inflation was close to 2.5 per cent. The increase in the average inflation rate reflects the impact on consumer prices of the rise in indirect taxation and the acceleration in import prices of non-energy industrial goods, as well as the unfavourable performance of unprocessed food prices, which are traditionally highly volatile. The differential of average inflation vis-à-vis the euro area, which had been virtually nil in 2005, widened to 0.8 p.p. in 2006. The maintenance of higher growth in unit labour costs than in the euro area contributed to the persistence of a positive inflation differential.

The combined current and capital account, which reflects the external borrowing requirements of the economy, remained broadly unchanged in 2006, at 8.7 per cent of GDP. The goods and services deficit narrowed by approximately 1 p.p. of GDP, benefiting, in particular, from strong export growth. However, the income deficit widened significantly (from 2.6 to 3.5 per cent of GDP in 2006), due to the continued deterioration of the international investment position of the Portuguese economy and the increase in interest rates in 2006. The capital account also deteriorated, mirroring the smaller volume of transfers from the European Union.

2. MAJOR INTERNATIONAL ECONOMIC DEVELOPMENTS

In 2006 world economic activity and trade continued to grow at a robust pace. In turn, inflation at the global level remained relatively contained, against a background of more moderate growth in oil prices and less accommodative monetary policies. Financial market conditions remained globally favourable, despite a period of instability in May/June, related to expectations of a more marked increase in the federal funds rate in the United States.

World output growth stood at 5.4 per cent in 2006 (Table 2.1). Activity accelerated in most regions, standing out the persistent high buoyancy of the Asian economies, namely China and India, and of the oil-producing countries of the Middle East and the Commonwealth of Independent States. In major advanced economies, growth differentials narrowed, reflecting the virtual stabilisation of growth in the United States and the robust strengthening of activity in the euro area and, to a lesser extent, in the United Kingdom and Japan.

Continued strong world demand kept an upward pressure on the US dollar prices of raw materials in international markets (Chart 2.1). The prices of non-energy commodities increased by 26 per cent in 2006 and remained on an upward trend throughout the year in particular, the price of non-ferrous metals that increased by approximately 62 per cent. Oil prices went up by 20 per cent, on average, in 2006, growing at a more moderate pace than in the previous year. Up to mid-August, oil prices increased sharply with the price of Brent crude oil reaching around USD 78 per barrel. However, this upward trend was subsequently reversed and the price of Brent crude oil dropped to around USD 55 per barrel in January 2007. The reduction in oil prices benefited from the temporary easing of tensions in the Middle East, as well as from signs of more subdued growth in the demand for oil in OECD countries and

Table 2.1

DEVELOPMENTS IN THE WORLD ECONOMY
Rate of change, in percentage

	2004	2005	2006
GDP			
Wordl Economy	5.3	4.9	5.4
Advanced Economies	3.3	2.5	3.1
United States	3.9	3.2	3.3
Japan	2.7	1.9	2.2
Euro Area	2.0	1.4	2.7
Germany	1.2	0.9	2.7
France	2.3	1.2	2.2
Italy	1.2	0.1	1.9
Spain	3.2	3.5	3.9
Portugal	1.3	0.5	1.3
United Kingdom	3.3	1.9	2.8
Newly industrialised Asian economies[(a)]	5.8	4.7	5.3
Emerging market and developing economies	7.7	7.5	7.9
Central and Eastern Europe	6.6	5.5	6.0
Commonwealth of Independent States	8.4	6.6	7.7
Russia	7.2	6.4	6.7
Developing Asian countries	8.7	9.2	9.4
China	10.1	10.4	10.7
India	7.8	9.2	9.2
Middle East	5.6	5.4	5.7
Latin America	6.0	4.6	5.5
Africa	5.8	5.6	5.5
Volume of world trade in goods and services	10.6	7.4	9.2
International commodity prices in USD			
Oil (*brent*)	33.5	45.0	20.1
Non-energy commodities	21.7	9.5	26.3
Consumer prices			
Advanced economies	2.0	2.3	2.3
Emerging market and developing economies	5.6	5.4	5.3

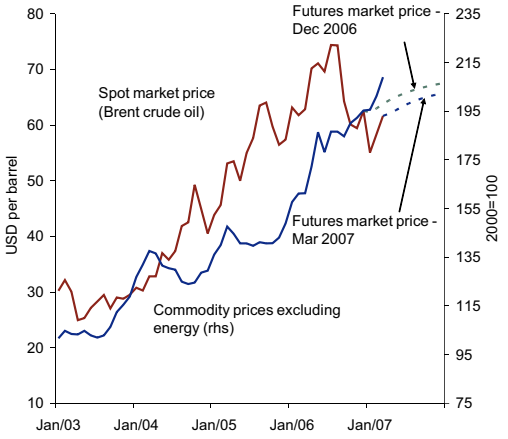
Sources: Eurostat, IMF, HWWA, Thomson Financial Datastream and Banco de Portugal.
Note: (a) Korea, Hong-Kong, Taiwan and Singapore.

from favourable weather conditions. However, given the persistence of geopolitical tensions, high production capacity utilisation, and the announcement of cuts in OPEC production as from February, the price of Brent crude oil increased again after mid-January to levels around USD 64 per barrel at the end of March 2007. The futures market continues to point to a gradual rise in the price of Brent crude oil throughout 2007.

Developments in oil prices contributed to widen, global imbalances in 2006. In oil-exporting countries, the current account surplus recorded a further significant increase (Chart 2.2), in a context in which the exchange rate policy of these countries continued to limit exchange rate fluctuations. By contrast, in net oil-importing countries the rise in oil prices translated into deteriorating terms of trade and widening energy deficit, albeit to a lesser extent than in the past few years. In the United States, the deterioration of the energy component of the trade balance contributed to the worsening of the current account deficit, which reached 6.5 per cent of GDP in 2006 (Chart 2.3). However, the other goods and services trade deficit as a percentage of GDP narrowed, reflecting an acceleration of exports from the United States, as a result of more balanced growth of world demand and slight depreciation of the US dollar in

Chart 2.1

INTERNATIONAL COMMODITY PRICES



Sources: Bloomberg and HWWA.

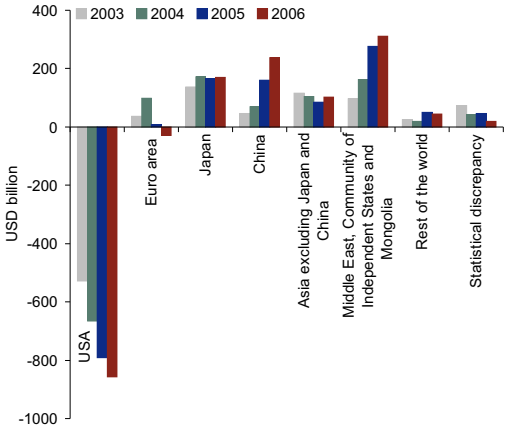
real effective terms. Asian emerging and developing economies continued to post high current account surpluses, despite somewhat increased exchange rate flexibility in several of those countries, namely in China since mid-2005.

The growth of economic activity in the main trading partners of the Portuguese economy, in a context of strong global economic growth and high pace of expansion of the world trade, continued to result in a favourable evolution of external demand for Portuguese goods, which accelerated from 2005 to 2006.

The pace of expansion in the euro area increased from 1.4 to 2.7 per cent in 2006. Growth became more broadly based across the expenditure components, reflecting the strengthening of domestic demand and a positive contribution of net exports (Chart 2.4). Investment, in particular, was highly buoy-

Chart 2.2

CURRENT ACCOUNT

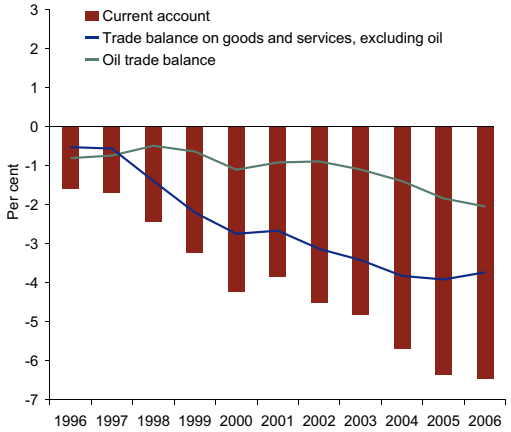


Source: IMF.

Chart 2.3

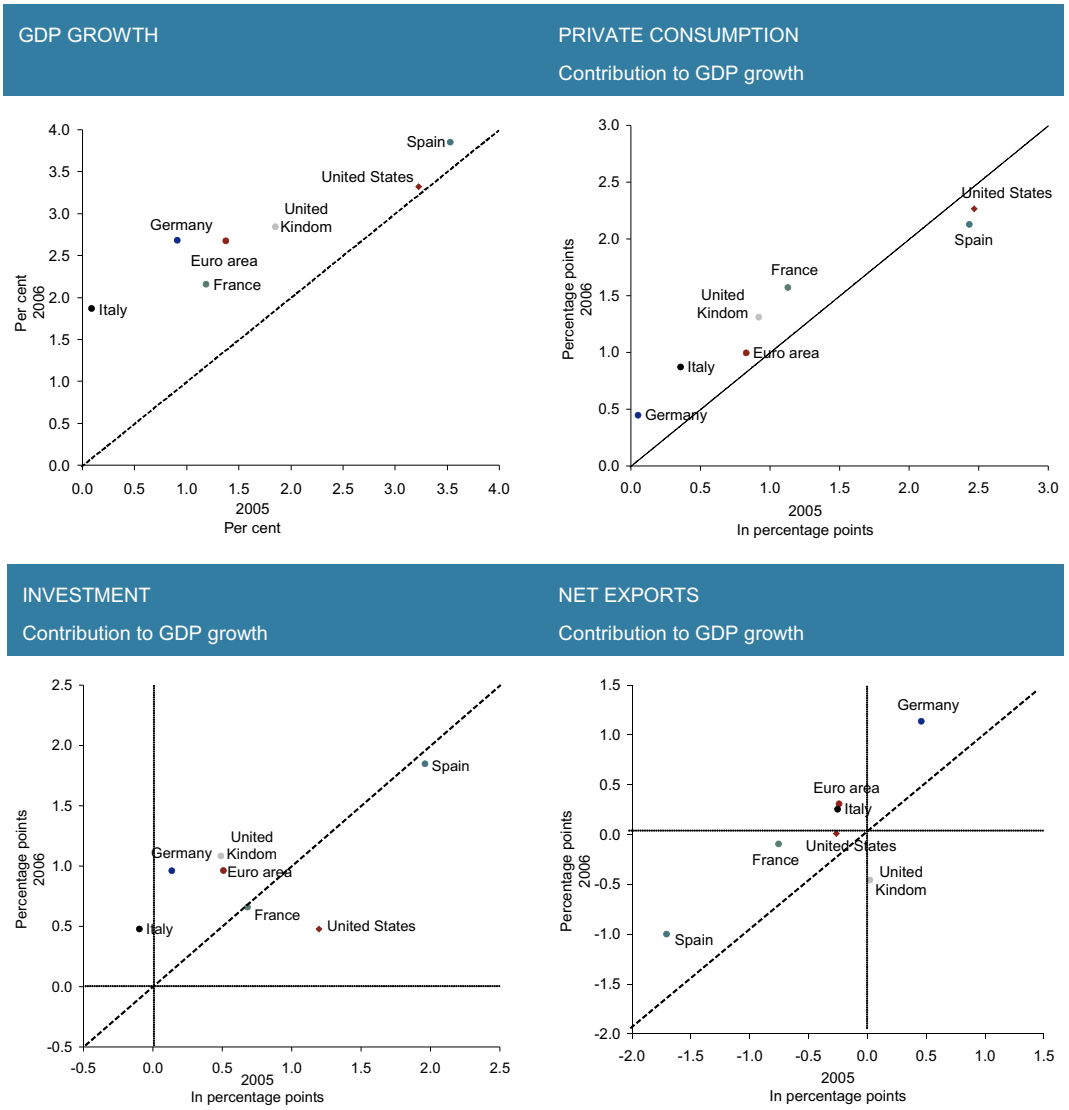
US CURRENT ACCOUNT

As a percentage of GDP



Sources: US Department of Commerce and calculations of Banco de Portugal.

Chart 2.4



Sources: Eurostat and Thomson Financial Datastream.

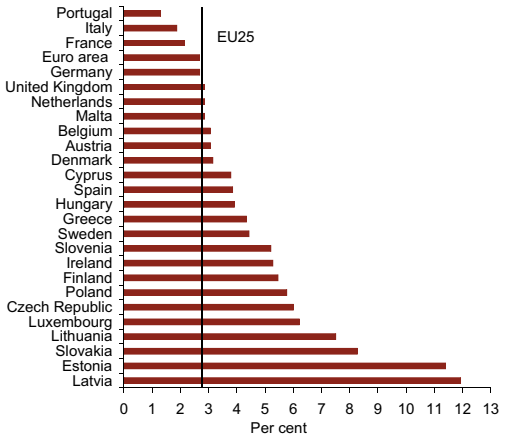
ant, fuelled by continued favourable financing conditions, strog corporate profits and prospects of an expansion of demand, while the improvement in labour market conditions contributed to stronger private consumption growth. Exports made a significant contribution to activity growth, as was the case in Portugal (see Section 5 "Demand"). In the euro area, this evolution reflected an increase in exports to Asia and to the new Member States of the European Union (EU) in line with the trend seen in recent years.

The acceleration of activity was broadly based across most euro area countries, including Portugal. Growth dispersion between the several countries declined, although the Portuguese economy continued to increase its distance relative to the euro area average. In 2006 the Portuguese economy recorded the lowest growth rate among EU countries (Chart 2.5). Among the main trading partners of Portugal, Spain continued to record high buoyancy with a growth rate close to 4 per cent and Germany recorded a sharp increase in growth to 2.7 per cent, while the growth pace in France and Italy, despite recovering somewhat, continued to be more subdued, standing at around 2 per cent.

Chart 2.5

GROSS DOMESTIC PRODUCT IN EUROPEAN UNION COUNTRIES IN 2006

Real rate of change



Sources: Eurostat and Banco de Portugal.

In the United Kingdom, economic activity accelerated from 1.9 to 2.8 per cent in 2006, largely reflecting the strengthening of private consumption and investment, which translated into higher domestic demand buoyancy (Chart 2.4). Conversely, net exports made a negative contribution to GDP growth.

In the United States, activity growth remained strong, standing at 3.3 per cent in 2006, against a background of more favourable developments in exports and changes in inventories that offset the moderation in domestic demand growth. The adjustment in the housing market translated into a fall in residential investment, although private consumption recorded only a slight moderation, remaining supported by continuing growth in employment and real disposable income. In turn, non-residential private investment growth remained robust in 2006 as a whole, despite decelerating towards the end of the year.

Against this backdrop, estimates for the external demand for Portuguese goods evolved favourably, accelerating by 2.5 p.p. to 8.4 per cent in 2006 (Table 2.2). The growth rate of Portuguese exports of goods in volume terms was similar to that of external demand, reflecting a strong recovery from 2005. This behaviour was largely due to the higher growth of exports to the traditional markets of destination, but it also benefited from an increase in sales to markets with a smaller share in Portuguese exports, as explained in more detail in *Section 5 "Demand"*.

In comparative terms, growth in volume of Portuguese exports of goods and services was slightly higher than in the euro area in 2006, in contrast to the past two years (Chart 2.6). However, the growth of Portuguese exports remained slightly lower than in the ten new EU Member States, whose export buoyancy remained high in 2006. Outside the European Union, the pace of expansion of goods and services exports in the emerging and developing economies of Asia remained particularly high, continuing to underpin activity growth in those countries. It should be noted that in 2006 both the new EU Member States and the emerging market economies in Asia increased further their share in imports of the euro area, which is the main market of destination of Portuguese exports (Chart 2.7). As referred to above, the share of these countries in euro area exports also increased further, evidencing their increasing integration in the world economy.

Table 2.2

EXTERNAL DEMAND FOR PORTUGUESE GOODS
Real rate of change, per cent

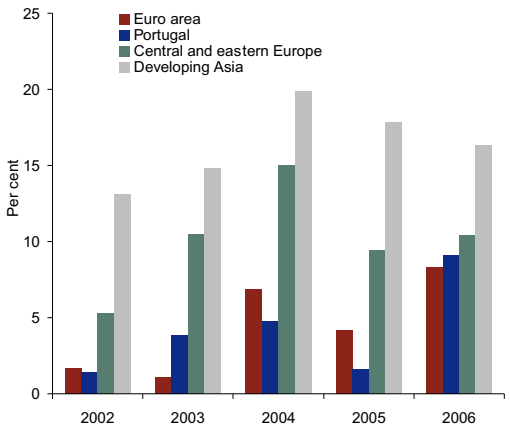
	Weights 2005	2004	2005	2006
External demand [a]	100.0	8.3	5.9	8.4
Intra-euro area external demand	79.3	8.1	6.0	8.5
of which:				
Spain	31.8	9.7	6.5	8.8
France	16.1	6.7	6.2	8.5
Germany	14.2	8.1	7.1	10.5
Italy	5.2	3.3	-0.1	3.4
Extra-euro area external demand	20.7	8.8	5.5	8.0
of which:				
United Kingdom	10.1	8.0	4.0	8.4
United States	6.3	10.9	6.7	6.7

Sources: European Commission, UK Office for National Statistics and *INE*.
Note: (a) Calculated as a weighted average of the real growth in imports of goods from the 17 major trading partners. Each individual country was weighted according to its share in Portuguese exports in the previous year. The 17 countries selected are the destination of around 85 per cent of total exports.

In an environment characterised by the high pace of expansion of world activity and more moderate growth in oil prices, overall inflation remained broadly unchanged in 2006 compared with the previous year (Table 2.1). The annual change in the Consumer Price Index (CPI) stood at 2.3 per cent in the advanced economies and 5.3 per cent in the emerging market economies, in a context in which increased international competition and the contribution of central banks to the stabilisation of inflation expectations are likely to have contained the growth of consumer prices.

Chart 2.6

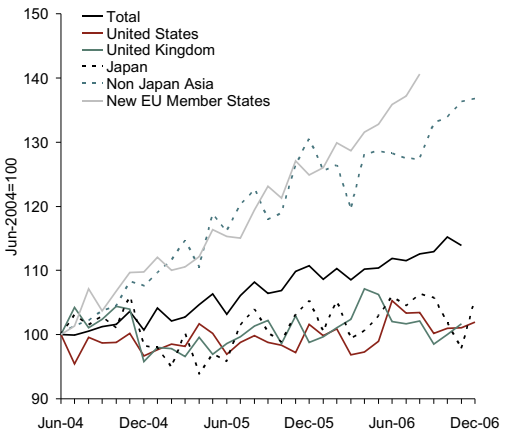
GOODS AND SERVICES EXPORTS
Real rate of change



Sources: Eurostat, IMF and Banco de Portugal.
Note: (a) Includes Albania, Bulgaria, Croatia, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Macedonia, Malta, Poland, Romania, Slovakia and Turkey.

Chart 2.7

EXTRA-EURO AREA IMPORTS BY COUNTRY OF ORIGIN
In volume



Source: Eurostat.

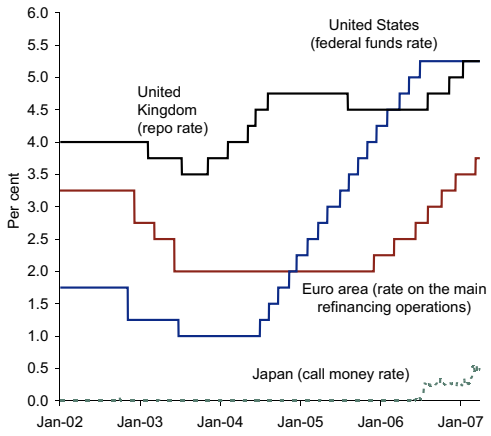
Monetary policy in major advanced economies became in general less accommodative in 2006. The robust growth of world activity and the rise in oil prices during the first half of the year heightened concerns about an increase in inflationary pressures. Thus, the national central banks of the euro area and the United States raised their key interest rates in the first half of the year (Chart 2.8). Following the decline in oil prices from August onwards, there was a moderation in inflation rates in the main advanced economies. In this context, during the second half of 2006, the Federal Reserve kept unchanged the federal funds rate at 5.25 per cent against a background of decelerating economic activity in the United States. In turn, the ECB continued to reduce the accommodative stance of monetary policy, raising the key ECB interest rate to 3.75 per cent in March 2007 (see *Section 3 "Macroeconomic policies"*). In the United Kingdom, in response to inflationary pressures and as the economy was gaining momentum, the Bank of England raised its repo rate in August and November, to 5.25 per cent. Japan announced the end of the zero interest rate policy in July, raising the call rate by 25 basis points, and decided to further increase this rate in February 2007, even though inflation remained close to zero. Some emerging market economies, including China and Russia, also adopted less accommodative monetary policies, due to concerns of overheating related to the high growth pace of economic activity, although the inflation rates in these economies in general have remained relatively contained.

Financial markets conditions remained globally favourable in 2006, despite a period of instability in May/June, associated with significant sales of riskier assets. This movement seems to have been related to a reassessment of investors' expectations towards a more marked increase in the federal funds rate in the United States in view of higher inflationary tensions.

Stock price indices in major advanced economies increased further in 2006 (Table 2.3), given strong economic growth and ample liquidity. The rise in the main indices reflected improved corporate earnings, having also benefited from the strong increase in mergers and acquisitions. The broadly based upward trend of stock price indices was temporarily interrupted in the above-mentioned period of instability in May/June, with a reduction in prices and an increase in stock market volatility, which was more marked in emerging market economies (Chart 2.9).

Chart 2.8

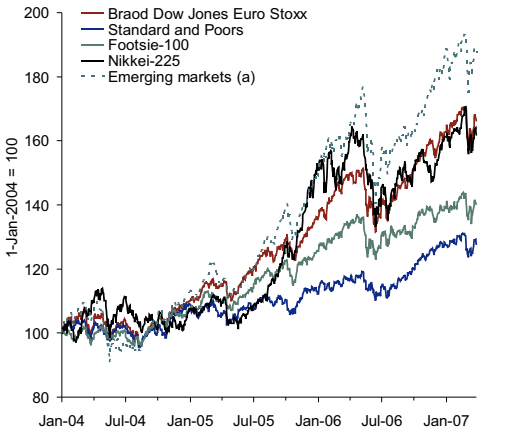
OFFICIAL INTEREST RATES



Source: Bloomberg.

Chart 2.9

STOCK MARKETS



Sources: Bloomberg and Thomson Financial Datastream.
Note: (a) The Morgan Stanley Capital International index includes: Argentina, Brazil, Chile, China, Colombia, Czech Republic, Egypt, Hungary, India, Indonesia, Israel, Jordan, Korea, Malaysia, Mexico, Morocco, Pakistan, Peru, Philippines, Poland, Russia, South Africa, Taiwan, Thailand and Turkey.

Table 2.3

INTERNATIONAL FINANCIAL MARKETS

	Averages			End-of-period		
	2004	2005	2006	2004	2005	2006
Stock price indexes (percentage change)						
S&P 500	17	7	9	9	3	14
Nasdaq	21	6	8	9	1	10
Nikkei 225	20	11	30	8	40	7
FTSE 100	12	14	15	8	17	11
Dow Jones Euro Stoxx	18	17	22	10	23	20
10-year interest rates on public debt (per cent)						
United States	4.3	4.3	4.8	4.2	4.4	4.7
Japan	1.5	1.4	1.7	1.4	1.5	1.7
United Kingdom	4.9	4.4	4.5	4.5	4.1	4.7
Euro area	4.1	3.4	3.9	3.7	3.4	4.1
Diferential between private and public debt bond yields (with a maturity of 7 to 10 years						
United States						
AA	13.1	24.1	49.5	19.7	40.0	53.9
BBB	72.8	76.1	101.6	58.2	98.5	111.2
Euro area						
AA	32.6	27.9	34.3	32.7	29.2	35.1
BBB	83.9	98.2	124.0	71.5	122.5	110.4
Emerging market debt spreads						
EMBI+	437.2	316.7	199.5	356.0	245.0	169.0
Nominal effective exchange rates (percentage change)[a]						
US dollar	-4.6	-2.6	-2.0	-4.5	3.3	-4.3
Japanese yen	3.7	-3.2	-7.2	0.7	-10.4	-6.1
Pound sterling	5.0	-1.6	0.5	1.6	-2.3	6.0
Euro	4.0	-0.9	0.5	2.1	-7.1	5.1
Memo:						
EUR/USD exchange rate[b]	10.0	0.0	0.9	7.8	-13.4	11.6

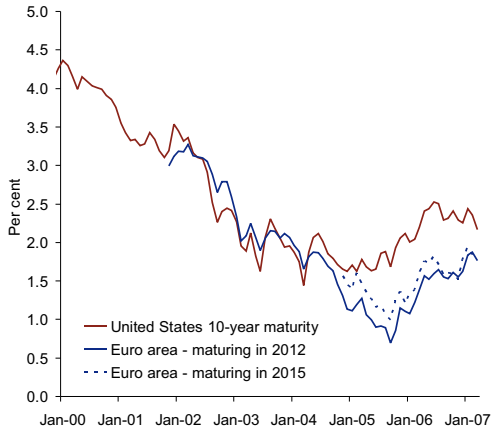
Sources: ECB, BIS, Boomberg, JP Morgan and Federal Reserve Board.
Notes: (a) A positive change corresponds to an appreciation. (b) A positive change corresponds to an appreciation of the euro.

In bond markets, long-term interest rates in the United States and in the euro area followed a rising trend in the first half of the year. Inflation-indexed bonds show that this evolution reflected a rise in real interest rates and an increase in long-term inflation expectations (Charts 2.10 and 2.11). During the period of instability, 10-year rates recorded only a slight and temporary reduction, in line with the increased preference for less risky assets. In the second half of the year, there was a reversal in the upward trend of long-term interest rates, largely reflecting easing inflation expectations, following the decline in oil prices in international markets. At the same time, long-term interest rate differentials between the United States and the euro area narrowed, as a result of both a reduction in inflation expectations in the United States to levels close to those seen in the euro area and of closer activity growth prospects in both economies.

In turn, interest rate differentials between private and public debt in the United States and in the euro area remained at low levels, although slightly higher than in recent years. Sovereign debt spreads of emerging market economies, despite having widened somewhat during the period of instability, subsequently resumed their downward path, remaining in the course of the year at low levels by historical standards.

Chart 2.10

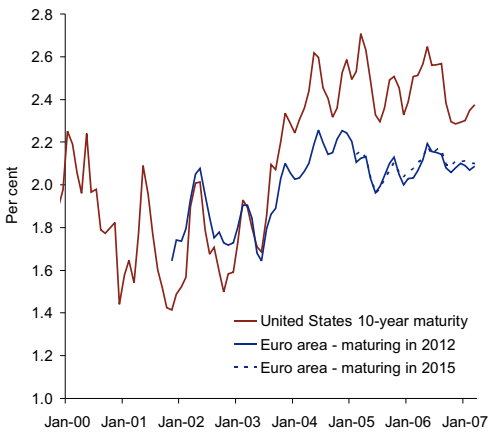
YIELDS ON INFLATION-INDEXED BONDS[(a)]



Source: Bloomberg.
Note: (a) French bonds indexed to euro area HICP (maturing in 2012 and 2015) and US bonds indexed to the US CPI for a 10-year residual average maturity.

Chart 2.11

INFLATION EXPECTATIONS IMPLIED BY INFLATION-INDEXED BONDS[(a)]



Sources: Bloomberg and calculations of Banco de Portugal.
Note: (a) Derived from French bonds indexed to euro area HICP (maturing in 2012 and 2015) and US bonds indexed to the US CPI for a 10-year average residual maturity.

Turning to the foreign exchange markets, the moderation of growth in the United States throughout the year and the strengthening of the expansion of economic activity in the euro area and in the United Kingdom contributed to the depreciation of the US dollar against the euro and the pound sterling. The persistence of a high US current account deficit is likely to have equally contributed to the weakening of the US dollar. In 2006 the Japanese yen remained on a depreciating trend, in a context in which the significant interest differentials of Japan against the United States and the emerging market economies, strengthened capital outflows from the Japanese economy, a phenomenon usually known as carry trade. The Chinese renminbi appreciated by 3.3 per cent against the US dollar in 2006 compared with end-2005, continuing the trend appreciation against the US dollar observed since the introduction of the managed floating exchange rate regime in mid-2005. Therefore, and taking into consideration the euro area main trading partners, the euro appreciated by 5.1 per cent in 2006 in nominal effective terms compared with end-2005. The strengthening of the euro reflected a significant appreciation against the US dollar and Japanese yen and, to a smaller extent, the Swiss franc, only partly offset by a depreciation against the pound sterling.

In late February/early March 2007, financial markets recorded again short-lived period of instability. This event seems to have been triggered by fears of measures of the Chinese authorities to fight speculative movements in the markets and was, magnified by the release of indicators for the United States that were less favourable than expected by the markets. As a consequence, the main stock price indices recorded falls and sovereign debt spreads of emerging market economies widened. In foreign exchange markets, the sale of riskier assets translated into the unwinding of carry trade outflows based on the Japanese yen and the Swiss franc, leading to an appreciation of these currencies and to the depreciation of the currencies of the emerging market economies with high interest rates. These movements in financial and foreign exchange markets were largely reversed in the last weeks of March.

3. MACROECONOMIC POLICIES

3.1. Monetary policy of the ECB and monetary and financial conditions of the Portuguese economy

Monetary policy of the ECB

In 2006 the ECB continued to gradually remove the accommodative stance of the euro area monetary policy (Table 3.1). The Governing Council of the ECB raised its key interest rates by 25 basis points in March, June, August, October and December 2006 and in March 2007, setting the minimum bid rate on the main refinancing operations at 3.75 per cent. The cumulative increase in the key ECB interest rates since December 2005 amounts, thus, to 175 basis points.

The decisions to increase the key ECB interest rates reflected the assessment by the Governing Council that there were upside risks to price stability over the medium-term in the euro area and aimed at ensuring that inflation expectations remained solidly anchored at levels consistent with price stability (Chart 3.1). The main upside risks identified by the Governing Council were associated with the rise in oil prices, in particular, with potential second round effects on consumer prices and wages, taking into account the buoyant growth of economic activity in the euro area and the continued improvement in labour markets. In addition, the pace of monetary and credit expansion in the euro area remained high in 2006, which according to the Governing Council's assessment pointed to upside risks to medium and long-term price stability.

The increase in the key ECB interest rates seems to have contributed to a relative stabilisation of the growth of loans to the private sector as from the second quarter of 2006, which however remained at high levels (Chart 3.2). The moderation of the expansion of loans was particularly evident in loans to household for house purchase, which reversed the trend acceleration observed since mid-2003, but

Table 3.1

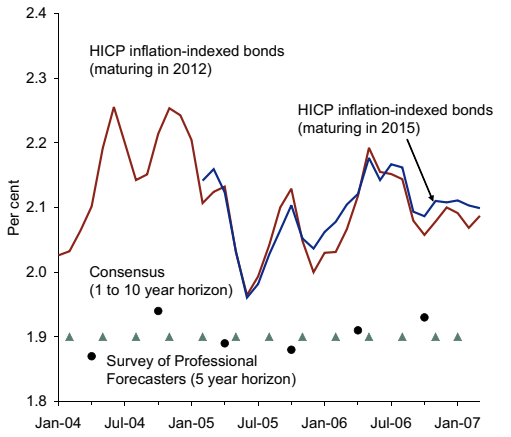
KEY ECB INTEREST RATES
Per cent

Date of the decision	Deposit facility	Main refinancing operations	Marginal lending facility
5 Oct. 2000	3.75	4.75	5.75
10 May 2001	3.50	4.50	5.50
30 Aug. 2001	3.25	4.25	5.25
17 Sep. 2001	2.75	3.75	4.75
8 Nov. 2001	2.25	3.25	4.25
5 Dec. 2002	1.75	2.75	3.75
6 Mar. 2003	1.50	2.50	3.50
5 Jun. 2003	1.00	2.00	3.00
1 Dec. 2005	1.25	2.25	3.25
2 Mar. 2006	1.50	2.50	3.50
8 Jun. 2006	1.75	2.75	3.75
3 Aug. 2006	2.00	3.00	4.00
5 Oct. 2006	2.25	3.25	4.25
7 Dec. 2006	2.50	3.50	4.50
8 Mar. 2007	2.75	3.75	4.75

Source: ECB.

Chart 3.1

EURO AREA LONG-TERM INFLATION EXPECTATIONS

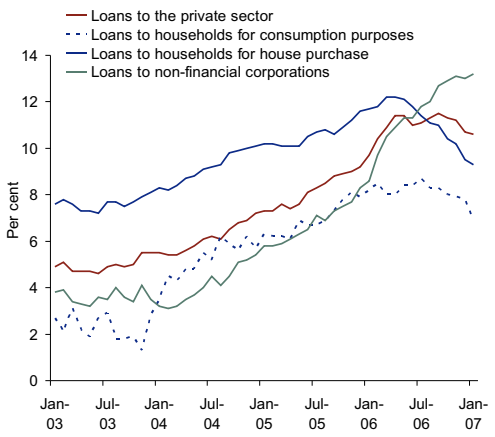


Sources: Bloomberg, Consensus Economics and ECB.

Chart 3.2

LOANS TO THE PRIVATE SECTOR IN THE EURO AREA

Year-on-year rate of change



Source: ECB.

maintaining high growth. The reduction in the growth pace of these loans seems to reflect an increase in interest rates and a slowdown in the housing market in several euro area countries. By contrast, loans to non-financial corporations continued to accelerate strongly in the course of the year. According to the results of the Bank Lending Survey for the euro area, these developments resulted increasingly from the rise in financing needs for investment and stockbuilding, in the context of improving economic activity, although funds' needs for mergers and acquisitions and restructuring activities continued to contribute significantly to the demand for loans by non-financial corporations.

Monetary and financial conditions of the Portuguese economy

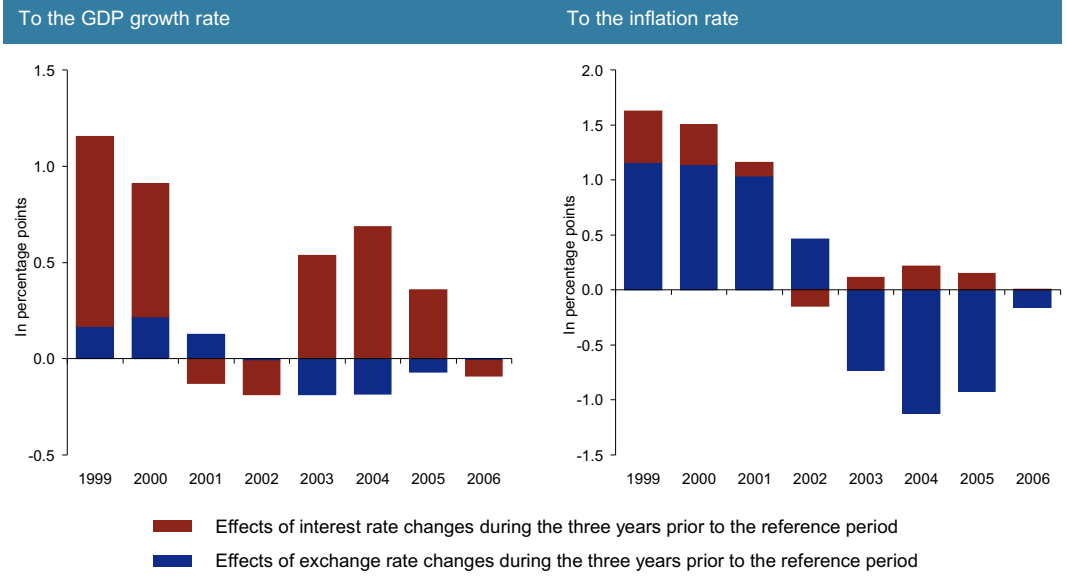
Due to the increase in the key ECB interest rates since the last quarter of 2005, monetary conditions exerted a restrictive, albeit moderate, impact on GDP growth in 2006, contrasting with the last three-year period (Chart 3.3).

However, it should be noted that financial conditions remained broadly favourable in 2006. In fact, despite the rise, interest rates remained at low levels in both nominal and real terms across the entire maturity spectrum, and the long-term rates continued to incorporate reduced risk premia. Stock markets continued to perform favourably thereby facilitating the recourse to this type of financing. In turn, prices in the residential segment of the real estate market continued to record a moderately positive nominal change (Table 3.2).

In 2006 long-term yields of Portuguese Treasury bonds remained at low levels by historical standards, despite a rise of around 50 basis points in annual average terms, (Chart 3.4), in line with development in the euro area. Although in the last quarter of 2006 the spread between long-term Portuguese and German government bond yields widened by slightly more than 15 basis points, this was a relatively occasional situation and, in the first three months of 2007, the differential narrowed to levels similar to those recorded since mid-2005 (between 10 and 15 basis points). It should also be noted that differentials between long-term private debt securities and long-term public debt securities remained at low levels, continuing to facilitate the issuance of long-term debt by the private sector.

Chart 3.3

CONTRIBUTION OF MONETARY CONDITIONS

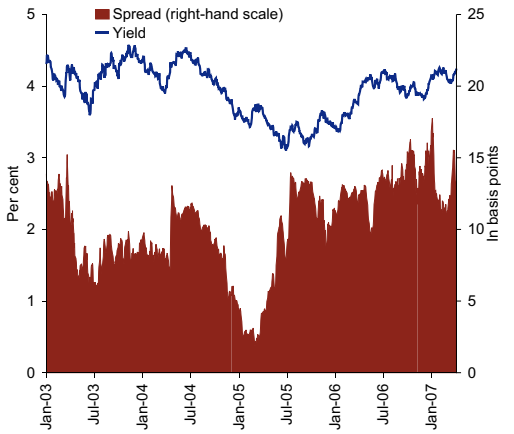


Source: Banco de Portugal.
Note: For further details on this index, see P. S. Esteves, "Monetary conditions index for Portugal", in the June 2003 issue of the Economic Bulletin of Banco de Portugal.

The Portuguese stock market recorded a valuation of around 30 per cent, in 2006, i.e. the largest since 1997 (as measured by the PSI-Geral index), exceeding the historical highs reached in March 2000. This performance benefited, on the one hand, from developments in international stock markets related to a broadly based improvement in corporate earnings and, on the other, from the impact of the

Chart 3.4

YIELDS ON PORTUGUESE GOVERNMENT BONDS AND SPREAD AGAINST GERMAN GOVERNMENT BONDS



Sources: ECB and Banco de Portugal.
Note: Yields at close of business. The spread was calculated by interpolating the German yield curve, to guarantee that the 10-year Portuguese benchmark yield is compared with a German yield of a comparable maturity. The spread was calculated on the basis of 5-day moving averages.

Table 3.2

MONETARY AND FINANCIAL CONDITIONS OF THE PORTUGUESE ECONOMY

	2004	2005	2006	2006			
				I	II	III	IV
Nominal interest rates - period averages (per cent)							
3-month Euribor	2.1	2.2	3.1	2.6	2.9	3.2	3.6
12-month Euribor	2.3	2.3	3.4	3.0	3.3	3.6	3.9
10-year fixed-rate Treasury bond yields	4.1	3.4	3.9	3.6	4.1	4.0	3.9
Bank interest rates							
Interest rates on outstanding amounts of loans							
Non-financial corporations	4.4	4.3	4.9	4.6	4.8	5.0	5.3
Households for house purchase	3.8	3.7	4.3	3.9	4.1	4.4	4.7
Households for consumption and other purposes	7.8	7.7	8.1	7.8	7.9	8.2	8.4
Interest rates on deposits with an agreed maturity							
Non-financial private sector - up to 2 years	2.0	2.0	2.3	2.1	2.2	2.3	2.6
Interest rates on new loans							
Households for house purchase	3.5	3.4	4.0	3.7	3.9	4.1	4.4
Exchange rates - period averages							
Nominal effective exchange rate index - percentage change from the previous corresponding period[a][b]	0.6	-0.2	0.2	0.1	0.4	0.1	0.0
Stock market - period averages							
PSI-Geral index - percentage change from the previous corresponding period	27.5	11.3	29.5	13.7	7.0	1.5	8.6
Housing market prices - period averages							
Índice Confidencial Imobiliário - percentage change from the previous corresponding period[c]	0.6	2.3	2.1	0.0	0.7	0.0	0.3
Loans granted by resident credit institutions to the non-financial private sector							
End-of-period annual rate of change[d]							
Households	9.8	10.1	10.3	10.6	10.5	10.5	10.3
For house purchase	10.5	11.1	9.9	11.2	10.8	10.2	9.9
For consumption and other purposes	7.5	6.7	11.8	8.7	9.6	11.6	11.8
Non-financial corporations	3.2	4.8	7.6	5.5	6.0	6.9	7.6
Memo:							
HICP - End-of-period annual average rate of change	2.5	2.1	3.0	2.4	2.9	3.1	3.0

Sources: *Euronext Lisboa*, *INE*, Imométrica, Reuters and Banco de Portugal.
Notes: (a) A positive change corresponds to an appreciation of the effective exchange rate index. (b) Calculations against a group of 22 trading partners. For a detailed description of the methodology, see the article entitled "New effective exchange rate index for the Portuguese economy" by A. C. Gouveia and C. Coimbra, in the December 2004 issue of the Economic Bulletin of Banco de Portugal. (c) The Índice Confidencial Imobiliário tracks developments in the residential market in Portugal, in particular in the Lisbon and Oporto metropolitan areas. In October 2006 this index adopted a new methodology and broadened its background information. The index uses data available at www.lardocelar.com, which in 2005 contained around 280,000 real estate registrations. For further details on the methodology used, see the article by I. Fonseca and R. Guimarães, in the Newsletter Imobiliária Portuguesa - Confidencial Imobiliário, entitled: "Índice Confidencial Imobiliário: procedimentos metodológicos", October 2006. (d) Loans granted by resident credit institutions adjusted for securitisations through non-resident special purpose vehicles. The resident credit institutions aggregate includes other resident monetary financial institutions and other credit institutions included in the other resident financial intermediaries and financial auxiliaries sector.

takeover bids on Portugal Telecom and Banco Português de Investimento, announced in the first quarter of the year.

In turn, prices in the housing segment of the Portuguese real estate market, as measured by Índice Confidencial Imobiliário, slowed down slightly, from 2.3 per cent in 2005 to 2.1 per cent in 2006. Real estate valuation is particularly important as regards monetary and financial conditions, as it may induce a wealth effect on the expenditure decisions of their owners. Moreover, considering that real es-

tate can be used as collateral in credit operations, changes in its value may influence developments in the credit market. It should be noted that available evidence points to the non-existence of an excessive valuation in the Portuguese residential market.[1]

The banking system plays a fundamental role in financial intermediation in Portugal and, in particular, in the financial integration process associated with the participation in the euro area. In this context, the fact that in 2006 the banking system remained sound, in terms of its profitability, solvency, provisions against risk and liquidity management, continued to be a key determinant of the maintenance of favourable access conditions to international financial markets. The expansion of the activity of the banking system has been associated with significant innovation in the credit products offered to the private sector, enabling, on the one hand, the setting of prices more in line with the risk profile of each debtor and, on the other, a better adjustment of the products to the counterparties' capacity to service debt. In fact, according to the INE Investment Survey, access restrictions to bank credit seem to have played a smaller role as a factor limiting investment in 2006, despite the very slight increase in the relevance attributed to the interest rate level. Anyway, the deterioration of sales prospects continued to be pointed out as the major factor limiting investment.

Bank interest rates on outstanding amounts accompanied with a slight lag the increase in the key ECB interest rates. The rises were more substantial in bank lending rates, namely in loans to households for house purchase and loans to non-financial corporations. These segments have a closer link to money market rates. Portugal belongs to the group of euro area countries where bank lending rates at the short term or with an agreed maturity of up to one year (typically indexed to money market rates) clearly dominate. This contrasts strongly with France and Germany, where the predominance of long-term interest rates made the banking counterparties immune to the rising trend in short-term interest rates (i.e. with an agreed maturity of up to one year). It should be noted however that in parallel with the increase in interest rates, the margins applied by Portuguese banks on lending operations narrowed. According to the results of the Bank Lending Survey, this has been associated with competitive pressure between banking institutions (Charts 3.5 and 3.6).[2]

Deposit rates, measured as the average rates of amounts outstanding, have not moved in line with developments in money market rates as far as magnitudes are concerned. This has been chiefly seen in household deposits with an agreed maturity of up to two years, which concentrate the largest share of deposits with an agreed maturity made by this sector. The smaller adjustment of deposit rates to lending rates reflects the fact that banks are giving preference to other forms of financing. In fact, amid declining savings rates, increased debt servicing and low (or even negative), real interest rates banking institutions have provided their customers with investment opportunities in products that are an alternative to the traditional deposits and whose remuneration is in part associated to the capital market. These products simultaneously favour customer loyalty and increased income from portfolio investment and management fees. In this context, it should be noted that despite decreasing somewhat, the profitability of real estate and securities investment funds (excluding money market funds and cash funds) continued to be broadly higher than that from deposits with an agreed maturity of up to two years.

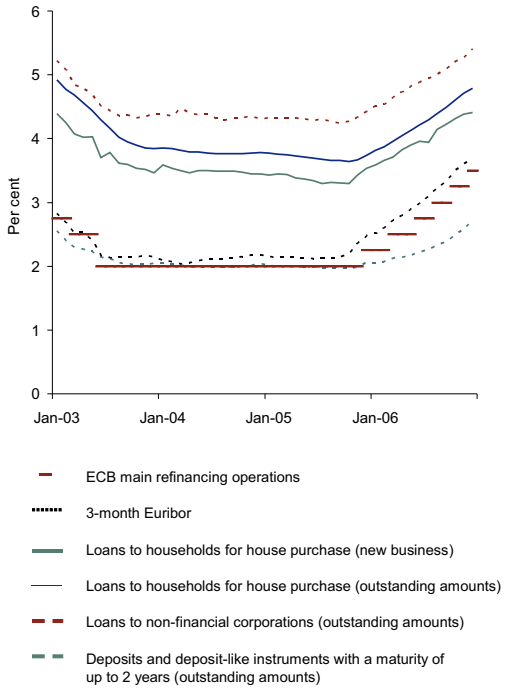
The increase in interest rates will tend to exert a restrictive effect on economic agents' expenditure. Due to the income effect, the impact will be more significant for economic agents with a net liability po-

(1) See "Box 6.1 *Housing prices in Portugal and macroeconomic fundamentals: evidence of quantile regression*", in the 2005 issue of the *Financial Stability Report* of the Banco de Portugal.

(2) The results of the Banking Lending Survey are available at: www.bportugal.pt/publish/bls/bls_e.htm.

Chart 3.5

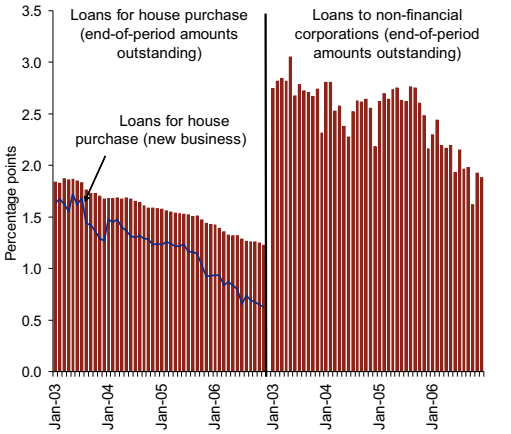
KEY ECB INTEREST RATES, MONEY MARKET INTEREST RATES AND BANK LENDING RATES



Sources: ECB and Banco de Portugal.

Chart 3.6

INTEREST RATE MARGINS IN LENDING OPERATIONS



Source: Banco de Portugal.
Note: The interest margin in amounts outstanding of loans is calculated as the difference between the interest rate on amounts outstanding and the 6-month moving average of the 6-month Euribor. In the case of new loans, the interest margin is the difference between the interest rate on new loans and the 6-month Euribor.

sition.[3] However, this impact was to a certain extent mitigated by the change, in the past few years, in conditions applied by banks on credit supply. Indeed, data compiled from the Bank Lending Survey, which is addressed to the main banking groups in Portugal, show that in addition to the squeeze in the interest differential of lending operations, banking institutions have also granted to their customers (enterprises and households) other more favourable conditions in the supply of credit. These conditions include in particular the reduction of fees and other charges, the lengthening of maturities, the adoption of longer grace periods and potential higher loan-to-value ratios. This has contributed, on the one hand, to contain the emergence of credit portfolio's default and, on the other, to the maintenance of high growth rates in the credit aggregates. In fact, despite the rise in interest rates and the high indebtedness levels of the non-financial private sector, the indebtedness of this sector (measured as a percentage of GDP) increased further in 2006.

Loans granted by resident credit institutions to non-financial corporations accelerated progressively throughout 2006 and their rate of change stood at around 8 per cent at the end of the year (4 per cent in December 2005) (Chart 3.7). The results of the Bank Lending Survey show that these developments are associated with debt restructuring, mergers and acquisitions and corporate restructuring and, to a lesser extent, with the financing of inventories and working capital. In addition, the respondent banks continued to make a negative assessment of the role played by investment in fuelling the demand for loans by non-financial corporations. It should be noted however that a significant share of the increase in loans was counterbalanced by a significant reduction in the recourse to commercial paper as a short-term source of finance of non-financial corporations; net issuance in the first half of the year was

(3) Economic agents, in relation to which the difference between financial assets and liabilities earning interest is negative, fall into this category.

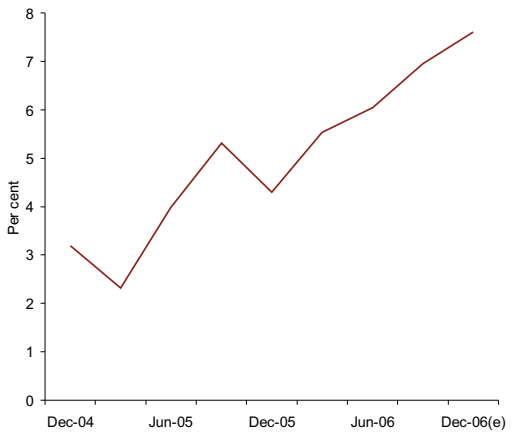
virtually nil. Subsequently, the second half of the year saw increased recourse to financing not directly intermediated by banks, as regards both commercial paper and shares and bonds. In annual terms, (net) issuance of bonds remained broadly unchanged from 2005. At the same time, (net) issuance of shares increased strongly from 2005 and continued to be concentrated on unlisted companies (Chart 3.8).

The growth rate of household debt was close to 10 per cent, as in the past few years. However, the situation at the end of 2006 contrasted with a year earlier, given the progressive deceleration of loans for house purchase, largely offset by developments in consumer credit and other lending (Chart 3.9).[4]

Chart 3.7

LOANS GRANTED BY RESIDENT CREDIT INSTITUTIONS TO NON-FINANCIAL CORPORATIONS[(a)]

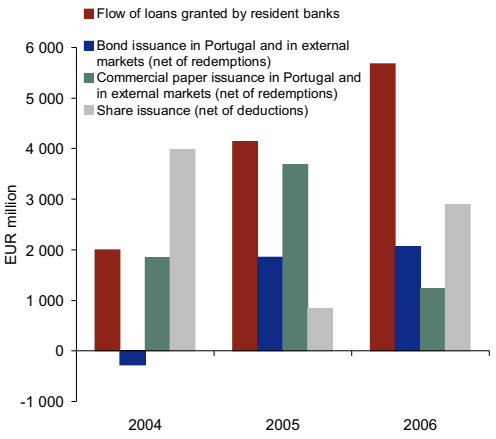
Annual rate of change



Source: Banco de Portugal.
Note: (a) Including loans granted by resident credit institutions adjusted for securitisations operations with the intervention of non-resident financial vehicle.

Chart 3.8

FINANCING OF PORTUGUESE NON-FINANCIAL CORPORATIONS



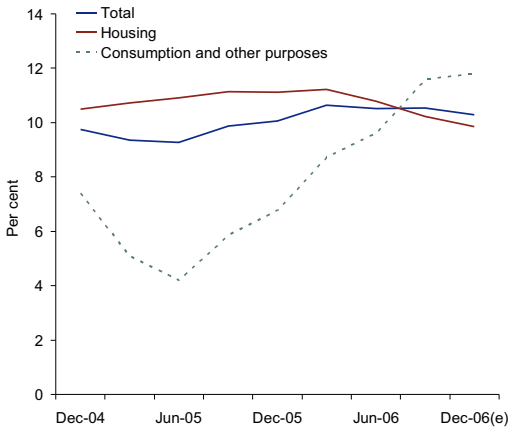
Source: Banco de Portugal.

(4) In the second half of 2006, developments in this aggregate were temporarily affected by loans granted to private non-profit institutions (which, for statistical classification purposes are included in the household sector). These loans were repaid before the end of 2006.

Chart 3.9

LOANS GRANTED BY RESIDENT CREDIT INSTITUTIONS TO HOUSEHOLDS[a]

Annual rate of change



Source: Banco de Portugal.
Note: (a) Including loans granted by resident credit institutions adjusted for securitisations operations with the intervention of non-resident financial vehicle.

3.2. Fiscal policy[5]

The general government deficit, on a national accounts basis, stood at 3.9 per cent of GDP in 2006. This outcome was clearly more favourable than the initial target of 4.6 per cent of GDP. The narrowing of the deficit was also very positive compared with the figure of 6.0 per cent of GDP recorded in the previous year (Table 3.3). These developments show the tightening stance of fiscal policy in 2006, reflected in a reduction of the primary deficit adjusted for the effects of the cycle and temporary measures by 2.2 p.p. of GDP. The contribution of total revenue and primary expenditure to this result was quite

Table 3.3

FISCAL BALANCES

As a percentage of GDP[a]

	2004		2005	2006
	Incl. temporary measures	Excl. temporary measures		
Overall balance	-3.3	-5.4	-6.0	-3.9
(-) Cyclical component[b]	-0.4	-0.4	-0.5	-0.5
Cyclically adjusted overall balance	-2.9	-5.0	-5.5	-3.4
(+) Interest	2.6	2.6	2.7	2.8
Cyclically adjusted primary balance	-0.3	-2.4	-2.8	-0.6

Sources: *INE*, Ministério das Finanças and Banco de Portugal.
Notes: (a) The value of GDP corresponds to the estimate of Banco de Portugal. (b) For a description of the methodology used, see Braz (2006), "The Calculation of Cyclically Adjusted Balances at Banco de Portugal: An Update", *Economic Bulletin,* Winter issue Winter issue Banco de Portugal.

(5) This section is based on the excessive deficit procedure notification data and on the provisional accounts of the general government, on a national accounts basis, sent by INE to Eurostat at the end of March 2007, and on the estimates of the Banco de Portugal for GDP and for the balances adjusted for the effects of the cycle and temporary measures.

similar and resulted chiefly from a rise in the tax burden and a reduction in compensation of employees and investment. Turning to the structural deficit and considering that the cyclical component of the deficit remained broadly unchanged, the overall deficit adjusted for the effects of the cycle and temporary measures also improved by 2.1 p.p. Thereby it was possible to largely meet the Council recommendation regarding a correction of the structural deficit of some 1.5% of GDP in 2006. The continuation of the pursuance of the objectives set out in the Stability Programme will remain the main driver of fiscal policy in the forthcoming years (see *Box 1 "Fiscal prospects"*)

The 2006 budgetary outcome reflects the contribution of increased tax revenue (+0.8 p.p. of GDP), the reduction of primary current expenditure (-0.5 p.p. of GDP) and the fall in capital expenditure (-0.6 p.p. of GDP).

Tax revenue growth remained strong, increasing 0.8 p.p. as a percentage of GDP in 2006 (Table 3.4). The main contribution to these developments was made by taxes on production and imports, whose collection was strongly influenced by the rise in the standard VAT rate in mid-2005 and in the tax on oil products in January 2006. Moreover, the magnitude of the anticipation of the introduction of tobacco

Table 3.4

GENERAL GOVERNMENT ACCOUNTS (excluding temporary measures)
On a National Accounts basis

	As a percentage of GDP [a]			Growth rate (???)	
	2004	2005	2006	2005	2006
Total revenue	41.0	41.6	42.6	4.5	6.2
Current revenue	39.5	40.3	41.6	4.9	7.1
Tax revenue	34.9	36.2	37.0	6.8	6.1
Taxes on income and wealth	8.5	8.6	8.9	3.8	7.5
Taxes on production and imports	14.1	15.0	15.5	9.0	7.3
Social contributions	12.2	12.6	12.6	6.2	3.6
Other current revenue	4.7	4.1	4.6	-9.3	15.9
Capital revenue	1.4	1.3	1.0	-5.7	-19.8
Total expenditure	46.4	47.6	46.5	5.5	1.4
Current expenditure	41.9	43.5	43.1	6.7	2.7
Current transfers	21.2	22.3	22.6	8.1	5.3
Social benefits	17.6	18.4	18.9	7.1	6.7
in cash	14.3	14.9	15.2	7.0	6.2
in kind	3.3	3.5	3.7	7.7	8.5
Subsidies	1.5	1.6	1.4	10.9	-10.9
Other current transfers	2.1	2.3	2.4	13.9	5.8
Interest	2.6	2.7	2.8	5.5	8.1
Compensation of employees	14.1	14.5	13.6	5.5	-2.3
Intermediate consumption	4.0	4.0	4.0	4.8	2.9
Capital expenditure	4.5	4.1	3.5	-5.6	-12.3
Gross fixed capital formation	3.1	2.8	2.3	-6.5	-15.1
Other capital expenditure	1.4	1.3	1.2	-3.6	-5.9
Overall balance	-5.4	-6.0	-3.9		
Overall balance (including temporary measures for 2004)	-3.3	-6.0	-3.9		
Memo:					
Primary current expenditure	39.3	40.8	40.3	6.8	2.4
Public debt	58.2	63.8	65.3		

Sources: *INE*, Ministério das Finanças and Banco de Portugal.
Note: (a) The value of GDP corresponds to the estimate of Banco de Portugal.

products in distribution circuits at the end of 2006, contrasting with developments in the corresponding period of 2005, led to a substantial increase in revenue from the tobacco tax recorded in the 2006 account. Conversely, the composition of growth, which was more supported by exports, and the change in administrative procedures regarding VAT reimbursements, speeding them up in many cases, dampened the increase in net revenue from this tax.

The taxes on income and wealth also increased as a percentage of GDP, as a consequence of the lagged effect of measures related to the personal income tax included in the State Budget for 2005. Moreover, this was also the outcome of the good results in corporate income tax payments by some important taxpayers in 2005. These effects were strengthened by the impact of the increased effectiveness of tax administration, particularly relevant in the latter tax.

Revenue from social contributions remained stable as a percentage of GDP, although the contributions from the general scheme increased by more than the private sector wage bill, due to the improved effectiveness of the collection system and the enrolment of the new public employees in this scheme.

Other current revenue rose strongly, partly due to the recovery in general government income in the form of dividends, which had dropped sharply in 2005, and to the continued strong growth of interest, which is part of the general government revenue.

Primary current expenditure fell 0.5 p.p. as a percentage of GDP, reversing the trend of the past few years. This fall is chiefly associated with the results of the measures implemented to contain compensation of employees and expenditure with current transfers in kind to households, while the growth pace of pension payments continued to be higher than that of nominal GDP. In 2006 the composition of current expenditure was influenced by the fact that, at the end of 2005, five hospitals belonging to the National Healthcare Service were converted or transformed into corporations and therefore, in 2006, they were classified outside the general government sector.

Adjusted for the effect of these new corporate hospitals, compensation of employees is estimated to have decreased by 0.6 p.p. of GDP, due to the net reduction in the number of public employees, the decline in the average wage due to incomings/outgoings in this sector[6] and the freeze of automatic career progressions, which were only slightly counterbalanced by a moderate update in the public employees wage scale (by 1.5 per cent).

Excluding the payments to the new corporate hospitals, transfers in kind to households dropped by 0.2 p.p. as a percentage of GDP, chiefly due to the implementation of new rules on both the co-payment of medicines and health care services and on conventions with health care suppliers.

Conversely, the growth of expenditure on social payments in cash remained high, increasing by 0.4 p.p. its ratio to GDP. Expenditure with pension of both the general pension scheme and the civil servants scheme was a key determinant of this outcome, going up by around 7 per cent in 2006. These developments resulted from both the increase in the number of pensioners and in the average pension. The latter effect can be explained by the annual update of pensions, by the convergence process of the minimum pensions towards national minimum wage-indexed values in the general scheme (which ended in 2006) and by a composition effect resulting from the fact that the new pensions are, on average, much higher than the ceased ones. In this context, it should be noted that developments in expenditure in the public employees pension scheme in 2006 were only slightly influenced by the reform of the Retirement Statute approved in 2005, as there was a marked increase in the number of new retirements.

(6) The average wage of civil servants leaving the public sector, mainly for retirement reasons, is clearly higher than that of the newly hired civil servants. In a year like 2006, which recorded significant outflows, this effect has a considerable magnitude.

In 2006, interest expenditure increased by 0.1 p.p. of GDP, as a result of the rise in the stock of the public debt. In fact, due to the high share of fixed-rate public debt and to the redemption of Treasury bonds whose rates were still higher than those currently prevailing, the rise in interest rates in the euro area did not lead to an increase in the implicit interest rate of the Portuguese public debt.

Turning to capital operations, there was a strong decline in capital expenditure (by 0.6 p.p. of GDP), chiefly reflecting the behaviour of investment expenditure. The reduction in public investment was broadly based across all levels of general government and in particular at the local government level, reflecting the tight budget constraint of this subsector. In parallel, capital transfers from the European Union also declined.

The public debt ratio stood at 65.3 per cent at the end of 2006, continuing the upward trend seen in recent years. The 1.5 p.p. rise compared with end-2005 reflects the still very significant fiscal imbalance, in a macroeconomic environment characterised by moderate output growth. The debt-deficit adjustments as a whole made a negligible contribution to the debt dynamics.

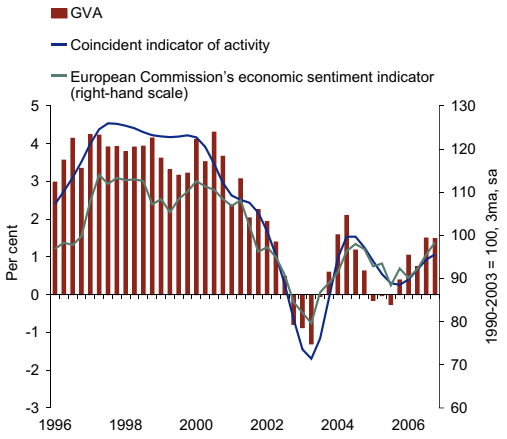
4. SUPPLY

The Banco de Portugal estimates point to real growth in the gross value added (GVA) of the Portuguese economy of 1.1 per cent in 2006, after a 0.3 per cent change in 2005.[7] The year-on-year rate of change in GVA increased from the first to the second half of 2006. The intra-annual pattern of the rebound in activity is confirmed in qualitative terms by the coincident indicator of Banco de Portugal and by the economic sentiment indicator of the European Commission, which followed an upward path in the course of the year (Chart 4.1). The confidence indicators in industry, services and, to a much lesser extent, construction also improved from the first to the second half of the year.

Chart 4.1

GVA, COINCIDENT INDICATOR OF ACTIVITY AND ECONOMIC SENTIMENT INDICATOR

Year-on-year rate of change



Sources: European Commission, *INE* (Quarterly Accounts) and Banco de Portugal.

(7) Gross value added is registered at basic prices and differs from GDP at market prices as the latter includes, in addition to sectoral GVAs, taxes and subsidies on products and import taxes.

Table 4.1

GROSS VALUE ADDED BY SECTOR OF ACTIVITY[a]
Real percentage rate of change

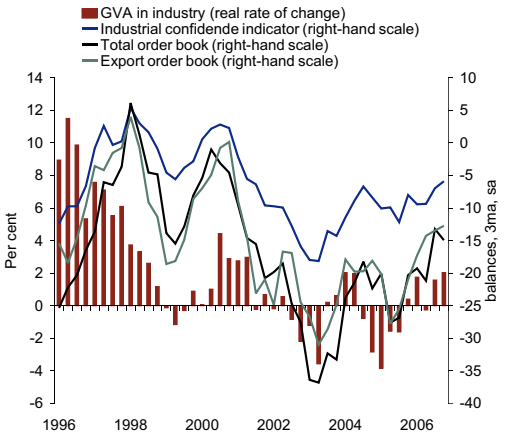
	Weights 2003 [b]	2002	2003	2004	2005	2006
Agriculture, forestry and fishing	3.2	2.4	-2.2	4.9	-9.5	6.3
Industry	16.0	-0.6	-1.0	0.4	-2.2	2.7
Electricity, gas and water	2.7	0.3	8.3	5.7	5.4	4.1
Construction	7.1	-4.0	-8.7	-2.3	-4.5	-6.4
Services	70.9	1.5	0.3	1.5	1.6	1.2
GVA	100.0	0.8	-0.5	1.3	0.3	1.1
Memo:						
GDP [c]	-	0.8	-0.8	1.3	0.5	1.3

Sources: *INE* and Banco de Portugal.
Notes: (a) Values for 2004-2006 correspond to estimates of Banco de Portugal derived from the *INE*'s National Accounts. (b) As a percentage of total GVA at current prices. (c) GDP at market prices. The nominal value of GDP includes, in addition to sectoral GVAs, taxes and subsidies on products and import taxes.

The acceleration in Portuguese economic activity in 2006 benefited from the recovery in manufacturing and agriculture, forestry and fishing (Table 4.1). According to the estimates of Banco de Portugal, GVA in industry increased by 2.7 per cent in real terms, after falling by 2.2 per cent in 2005, which is consistent with the strong expansion of goods exports in 2006. Indeed, the acceleration of manufacturing activity throughout the year moved in line with the confidence levels in the sector as regards domestic demand and chiefly external demand, as shown by the results of the business surveys of the European Commission (Chart 4.2). The agriculture, forestry and fishing sector recovered strongly in 2006, after a marked fall in activity associated with the long period of drought in 2005. By contrast, the Banco de Portugal estimates a slowdown of GVA in the services sector, from 1.6 per cent in 2005 to 1.2 per cent in 2006. These developments reflected mainly the reduction in activity in the general government, defence and social security subsector and a strong deceleration in the financial activities

Chart 4.2

CONFIDENCE INDICATORS AND GVA IN INDUSTRY



Sources: European Commission and *INE* (Quarterly Accounts).

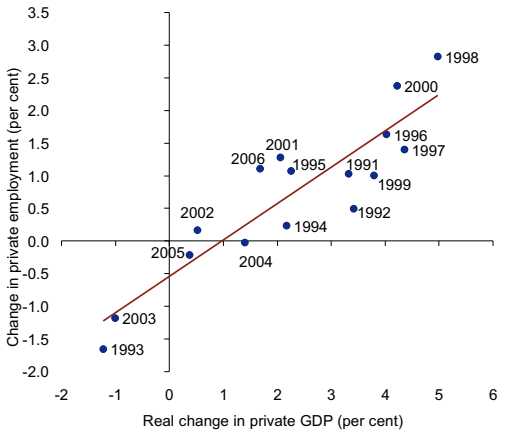
subsector, in particular, in its insurance and pension funds component. GVA of the insurance and pension funds subsector decreased in 2006, after the strong growth in 2005, which was largely due to legislative changes implemented in 2005.[8] The construction sector recorded another sharp decline in activity in 2006, in line with the low confidence levels in the sector, thus strengthening the correction trend of recent years, after the strong expansion in the second half of the 1990's.

Despite the acceleration in Portuguese economic activity, productivity per employee in the private sector continued to record very subdued growth, (around 0.5 per cent), in apparent contrast with the usual pro-cyclical behaviour of this variable. This reflects a rise in employment in the private sector in 2006 that was higher than expected given the cyclical position of the Portuguese economy (Chart 4.3). It should be noted that employment growth was particularly strong in the fixed-term contracts component, which are typically associated with lower productivity.

According to the INE Labour Force Survey, total employment increased by 0.7 per cent in 2006, after the stagnation observed on average in the period 2002-2005 (Table 4.2). Employment growth in the private sector exceeded that figure, as employment in the general government is estimated to have declined. The increase in employment in 2006 reflected a rise in the number of employees, as self-employment fell significantly for the third consecutive year. As referred to above, the larger contribution to dependent employment growth resulted from the strong rise in fixed-term contracts (9.3 per cent). Developments in fixed-term contracts are in line with the fact that the recovery of activity is at an initial stage, with uncertainty surrounding the future economic developments. In fact, the increased recourse to this type of contracts is typical of the start of a cyclical upturn. However, fixed-term contracts have been gaining weight in the employment structure since 1995, which may be seen as a consequence of the relative rigidity of permanent contracts in Portugal.[9] In sectoral terms, the acceleration of employment in 2006 resulted chiefly from the growth of employment in manufacturing, after several consecu-

Chart 4.3

GROWTH OF PRIVATE GDP AND PRIVATE EMPLOYMENT (a)



Sources: *INE* and Banco de Portugal.
Note: (a) Private sector employment is defined as total employment excluding the estimate of Banco de Portugal for public sector employment; private GDP is defined as total GDP less compensation and of public employees and general government fixed capital consumption. Employment and private GDP series do not include corporate public hospitals.

(8) See "Chapter 7 *Financial Situation*", *Annual Report* 2005, Banco de Portugal.
(9) See Portugal, P. (1999), "*Employment volatility, employment protection and unemployment*", *Economic Bulletin, December, Banco de Portugal.*

Table 4.2

POPULATION, EMPLOYMENT AND UNEMPLOYMENT
Percentage rate of change (unless otherwise indicated)

	2002	2003	2004	2005	2006
Population	0.7	0.8	0.6	0.5	0.2
Labour force	1.6	1.0	0.5	1.0	0.8
Paricipation rate 15-64 years (as a percentage of population)	72.6	72.8	72.9	73.4	73.9
Total employment	0.5	-0.4	0.1	0.0	0.7
Private sector employment[(a)]	0.2	-1.2	0.0	-0.2	1.1
Dependent employment	1.0	-0.3	1.2	0.8	2.2
Permanent contract	-0.5	0.9	2.2	1.3	0.9
Fixed-term contract[(b)]	7.3	-2.6	-1.9	1.7	9.3
Self-employment	1.0	0.5	-3.1	-2.8	-2.7
Total unemployment	26.7	26.5	6.6	15.7	1.3
Total unemployment rate (as a percentage of the labour force)	5.0	6.3	6.7	7.6	7.7
Long-term unemployment (as a percentage of total unemployment[(c)]	37.3	37.7	46.2	49.9	51.7

Sources: *INE* (Labour Force Survey) and Banco de Portugal.
Notes: (a) Private sector employment is defined as total employment excluding the estimate of Banco de Portugal for public sector employment. (b) Includes fixed-term contracts and contracts with temporary employment agencies. (c) A long-term unemployed is an individual seeking work for 12 months or more.

tive years of falls in employment in this sector. Employment in the services sector decelerated in comparison with the past few years, basically reflecting a reduction of employment in the wholesale and retail trade sector and lower growth of employment in the general government, education and health (the latter two subsectors include private employment).

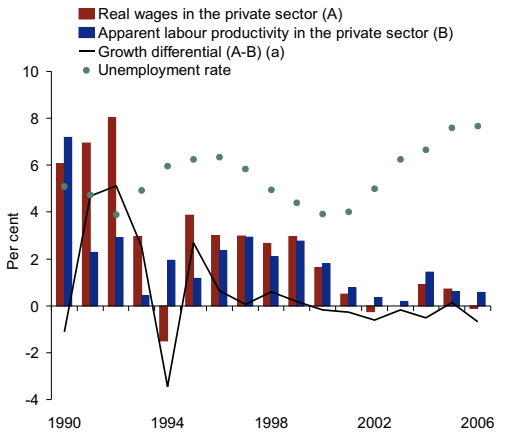
Over the last decade, the rise in the real wages of the private sector was very similar to that of apparent labour productivity (Chart 4.4). In addition, throughout the past few years, real wages showed low sensitivity to the evolution of the business cycle. In particular, the continued rise of the unemployment rate and of the proportion of the long-term unemployed did not lead to a significant adjustment of real wages. In a context in which inflation was higher than initially anticipated, available estimates point to a close to zero change in the real wages of the private sector in 2006. In turn, the growth of unit labour costs remained higher than in the euro area, albeit to a lesser extent (see *Section 6 "Prices and Costs"*). Wage rigidity in the Portuguese labour market, which is among of the highest in the European Union, does not facilitate the adjustment of firms to adverse demand shocks, especially given that the labour legislation also makes it difficult to adjust the number of workers to the evolution of firm activity.[10] This is particularly relevant in the context of Portugal's participation in the euro area and of the change in the pattern of comparative advantages associated with the stepping up of the globalisation process.

The unemployment rate stood at 7.7 per cent in 2006 as a whole, remaining broadly unchanged from 2005, after successive increases since 2002 (Table 4.2). In the fourth quarter of 2006, the unemployment rate stood at 8.2 per cent, compared with 8.0 per cent in the corresponding quarter of 2005. The virtual stabilisation of the Portuguese unemployment rate contrasts with the clear downward trend observed in the euro area, where the unemployment rate stood at 7.8 per cent in 2006 as a whole. Ac-

(10) See Portugal, P. (2006) *"Wage setting in the Portuguese labour market: a microeconomic approach"*, *Economic Bulletin, Autumn, Banco de Portugal.*

Chart 4.4

GROWTH IN REAL WAGES AND IN APPARENT LABOUR PRODUCTIVITY - PRIVATE SECTOR



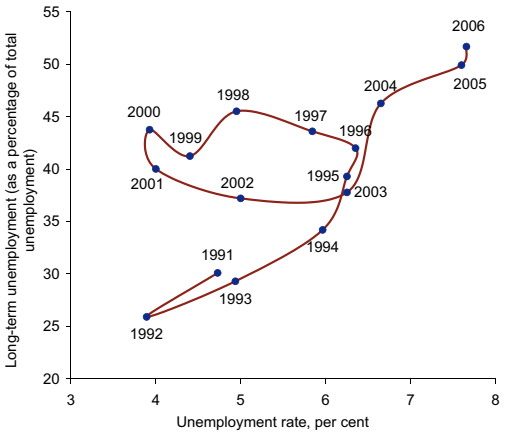
Sources: *INE* and Banco de Portugal.
Note: (a) In percentage points. A positive (negative) value means that real wages grew more (less) than productivity.

cording to the results of the Labour Force Survey of INE, the number of unemployed increased by 1.3 per cent in 2006, i.e. clearly less than in the past five years.

Long-term unemployment, which includes all individual seeking work for 12 months or more, maintained the rising path seen since 2003, reaching 51.7 per cent of total unemployment in 2006 (Chart 4.5). In addition, very long-term unemployment, i.e. with a duration of 25 months or more, continued to increase at a rate above 20 per cent, accounting for around 30 per cent of the unemployed in 2006. The further increase in the average duration of unemployment, from 21.1 to 22.4 months in 2006, is

Chart 4.5

TOTAL UNEMPLOYMENT AND LONG-TERM UNEMPLOYMENT(a)



Sources: *INE* and Banco de Portugal.
Note: (a) The breaks in the unemployment rate series were corrected according to the methodology described in Castro G.L. and Esteves P. S. (2004), "Quarterly series for the Portuguese economy: 1977-2003", *Economic Bulletin* of Banco de Portugal.

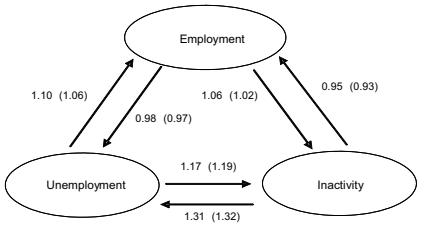
consistent with the weak activity growth and the ongoing gradual sectoral restructuring process of the Portuguese economy, given the depreciation/mismatch between the professional skills of the unemployed and new job offers. The high financial generosity of the unemployment benefit system, as well as the significant average potential duration of payments, seem to be also contributing to the maintenance of a considerable level of long-term unemployment in Portugal.[11] In this sense, the changes introduced in the beginning of 2007 in the unemployment benefit system will likely contribute to increase job search by the unemployed.[12]

The analysis of flows between employment, unemployment and inactivity confirms some of the most relevant features of labour market developments (Chart 4.6). The low intensity of flows between the three states of the Portuguese labour market points to the existence of barriers to mobility, which tend to be negatively reflected in the allocation of resources and, hence in the productivity of the economy. In 2006 the large majority of the quarterly flows between different labour market states stood at around 1 per cent of the labour force, remaining broadly unchanged from 2005. Compared with 2005, there was a slight increase in separations, chiefly due to the gross flows between employment and inactivity, which interrupted the downward trend observed in the past three years. Anyway, in 2006 there was again a net outflow of individuals from inactivity leading to a further rise in the participation rate. Flows from employment to unemployment continued to be evenly distributed among the several types of labour contracts. Outflows from unemployment to fixed-term contracts intensified in 2006, accounting for more than 63 per cent of flows from unemployment to employment.

Chart 4.6

QUARTERLY AVERAGE FLOWS IN THE LABOUR MARKET

As a percentage of the labour force



Sources: *INE* and Banco de Portugal.
Note: (a) Considering the common sample component of quarter t and quarter t-1, and using the population weights of quarter t. Average figures for 2006 and 2005 (figures for 2005 in brackets).

(11) See Pereira, A. (2006) *"Assessment of the changes in the Portuguese unemployment insurance system"*, *Economic Bulletin*, Spring, Banco de Portugal and "Box 2.5 *Work incentives and the generosity of unemployment benefits*", *Annual Report*, 2005, Banco de Portugal.

(12) See *Decree-Law* No 220/2006 of 3 November and Executive Order No 8-B/2007 of 3 January.

5. DEMAND

Economic activity accelerated in 2006 after very subdued growth in 2005. The annual change in GDP stood at 1.3 per cent, compared with 0.5 per cent in 2005 (Table 5.1). Growth in 2006 was 0.5 p.p. higher than projected in the beginning of the year and the composition of expenditure differed significantly from expectations.[13] The acceleration of activity was underpinned by the strong expansion of exports, which clearly exceeded expectations, while the deceleration of domestic demand was more marked than anticipated.

The deceleration of domestic demand in 2006 was associated with the moderation of private consumption and the fall in public consumption. These developments should be seen in the light of the need to correct the macroeconomic imbalances of the Portuguese economy. The change in investment continued to be negative, reflecting the contraction of general government and housing investment, as corporate investment growth is expected to record a slightly positive figure.

Despite the acceleration of economic activity, the level of growth is lower than the average in the previous business cycle and is insufficient to resume the process of real convergence towards the euro area. The change in GDP was the lowest among the 25 EU countries and the growth differential vis-à-vis the euro area average widened further (Chart 5.1 and Chart 2.4 in *Section 2 "Main international economic developments"*).

Current estimates point to the deceleration of private consumption in 2006. The growth of consumption was slightly higher than 1 per cent, after a 2.1 per cent change in 2005. These developments reflect both the smaller growth of consumption of non-durable goods (1.4 per cent down from 1.8 per cent in 2005) and a fall of approximately 1 per cent in consumption of durable goods, after an increase above

Table 5.1

GDP AND MAIN EXPENDITURE COMPONENTS[(a)]
Real rate of change, in percentage

	Weights 2005	2002	2003	2004	2005	2006
GDP	100.0	0.8	-0.8	1.3	0.5	1.3
Private consumption	65.1	1.3	-0.2	2.7	2.1	1.1
Public consumption	21.3	2.6	0.2	2.5	2.0	-0.3
Investment	22.2	-4.7	-8.3	0.9	-3.9	-1.9
GFCF	22.1	-3.5	-7.4	0.3	-3.1	-2.1
Change in inventories[(b)]		-0.4	-0.3	0.2	-0.2	0.0
Domestic demand	108.6	0.1	-2.0	2.3	0.8	0.2
Exports	28.6	1.4	3.9	4.8	1.6	9.1
Imports	37.3	-0.7	-0.9	7.0	2.2	4.2
Contribution of domestic demand to GDP[(b)]		0.1	-2.2	2.4	0.8	0.3
Contribution of net external demand to GDP[(b)]		0.7	1.4	-1.1	-0.3	1.1

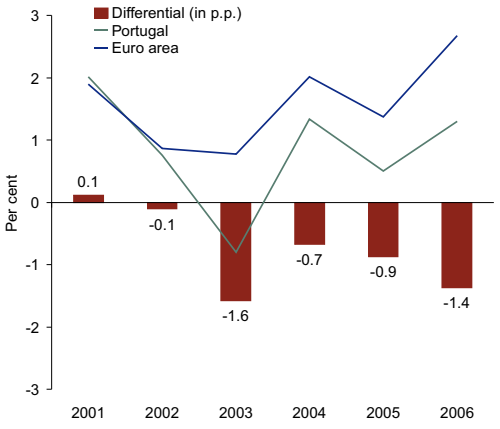
Sources: *INE* and Banco de Portugal.
Notes: (a) Values for 2004-2006 correspond to estimates of Banco de Portugal derived from the *INE*'s National Accounts. (b) Contribution to the rate of change in GDP in percentage points.

(13) See the Autumn 2005 issue of the *Economic Bulletin* of the Banco de Portugal.

Chart 5.1

GDP IN PORTUGAL AND IN THE EURO AREA

Real rate of change

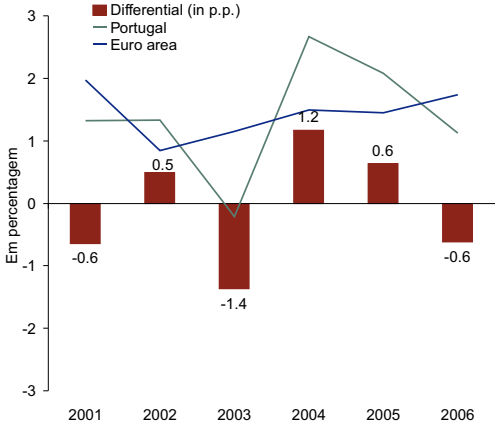


Sources: Eurostat, *INE* and Banco de Portugal.

Chart 5.2

PRIVATE CONSUMPTION IN PORTUGAL AND IN THE EURO AREA

Real rate of change



Sources: Eurostat, *INE* and Banco de Portugal.

4 per cent in 2005. Contrasting with developments in the recent years, the change in private consumption was lower than GDP growth and private consumption growth in the euro area (Chart 5.2).

The behaviour of private consumption should be seen in the light of the adjustment process regarding the participation in the euro area and to the financial integration of the Portuguese economy. In the second half of the 1990's, the ensuing marked fall in nominal and real interest rates and expectations of strong economic growth strengthened the decline in the savings rate.[14] After the adjustment to a structurally lower level of interest rates, solvency conditions resulting from the intertemporal budget constraints of economic agents were expected to induce a protracted and gradual slowdown in consumption. However, despite the high indebtedness levels reached in the meantime private consumption was highly resilient to slowdown in the last two years. This behaviour seems to have been associated with the persistence of rather favourable financing conditions in the credit market. In addition to the low levels of the key ECB interest rates, the squeeze on bank lending margins and the supply of new financial products and types of contracts, made it possible to contain the household debt service burden (see *Section 3 "Macroeconomic policies"*). In 2006, the increase in interest rates and in the tax burden induced a moderation in private consumption expenditures, amid incipient improvements of labour market conditions. The erosion of real disposable income associated with higher inflation than expected at the beginning of the year (see *Section 6 "Prices and costs"*) may have also contributed to contain consumption growth.

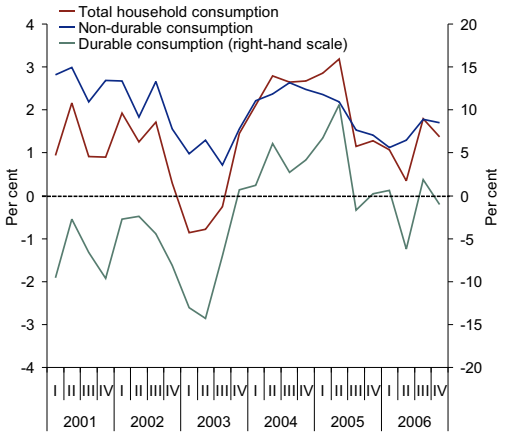
In intra-annual terms, the year-on-year rate of change in private consumption was largely conditioned by base effects related to household consumption of durable goods, associated with the rise in the standard VAT rate in July 2005 (Chart 5.3). Consumption of non-durables accelerated in the course of the year, reversing the trend of significant slowdown observed throughout 2005 and in the first half of 2006. The intra-annual behaviour of private consumption is captured by the coincident indicator of trend developments in private consumption produced by the Banco de Portugal and seems to be con-

(14) The reduction in the savings rate between the mid-1980's and mid-1990's must be seen in the context of the process of disinflation of the Portuguese economy. The high inflation rates eroded the real value of the stock of household net financial assets. Thus, the lower the inflation rate the lower the need to save to rebuild financial wealth in real terms. These developments were analysed in "Box II.3.1 *Households savings and the business cycle*", *Annual Report* 2003, Banco de Portugal.

Chart 5.3

HOUSEHOLD CONSUMPTION

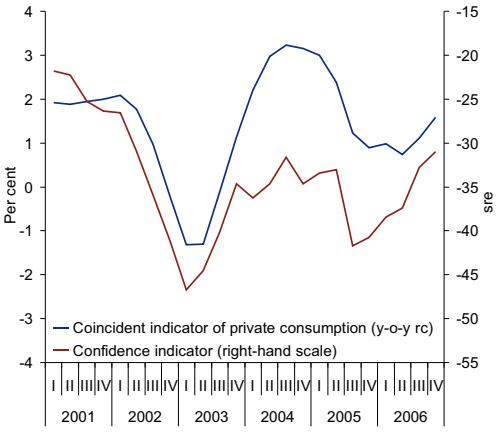
Year-on-year rate of change, in volume



Source: *INE* (Quarterly Accounts).

Chart 5.4

COINCIDENT INDICATOR OF PRIVATE CONSUMPTION AND CONSUMER CONFIDENCE INDICATOR



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

sistent with the evolution of the consumer confidence indicator, which after a steep fall in 2005, recorded a recovery in the course of 2006 (Chart 5.4).

According to the estimates of the Banco de Portugal, public consumption decreased by 0.3 per cent in volume in 2006, after an increase of 2 per cent in 2005. These developments result in particular from the decline in the number of civil servants. In addition to the effect of the control over new hirings of civil servants, the fall in the number of civil servants was particularly marked in the education sector, given the decline in the number of basic and secondary teachers hired in the 2005/2006 school year. Expenditure in goods and services accelerated somewhat compared with 2005, despite the expenditure reduction in the National Healthcare Service associated with the reimbursement of medication costs.

Current estimates of developments in GFCF indicate a fall in volume of around 2 per cent in 2006, which in spite of being less marked than in 2005, contrasts with the favourable developments in this expenditure component in the euro area (Chart 5.5). According to estimates of Banco de Portugal, the contraction of GFCF reflected unfavourable developments in the public and housing components, as corporate investment seems to have recorded a positive rate of change in 2006. A stronger recovery of corporate investment, in parallel with an improvement in its quality, is a precondition for stronger and more sustained growth of economic activity in the future.

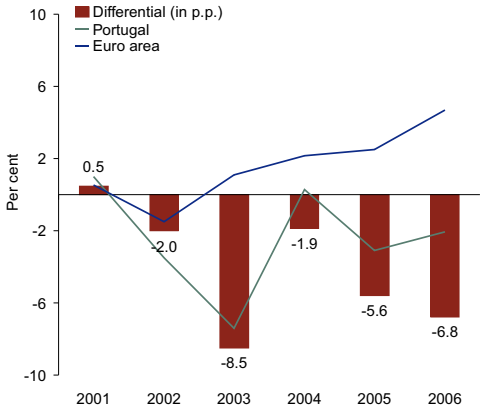
In 2006, public investment recorded a further decline (by around 17 per cent), which was significantly more marked than in 2005 (9 per cent). This evolution is in part due to the ongoing fiscal consolidation process.

Household investment in housing recorded again adverse developments, falling by around 4 per cent in 2006, i.e. slightly more than in 2005. According to the current estimates, the cumulative reduction in this type of investment since 2000 has reached approximately 25 per cent (Chart 5.6).

Estimates for developments in corporate investment point to an expansion in volume of 1.3 per cent in 2006 (-1.7 per cent in 2005), in line with the rise in confidence levels in the industrial sector, reflected in the opinion surveys of the European Commission (see Chart 4.2 of *Section 4 "Supply"*). However, it is not possible to conclude from the Business Surveys that these developments correspond to a clear re-

Chart 5.5

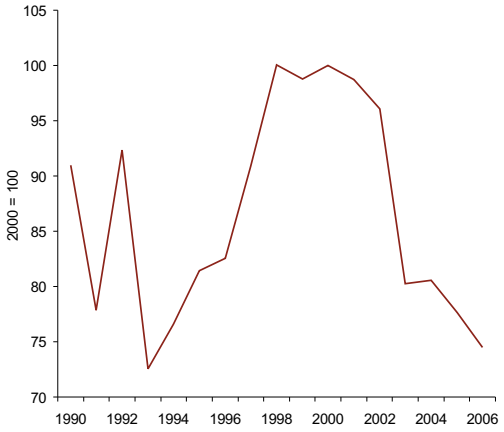
GFCF IN PORTUGAL AND IN THE EURO AREA
Real rate of change



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

Chart 5.6

HOUSING INVESTMENT
In volume

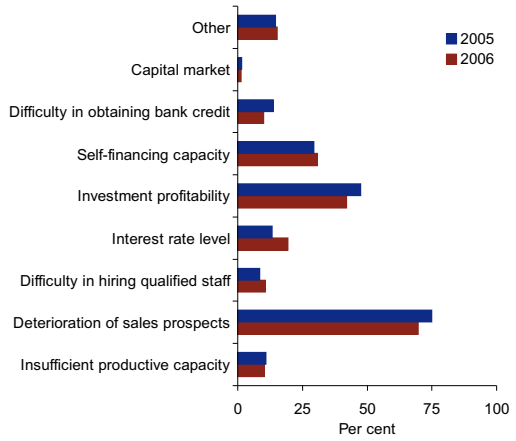


Sources: *INE* and Banco de Portugal.

versal of the trend decline recorded in recent years. According to the results of the INE Investment Survey, the percentage of companies in the several activity sectors that reported investment constraints remained broadly unchanged from 2005. In the total sample, the percentage of companies that reported investment constraints declined only marginally, standing at 47.3 per cent in 2006.[15] Among the companies that reported investment constraints, the deterioration of sales prospects continues to be clearly the most important factor (Chart 5.7). The results of the *Bank Lending Survey* show that the financing of investment continued to be mentioned by respondent banks as a motive underlying a lower

Chart 5.7

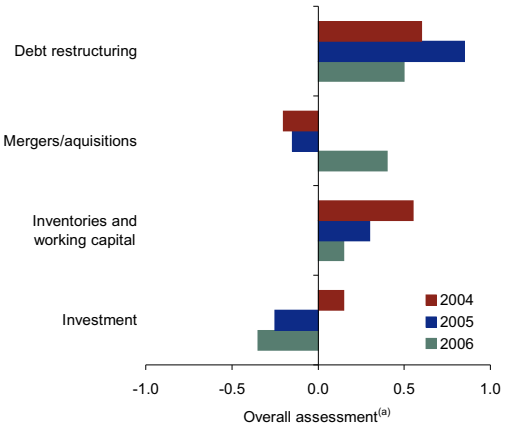
MAIN FACTORS LIMITING INVESTMENT



Source: *INE* (Investment Survey).
Note: These results are based on responses to surveys conducted in the second half of 2005 and 2006.

Chart 5.8

FACTORS BEHIND GROWTH OF BANK LENDING TO CORPORATIONS[(a)]



Source: Banco de Portugal (Bank Lending Survey - April, July, October and January).
Note: (a) Weighted balances of responses are expressed in deviations from the neutral position (neutral value =0).

(15) These statistics are based on the Investment Surveys conducted in second half of 2005 and 2006. The latter survey was made to a sample of 4,194 companies with more than 4 employees and turnover of at least EUR 125,000.

demand for credit (Chart 5.8). Corporate borrowing continued to be chiefly channelled to debt restructuring. The financing of mergers and acquisitions also played a key role in 2006.

The analysis of the investment behaviour of households and corporations, as well as the analysis of private consumption, should be seen in the context of the process of adjustment to a regime characterised by structurally lower financing costs resulting from the participation in the euro area and from the financial integration of the Portuguese economy. The fall in real and nominal interest rates together with expectations of higher economic growth in the second half of the 1990's increased borrowing to finance the expansion of the housing park owned by households as well as corporate investment, giving rise to a significant increase in the investment rate of the economy until 2000.

With regard to households, the nature of the decision to move into a self-owned house and the low rate of depreciation of houses are reflected in a relatively slow renewal of the housing park, strongly conditioning housing investment.

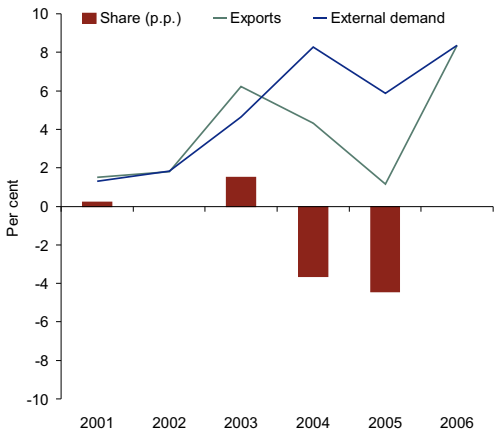
With respect to companies, the deterioration of domestic demand prospects amid the accumulation of macroeconomic imbalances in the Portuguese economy, as well as uncertainty about how these imbalances will be corrected, led to a reduction in investment expenditure in the period 2000-2005. The institutional framework, characterised by insufficient flexibility in the labour and product markets, has also penalised corporate investment in an environment in which the increasing international competition has changed the global patterns of comparative advantages, requiring major sectoral reallocations in Portugal. Finally, the structural weaknesses in terms of human capital may also be limiting more sustainable corporate developments, in particular given the complementarity between physical and human capital.

Goods and services exports were the most buoyant component of global demand in 2006. In fact, current estimates point to an increase in exports of 9.1 per cent, compared with 1.6 per cent in 2005. The strong acceleration of exports was recorded in both goods and services. The latter showed an increase not only in tourism exports but also in other services, such as those related to transports, activity in the construction sector and supply of skilled services. The rise in exports of goods was close to

Chart 5.9

EXPORTS OF GOODS AND EXTERNAL DEMAND

Real rate of change



Sources: European Commission, UK Office for National Statistics and *INE*.
Note: The calculation of external demand is based on the weighted growth of imports from 17 important markets of destination of Portuguese exports of goods.

that recorded by the usual indicator that measures the evolution of external demand, contrasting with the past two years, in which there were substantial losses in market shares (Chart 5.9).

The growth rate of exports of goods in nominal terms stood at 12.4 per cent in 2006 (2.8 per cent in 2005). A detailed analysis of these exports points to broadly favourable developments, both by groups of products or major economic categories, and geographical markets (Tables 5.2 and 5.3).

The breakdown by products shows that machinery and equipment made the highest contribution to the growth of exports. The favourable performance of motor vehicles sales, which have a significant weight in the structure of Portuguese exports, was associated with the start in 2006 of the production of a new car model in a big company of this sector whose production is mainly oriented to external markets. Exports of mineral fuels and other minerals continued to record a exceptionally high sales increase, associated with constraints in the global refining capacity and the rise in the international price of raw materials. Only exports of clothing and footwear recorded again negative rates of change, which may in part reflect changes in the pattern of specialisation of the Portuguese economy, against a background of changing global comparative advantages.

Table 5.2

PORTUGUESE EXPORTS BY PRODUCTS

		Nominal rate of change (%)[a]			Contribution to the total rate of change (p.p.)		
	Weights 2005	2004	2005	2006	2004	2005	2006
Total		5.3	2.8	12.4	-	-	-
Classification by groups of products							
Machinery, equipment	18.7	1.5	1.3	19.1	0.3	0.3	3.6
Basic metals	7.4	27.7	10.4	26.6	1.6	0.7	2.0
Mineral fuels	4.3	24.9	52.9	43.8	0.6	1.5	1.9
Minerals, ores	5.0	19.5	7.2	20.8	0.8	0.3	1.0
Motor vehicles, other transport equipment	14.0	5.8	-5.9	6.1	0.9	-0.9	0.9
Plastic, rubber products	5.2	16.7	11.7	13.4	0.7	0.6	0.7
Pulp, paper	4.6	-2.7	4.5	10.4	-0.1	0.2	0.5
Food products	4.2	1.6	4.6	11.3	0.1	0.2	0.5
Chemicals	5.3	12.1	16.4	8.3	0.5	0.8	0.4
Agriculture	3.8	15.3	10.5	8.2	0.5	0.4	0.3
Other products	4.2	10.4	3.7	7.4	0.4	0.2	0.3
Wood, cork	4.5	3.2	-1.2	5.6	0.2	-0.1	0.3
Textile products	5.1	-3.3	-0.9	4.6	-0.2	0.0	0.2
Optical and precision instruments	0.9	-5.5	-11.7	10.6	-0.1	-0.1	0.1
Leather, leather products	0.3	-5.4	2.3	17.3	0.0	0.0	0.1
Footwear	4.2	-6.2	-4.9	-1.2	-0.3	-0.2	-0.1
Clothing	8.3	-5.4	-9.8	-3.1	-0.6	-0.9	-0.3
Classification by broad economic categories							
Intermediate goods	32.6	12.8	4.4	15.5	3.6	1.4	5.1
Capital goods	26.4	3.0	-2.5	13.6	0.8	-0.7	3.6
Consumer goods[b]	35.9	0.7	-1.0	5.2	0.3	-0.4	1.9
Fuels	3.9	22.4	58.8	47.7	0.5	1.5	1.8
Other[c]	1.2	11.3	333.7	1.8	0.0	1.0	0.0

Sources: *INE* (International Trade Statistics) and Banco de Portugal.
Notes: (a) For 2005 and 2006 the calculation of the rates of change is based on the methodology released by the *INE* in September 2005 (exports include estimates of non-responses and of transactions below the reporting threshold). (b) Includes passenger cars. (c) From 2005 onwards includes values subject to statistical confidentiality.

Table 5.3

PORTUGUESE EXPORTS OF GOODS BY GEOGRAPHICAL MARKETS

		Nominal rate of change (%)[a]			Contribution to the total rate of change (p.p.)		
	Pesos 2005	2004	2005	2006	2004	2005	2006
Total		5.3	2.8	12.4	-	-	-
Markets with a higher positive contribution in 2006							
Spain	27.1	12.8	7.5	14.0	3.0	1.9	3.8
Germany	12.1	-4.8	-6.3	21.6	-0.7	-0.8	2.6
United Sates	5.4	9.2	-5.3	27.3	0.5	-0.3	1.5
Angola	2.6	3.0	19.7	50.7	0.1	0.4	1.3
Singapore	1.2	5.2	56.8	83.8	0.0	0.5	1.0
Brazil	0.6	19.7	15.3	43.0	0.1	0.1	0.2
France	13.7	10.3	1.4	1.8	1.4	0.2	0.2
Italy	4.4	-4.0	4.0	5.3	-0.2	0.2	0.2
Netherlands	4.0	13.0	2.2	4.7	0.5	0.1	0.2
Mexico	0.3	21.5	21.4	61.6	0.0	0.1	0.2
Aggregation	71.5	6.8	3.2	15.9	4.8	2.3	11.3
Markets with a higher negative contribution in 2006							
Belgium	3.8	-0.2	-8.0	-5.6	0.0	0.0	-0.2
United Kingdom	8.6	-2.9	-6.2	-7.9	-0.3	-0.3	-0.7
Aggregation	12.4	-2.1	-6.7	-7.2	-0.3	-0.3	-0.9

Sources: *INE* and Banco de Portugal.
Note: (a) From 2005 onwards, the calculation of the rates of change is based on the methodology released by the *INE* in September 2005 (exports include estimates of non-responses and of transactions below the reporting threshold).

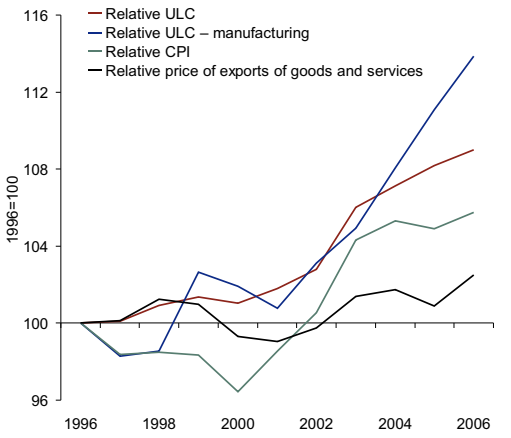
The breakdown by geographical markets reveals that the major contributions to export growth in 2006 were made by the traditional markets, namely Spain, whose positive contribution has become more marked, and the United States and Germany, which have recovered significantly from unfavourable developments in past years. The United Kingdom is an exception, with exports to this market declining further in 2006. However, it should be noted that exports also benefited from the strong growth of sales to markets with lower weights, such as Angola and Singapore and, to a lesser extent, Mexico and Brazil. On the whole, these markets account for less than 5 per cent of total exports, but in 2006 their contribution to the total growth of exports reached 2.8 p.p. in nominal terms. As the usual indicator of external demand is based on a limited number of countries, chosen on the basis of their weight in national exports, and considering that the broadening of the group of countries covered is conditioned by statistical information constraints, the significant geographical diversification of exports makes the market share analysis based on available indicators more difficult.

The degree of sustainability of the buoyancy of Portuguese exports in 2006 is surrounded by some uncertainty. On the one hand, the relative costs of the Portuguese economy continued to grow in 2006 (Chart 5.10). On the other hand, the increasing integration in the world economy of emerging market economies, which have low unit production costs, and the ongoing productive restructuring of the Portuguese economy made it more difficult to interpret the usual price-competitiveness indicators.

The rate of change in goods and services imports in real terms reached 4.2 per cent in 2006 (2.2 per cent in 2005), in line with developments in the behaviour of overall demand weighted by the import content (Chart 5.11). Available data show that the acceleration of imports seems to be generalised across the major economic categories, with the exception of fuel. In volume, fuel imports declined by 6.7 per

Chart 5.10

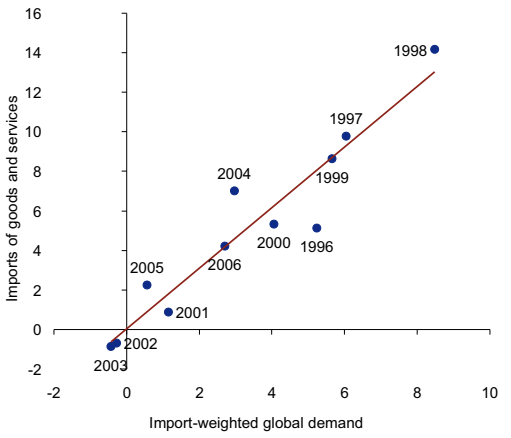
EFFECTIVE EXCHANGE RATE INDICES FOR PORTUGAL[(a)]



Sources: European Commission, Eurostat, *INE*, OECD and Banco de Portugal.
Note: (a) Costs/prices against the 13 major trading partners until 1999 and against the 22 major trading partners from 1999 onwards, both adjusted for the change in the nominal rate of change. A positive change means an increase in the relative prices/costs of Portuguese exporters.

Chart 5.11

IMPORTS AND WEIGHTED GLOBAL DEMAND
Real percentage rate of change

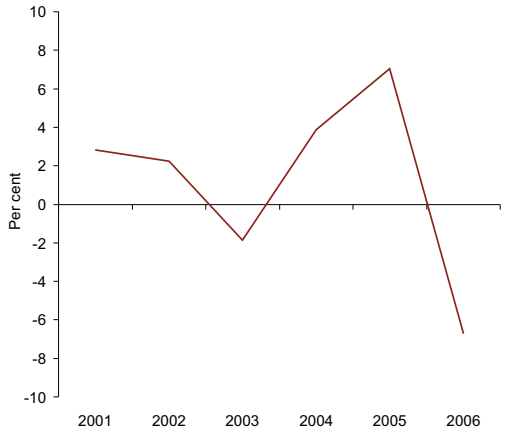


Sources: *INE* and Banco de Portugal.

cent, almost entirely offsetting the 7.0 per cent growth in 2005 (Chart 5.12), and possibly reflecting a stock adjustment policy. The growth rate of imports was higher than that of domestic demand (and also of overall demand), giving rise to a further rise in the rate of penetration of imports in the national economy.

Chart 5.12

FUEL IMPORTS
Real rate of change



Source: *INE*.

6. PRICES AND COSTS

In 2006, the inflation rate reversed the downward trend showed since 2001. Inflation, as measured by the change in the HICP in annual average terms, increased from 2.1 to 3.0 per cent (Table 6.1). However, prices decelerated sharply between the first and the second half of 2006 and inflation moved to a level close to 2.5 per cent at the end of the year. The increase in the inflation rate in annual average terms was associated with the impact on consumer prices of the rise in indirect taxation, as well as with the acceleration of import prices of non-energy goods. The prices increase in 2006 was 0.5 p.p. higher than projected at the beginning of the year.[16] This deviation can be explained by the more volatile components of the HICP (unprocessed food and energy). The average rate of change in the euro area HICP remained unchanged at 2.2 per cent, leading to the widening of the inflation differential to 0.8 p.p. in 2006. All the major aggregates contributed to this widening, but developments in food prices were a key determinant (Charts 6.1 and 6.2).

With respect to the tax measures that had an impact on inflation, the rise in the tobacco tax in the beginning of 2006 played a dominant role. The increase in the price of tobacco, which was higher than in 2005, largely explains the acceleration in processed food prices. In addition, the lagged effects associated with the rise in the standard VAT rate in July 2005 also exerted pressure on domestic prices. Finally, notwithstanding the effect on fuel prices of the rise in the tax on oil products in January 2006, the energy component of the HICP decelerated in 2006, reflecting the smaller growth of oil prices in international markets.

The broadly based acceleration in import prices of non-energy goods also contributed to the rise in inflation in 2006. The estimates of Banco de Portugal, based on data made available by INE, point to an

Table 6.1

HICP - MAIN CATEGORIES AND AGGREGATES
Rates of change, in percentage

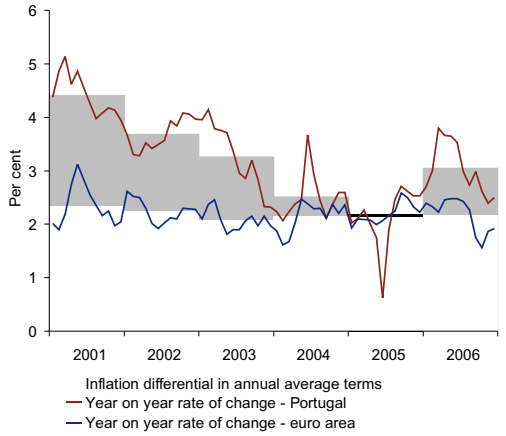
	Weights 2006	2002	2003	2004	2005	2006
Total	100.0	3.7	3.3	2.5	2.1	3.0
Total excluding energy	90.9	3.9	3.1	2.3	1.4	2.5
Total excluding unprocessed food and energy	80.2	4.5	3.3	2.6	1.7	2.4
Goods	61.8	2.4	2.4	1.6	1.9	3.2
Food	21.4	1.9	2.6	1.4	0.1	3.6
Unprocessed	10.7	0.2	2.1	0.0	-0.5	3.2
Processed	10.6	3.8	3.1	2.8	0.8	4.1
Industrial	40.4	2.7	2.4	1.8	2.8	3.0
Non-energy	31.4	3.1	1.8	0.8	1.0	1.5
Energy	9.1	1.2	4.9	5.4	10.0	8.1
Services	38.2	5.9	4.6	3.9	2.5	2.7
Memo:						
CPI[(a)]	-	3.6	3.3	2.4	2.3	3.1
HICP - euro area	-	2.2	2.1	2.1	2.2	2.2

Sources: Eurostat, *INE* and Banco de Portugal.
Note: (a) Until December 2002, rates of change were calculated using the CPI base 1997. From January 2003 onwards, rates of change were calculated using the CPI base 2002.

(16) See *Economic Bulletin*, Winter 2005, Banco de Portugal.

Chart 6.1

INFLATION RATE: PORTUGAL AND EURO AREA

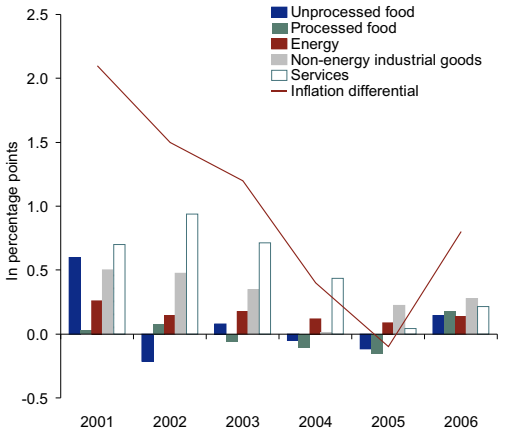


Source: Eurostat.

Chart 6.2

BREAKDOWN OF THE INFLATION DIFFERENTIAL VIS-À-VIS THE EURO AREA

Breakdown of the annual average differential



Source: Eurostat.
Note: The sum of contributions may differ slightly from the total inflation differential due to rounding.

increase of 2.3 per cent in the import deflator excluding energy goods (0.5 per cent in 2005). This increase was particularly marked in the consumer goods component (Table 6.2). Prices of non-energy commodities in international markets also accelerated strongly (see *Section 2 "Main international economic developments"*).

The persistence of a high increase in unit labour costs (ULC), particulaly in the private sector of the economy, did not allow external inflationary pressures to be eased (Table 6.3). The estimates of Banco de Portugal point to the maintenance of an ULC increase of around 2.5 per cent, in the private sector,

Table 6.2

PORTUGAL - MAIN INTERNATIONAL PRICE INDICATORS

Percentage rate of change

	2002	2003	2004	2005	2006
Import prices of goods[a]					
Total	-2.4	-2.2	2.1	4.1	4.8
Total excluding fuels	-1.8	-2.9	0.7	0.5	2.3
Consumer goods	-0.6	-2.9	-1.7	-1.6	1.6
International commodity prices					
Oil prices (Brent Blend), EUR	-4.9	-5.0	21.4	45.0	19.0
Non-energy commodity prices, EUR	-0.9	-4.5	10.8	9.4	24.8
Memo:					
Nominal effective exchange rate index for Portugal[b]	0.6	2.6	0.6	-0.2	0.2

Sources: Eurostat, HWWA, *INE*, Thomson Financial Datastream and Banco de Portugal.
Notes: (a) Calculations of Banco de Portugal based on information provided by *INE*. The classification by broad economic categories shown in this table differs from that used by *INE*, given that light passenger vehicles are included in consumer goods rather than in capital goods. (b) A positive change corresponds to an appreciation of the index. For a detailed description of the methodology, see the article entitled "New effective exchange rate index for the Portuguese economy", by A. C. Gouveia and C. Coimbra, in the December 2004 issue of the *Economic Bulletin* of Banco de Portugal.

Table 6.3

WAGES AND PRODUCTIVITY IN PORTUGAL AND IN THE EURO AREA
Annual average rate of change, in percentage

	2002	2003	2004	2005	2006
Portugal[a]					
Total economy					
Compensation per employee	3.0	2.8	2.7	2.9	2.4
Productivity	0.3	0.3	1.2	0.5	0.6
Unit labour costs	2.8	2.5	1.4	2.4	1.8
Private sector					
Compensation per employee	2.8	3.1	3.4	3.1	3.1
Productivity	0.3	0.2	1.4	0.6	0.6
Unit labour costs	2.4	2.9	2.0	2.5	2.5
Euro area					
Total economy					
Compensation per employee	2.6	2.1	2.1	1.6	2.2
Productivity	0.2	0.3	1.0	0.7	1.4
Unit labour costs	2.4	1.8	1.1	0.9	0.8

Sources: ECB, *INE* and Banco de Portugal.
Note: (a) Compensation per employee excludes government transfers to Caixa Geral de Aposentações (civil servants' pension scheme).

against a background in which wages continued to be strongly resilient to the slowdown and productivity growth remained subdued. It should be mentioned that the change in ULC is particularly important for developments in services prices, which in 2006 increased slightly more than in 2005.[17] As a result of the moderate increase in the public sector, the change in ULC for the economy as a whole declined to 1.8 per cent (2.4 per cent in 2005). However, it continued to exceed, albeit to a lesser extent, the increase observed in the euro area (Charts 6.3 and 6.4). The maintenance of a higher increase in ULC than in the euro area contributes to the persistence of a positive inflation differential.

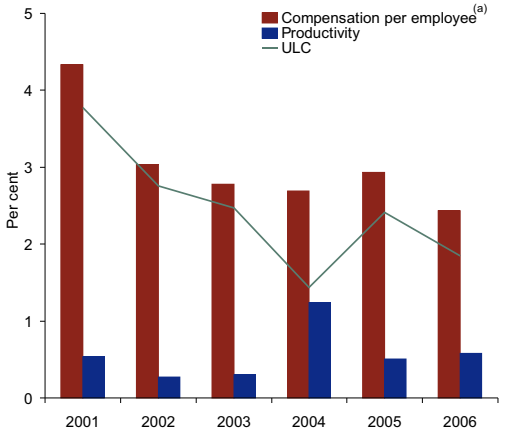
The strong deceleration in oil prices in international markets, which led to a strong reduction in the growth rate of energy prices, was the major factor behind the reduction in inflation throughout 2006. Another relevant factor was the unwinding of the impact on prices of the rise in the standard VAT rate as from the second half of the year onwards. The interpretation of the intra-annual year-on-year changes, however, is strongly conditioned by the new compilation method of the prices of "clothing and footwear" (see *Box 2 "Methodological changes in the computation of the HICP"*).

(17) It should be noted that the growth differential of services prices between Portugal and the euro area widened significantly in 2006. This differential had reached a particularly low level in 2005, due to the unwinding of the effects associated with the European Football Championship, held in Portugal in June 2004.

Chart 6.3

UNIT LABOUR COSTS IN PORTUGAL

Rate of change

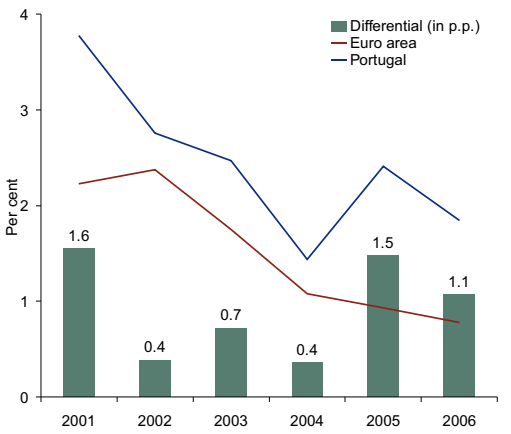


Sources: *INE* and Banco de Portugal.
Note: (a) Compensation per employee excludes government transfers to Caixa Geral de Aposentações (civil servants' pension scheme).

Chart 6.4

UNIT LABOUR COSTS IN PORTUGAL AND IN THE EURO AREA

Rates of change and differential



Sources: ECB, *INE* and Banco de Portugal.

7. BALANCE OF PAYMENTS

Net external borrowing requirements of the Portuguese economy did not change significantly in 2006. The reduction in the rate of investment of the economy and the rise in general government savings seem to have been counterbalanced by a reduction in private sector savings and by a decline in capital transfers from abroad. Thus, the combined current and capital account deficit increased only slightly, standing at 8.7 per cent of GDP (Table 7.1 and Charts 7.1 and 7.2).[18]

The virtual stabilisation of external borrowing requirements reflected opposite developments in the several components of the current and capital account, which according to current estimates cancelled out in 2006. In particular, the goods and services deficit narrowed by more than 1 p.p. of GDP, benefiting from the strong acceleration of exports. Conversely, the income deficit widened significantly, reaching 3.5 per cent of GDP (2.6 per cent in 2005). This can be explained both by the continued deterioration of the international investment position of the Portuguese economy and by the increase in interest rates in 2006. In addition, the capital account surplus decreased, partly due to the decline in transfers from the European Union under the third Community Support Framework.

The breakdown of the change in the goods and services account reveals that the narrowing of the deficit from 8.7 to 7.6 per cent of GDP in 2006 was due to a positive volume effect equivalent to approximately 1.3 per cent of GDP, which more than offset the negative impact associated with price and terms of trade effects (Chart 7.3). According to current estimates, based on data made available by INE, goods export and import prices increased by 4.3 and 4.8 per cent respectively; however, terms of trade excluding energy goods continued to record gains, as in this case, export and import prices increased by 3.5 and 2.3 per cent, respectively. In volume terms, the contribution of net exports to the

(18) The estimated financing needs in 2006 are higher than projected in the main scenario of the Winter 2005 issue of the *Economic Bulletin* of the Banco de Portugal by around 0.2 p.p. of GDP. Despite the stronger than projected growth in goods and services exports, that discrepancy basically reflected the revision of data for the income account, associated with the higher than initially estimated deterioration of the international investment position of the Portuguese economy, as well as the higher reduction in the capital account surplus.

Table 7.1

CURRENT AND CAPITAL ACCOUNT
Balance as a percentage of GDP

	2002	2003	2004	2005	2006
Current account	-8.1	-6.1	-7.7	-9.8	-9.5
Goods and services	-7.9	-6.5	-7.6	-8.7	-7.6
Goods	-10.4	-9.1	-10.4	-11.3	-10.8
Services	2.5	2.6	2.8	2.6	3.2
of which:					
Travel and tourism	2.8	2.7	2.8	2.5	2.6
Income	-2.3	-1.7	-2.0	-2.6	-3.5
Current transfers	2.2	2.1	2.0	1.5	1.6
of which:					
Emigrants/immigrants remittances	1.8	1.4	1.4	1.2	1.2
Capital account	1.5	1.9	1.5	1.2	0.8
Memo:					
Current transfers account + capital account	3.7	4.0	3.5	2.7	2.4
Current account + capital account	-6.6	-4.2	-6.2	-8.6	-8.7

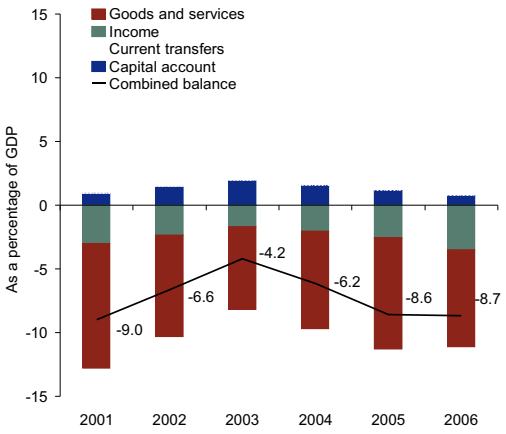
Sources: *INE* and Banco de Portugal.

change in the goods and services account was associated with both its non-energy and energy components, being particularly relevant in the latter the impact of the reduction of energy goods imports in volume (see *Section 5 "Demand"*). However, due to the high annual average rate of change in oil prices, net transactions of energy goods between Portugal and abroad recorded a further slight deterioration in nominal terms (Chart 7.4). In 2006, the deficit of the non-energy component of the goods and services account was lower than that of the energy component.

The borrowing requirements of the Portuguese economy were chiefly met through the resident banking system, contrasting with 2005, when financing was mainly met through the raising of funds abroad

Chart 7.1

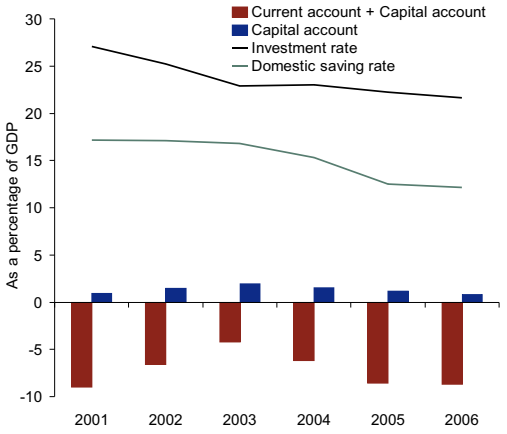
CURRENT AND CAPITAL ACCOUNT



Sources: *INE* and Banco de Portugal.

Chart 7.2

FINANCING CAPACITY OF THE ECONOMY

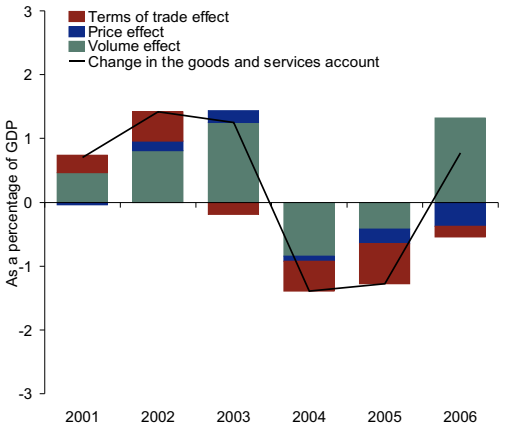


Sources: *INE* and Banco de Portugal.

Chart 7.3

BREAKDOWN OF THE GOODS AND SERVICES ACCOUNT BALANCE

Breakdown into volume, price and terms of trade effects

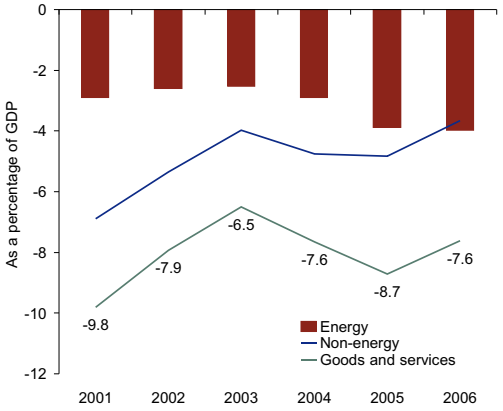


Sources: *INE* and Banco de Portugal.
Note: A positive (negative) change means an increase (decrease) in the goods balance. For a description of the methodology used, see Banco de Portugal, Annual Report 2003, page 169.

Chart 7.4

GOODS AND SERVICES ACCOUNT

Breakdown into energy and non-energy accounts



Sources: *INE* and Banco de Portugal.

by the general government. The financial account balance stood at 7.8 per cent of GDP, compared with 9.2 per cent of GDP in 2005 (Table 7.2).

A cross-check of the financial account with the consolidated balance sheet of the banking system shows that in 2006, and like in the past few years, the increase in banks' external indebtedness continued to be associated with the issuance of medium and long-term bonds by subsidiaries and branches abroad of Portuguese banking groups (entered under change in other investment liabilities). Moreover, there were significant inflows of funds (around 4.8 per cent of GDP), due to the sale of securitised bonds by one of the main banking groups operating in Portugal (affecting the change in portfolio investment assets of the other monetary financial institutions). These bonds were held in the portfolio of that banking group, following own securitisation transactions in past years. They were used as collateral in monetary policy operations, whose funds were redistributed to other business units abroad in the same group. In parallel, the same banking group reduced significantly its recourse to longer-term refinancing operations (with a maturity of three months). This is reflected in the financial account in a decrease in liabilities towards the Eurosystem, which are registered as other investment liabilities of monetary authorities.[19]

External financing associated with securitisation – recorded under change in portfolio investment liabilities of non-monetary financial institutions – continued to be significant in 2006, albeit lower than in past years.

In 2006 net inflows of external funds directly to the general government were far lower than in 2005, in line with the reduction in general government borrowing requirements. This fall resulted from the redemption of short-term securities issued by the general government, as there was an increase in net investment by non-residents in bonds and in other medium and long-term debt securities. These de-

(19) Following the methodological recommendations of the ECB, the net value of resident MFIs operations settled through the TARGET system are recorded in the balance of payments as a change in liabilities of monetary authorities under "other investment".

Table 7.2

FINANCIAL ACCOUNT

As a percentage of GDP

	January–December 2005			January–December 2006		
	Change in liabilities	Cange in assets	Net Change	Change in liabilities	Cange in assets	Net Change
Current and capital account			-8.6			-8.7
Financial account	17.7	-8.5	9.2	18.7	-10.9	7.8
Direct investment	2.1	-1.1	1.0	3.8	-1.8	2.0
Excluding Madeira and Santa Maria (Azores) off-shores	*2.4*	*-1.5*	*0.9*	*3.6*	*-1.9*	*1.8*
Portfolio investment	10.0	-10.8	-0.8	6.0	-4.3	1.7
Financial derivatives	-2.8	2.6	-0.1	-3.6	3.4	-0.2
Other investment	8.3	-0.2	8.1	12.5	-9.5	3.0
Reserve assets		1.0	1.0		1.2	1.2
By institutional sector of resident investor:						
Monetary authorities	2.8	-0.1	2.7	-3.9	0.6	-3.3
Portfolio investment		-0.7	-0.7		0.1	0.1
Financial derivatives	0.0	0.0	0.0	0.0	0.0	0.0
Other investment	2.8	-0.4	2.4	-3.9	-0.7	-4.6
Reserve assets		1.0	1.0		1.2	1.2
General government	6.7	0.2	6.9	1.7	0.6	2.4
Direct investment	0.0	0.0	0.0	0.0	0.0	0.0
Excluding Madeira and Santa Maria (Azores) off-shores	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*
Portfolio investment	7.5	-0.1	7.4	2.5	-0.2	2.3
Financial derivatives	-0.4	0.4	0.0	-0.8	0.7	-0.1
Other investment	-0.4	-0.1	-0.5	0.0	0.1	0.1
Other monetary financial institutions	-0.3	-1.6	-1.8	15.2	-2.8	12.4
Direct investment	0.0	-0.3	-0.3	0.2	-0.2	0.0
Excluding Madeira and Santa Maria (Azores) off-shores	*0.0*	*-0.3*	*-0.3*	*0.2*	*-0.2*	*0.0*
Portfolio investment	-3.8	-2.2	-6.0	0.6	2.2	2.8
Financial derivatives	-1.6	1.6	-0.1	-2.0	1.8	-0.2
Other investment	5.1	-0.6	4.5	16.3	-6.6	9.7
Non-monetary financial institutions	5.3	-6.3	-1.0	3.0	-4.5	-1.5
Direct investment	0.8	-0.3	0.5	0.8	-0.1	0.7
Excluding Madeira and Santa Maria (Azores) off-shores	*0.8*	*-0.3*	*0.5*	*0.8*	*-0.1*	*0.7*
Portfolio investment	4.7	-6.6	-1.8	2.4	-4.8	-2.4
Financial derivatives	-0.4	0.6	0.1	-0.5	0.7	0.2
Other investment	0.2	0.0	0.2	0.3	-0.3	0.0
Non-financial corporations and households	3.2	-0.8	2.4	2.7	-4.8	-2.1
Direct investment	1.4	-0.6	0.8	2.8	-1.5	1.3
Excluding Madeira and Santa Maria (Azores) off-shores	*1.6*	*-0.9*	*0.7*	*2.6*	*-1.5*	*1.1*
Portfolio investment	1.5	-1.2	0.3	0.5	-1.6	-1.1
Financial derivatives	-0.3	0.1	-0.1	-0.4	0.2	-0.2
Other investment	0.6	0.8	1.4	-0.2	-1.9	-2.2
Errors and omissions			-0.6			0.9

Sources: *INE* and Banco de Portugal.
Notes: A (+) sign means an increase in foreign liabilities or a decrease in foreign assets, i.e. a financial inflow. A (-) sign means a decrease in foreign liabilities or an increase in foreign assets, i.e. a financial outflow.

velopments are part of a debt management strategy, which has favoured the medium and long-term component.

With regard to non-financial corporations and households, there were net outflows of funds to foreign countries, contrasting with inflows in 2005. This reversal was largely due to an increase in household deposits abroad and trade credits granted by resident non-financial corporations. Developments in the latter were associated with buoyant exports, in parallel with the lengthening of the average credit period. In addition, net outflows in portfolio investment were associated with the redemption of commercial paper by two main economic groups in the first half of 2006.

The amount outstanding of direct investment operations, excluding those related to companies located in the free trade zones of Madeira and Azores, corresponded to net inflows of 1.8 per cent of GDP in 2006, accounting for a recovery in this type of financing from 2005 (0.9 per cent of GDP). In fact, the increase in foreign direct investment in Portugal more than offset the rise in direct investment of Portugal abroad. Unlike in recent years, the use by non-residents of the free trade zones for investment in third countries seems to have been quite reduced.

8. CONCLUSION

The Portuguese economy accelerated in 2006 and according to the projections published by the Banco de Portugal, growth will continue to increase in the current year. Recovery in 2006 was underpinned by strong export growth, mirrored in a rebound in industrial activity. This represents a significant change in the main contributions to GDP growth compared with the recent past. These developments should be interpreted in the light of a gradual process of adjustment of the Portuguese economy to changes in the pattern of comparative advantages, resulting from the increasing integration of global markets. This process is characterised *inter alia* by a marked reduction in the weight of exports of goods of low-tech and low-skill sectors, the recent acceleration of capital goods exports and an increase in the weight of services exports in total exports. However, it should be noted that the strong export buoyancy is expected to slow down, in particular given the expected deceleration in activity and in the volume of global trade in goods and services, especially of the main trading partners of Portugal, which in 2006 recorded particularly high growth rates.

Manufacturing recorded an increase in employment for the first time since 1998. This rise was accompanied by growth in labour productivity, at a pace comparable to the average for recent years. These developments seem to be associated with the process of gradual restructuring of the Portuguese economy and is consistent with the positive aggregate effects that the opening-up of markets and the increased global competition can have for a small open economy like the Portuguese. Taking full advantage, in terms of efficiency, of the opportunities resulting from the opening-up of markets implies an institutional framework and functioning of markets that favour competition, factor mobility, and the reallocation of resources in the economy.

In this context, it should be noted that the combination of some rigidity, in particular, in the labour market, with imperfect contestability in some sectors of the economy and structural weaknesses in human capital, have not favoured the rapid and efficient reallocation of resources in the economy. This scenario translated in the maintenance of weak intensity in labour market transitions in 2006, an increase in the average duration of unemployment and a further rise in very long-term unemployment. In this regard, the promotion of social protection policies consistent with incentives that clearly favour labour supply could make a positive contribution to the reallocation of resources in the economy. Moreover, greater flexibility and market competition would give rise to higher productivity growth, which would be reflected in an improvement of economic welfare in Portugal.

The main driving force pushing towards the correction of the macroeconomic imbalances of the Portuguese economy in 2006 was the achievement of significant fiscal consolidation, whose magnitude was higher than initially foreseen. In 2006 the reduction of the structural deficit was due in equal parts to a reduction of expenditure and an increase in revenue, measured as a percentage of GDP. The pursuance of the objectives set out in the Stability Programme, namely as regards expenditure and revenue, as well as the convergence towards the medium-term objective for the structural balance until the end of the current decade, will continue to be the main driver of fiscal policy in the coming years. Indeed, the achievement of these objectives is one of the major requirements to ensure the sustainable growth of the Portuguese economy in the medium to long-term.

Notwithstanding the significant deceleration of domestic demand and the strong acceleration of exports, the current account deficit narrowed only marginally in 2006. This mainly resulted from the deterioration of the income account, which was the highest since the start of the euro area. The impact of the progressive deterioration of the international investment position of the Portuguese economy, combined with the significant increase in interest rates, was also apparent in the evolution of the gross national product, whose growth was significantly lower than that of GDP. Developments in the international investment position in the last decade are associated, in particular, with the process of financial integration and with the increased external indebtedness compatible with the equilibrium of the Portuguese economy, which results from the wider choice offered to economic agents. However, this buoyancy will tend to translate into increased interest payments. This, in the absence of an acceleration of productivity, will imply a smaller contribution of domestic demand to GDP growth in the future. In an environment in which the banking system plays a dominant role in the external financing of the economy and the virtual absence of foreign exchange risk, the solvency conditions of national economic agents remain sound in aggregate terms, thereby favouring the stability of the financial system.

The cut-off date for data was early April 2007.

Box 1. Fiscal prospects

The Portuguese medium-term fiscal policy guidelines, within the framework of the Stability and Growth Pact, have been defined in the updated Stability Programme of December 2006. The State Budget for 2007 sets in detail the budgetary programming for the current year. Both documents have been prepared on the basis of data available last autumn. Considering the recent release of the very favourable fiscal results for 2006 and the revision of the target for the general government deficit from 3.7 to 3.3 per cent of GDP in 2007, it will be necessary to reassess both the 2007 State Budget and the Stability Programme. With regard to the former, to ensure at least the achievement of the new target for the deficit in 2007. As to the latter, to redefine the fiscal objectives over the Programme period.

Updated Stability Programme of December 2006

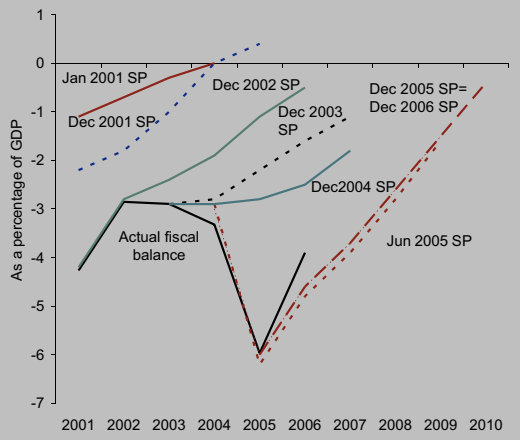
The updated Stability Programme sent to the European Commission in December 2006 confirmed the fiscal consolidation strategy defined in June 2005, which aimed at reducing the general government deficit in Portugal to below 3 per cent of GDP by 2008. The consistency resulting from the maintenance of the fiscal targets in the last three updates of the Stability Programme is a particularly relevant feature of recent public finance developments in Portugal, as illustrated in Chart 1.

The main fiscal indicators considered in this update of the Stability Programme are presented in Table 1. In addition to the correction of the excessive deficit by 2008, the Programme assumes the formal commitment to achieve the medium-term objective for the structural deficit in 2010 – set at 0.5 per cent of GDP –, as well as a more favourable evolution of the public debt ratio, although in line with past assumptions.[1] According to the estimates of the Banco de Portugal, the structural deficit stood at 3.4 per cent of GDP in 2006, i.e. far above the objective set for 2010.

The fiscal consolidation strategy resulting from the current Stability Programme is based on two fundamental assumptions. On the one hand, it considers a favourable macroeconomic scenario, with the real GDP growth rate rising gradually, to stand at 3 per cent in 2009 and 2010, underpinned by strong export growth over the whole period and by the acceleration of private consumption and investment (Table 2). On the other hand, it assumes the implementation of an ambitious set of measures to tackle public expenditure growth, notably in public administration, na-

Chart 1

FISCAL BALANCE TARGETS IN STABILITY PROGRAMME UPDATES AND ACTUAL FISCAL BALANCE



Sources: INE and Ministério das Finanças.

(1) *Within the framework of the reform of the Stability and Growth Pact, European Union Member States must set a medium-term objective for the structural balance (i.e. the cyclically-adjusted balance net of temporary measures) in the updated Stability/Convergence Programmes. This medium-term objective, which is set at individual country level, shall take into account the current public debt ratio and the growth of potential output, while providing a sufficient safety margin, so that under adverse cyclical conditions the deficit will not exceed the reference value.*

Table 1

MAIN FISCAL INDICATORS IN THE STABILITY PROGRAMME UPDATE
As a percentage of GDP

	2006	2007	2008	2009	2010
Total general government balance	-4.6	-3.7	-2.6	-1.5	-0.4
Primary balance	-1.7	-0.7	0.4	1.5	2.5
Cyclically adjusted total balance	-3.4	-2.6	-1.8	-1.3	-0.5
Change	*1.5*	*0.8*	*0.8*	*0.5*	*0.8*
Cyclically adjusted primary balance	-0.5	0.4	1.2	1.7	2.3
Change	*1.6*	*0.9*	*0.8*	*0.5*	*0.6*
Public debt	67.4	68.0	67.3	65.2	62.2

Source: December 2006 Stability Programme update.

tional healthcare service and social security, in addition to improving the fiscal discipline of regional and local governments. Given their nature, the large majority of the structural measures to contain expenditure take some time to produce significant effects. Therefore, they were supplemented, at a first stage, by tax increases and short-term measures affecting some expenditure items. In fact, the 2006 budgetary outcome translated into the narrowing of the total structural deficit by 2.1 percentage points (p.p.) of GDP, also largely due to developments in total revenue as a ratio of GDP (+1.1 p.p. of GDP), which however were similar to those in the expenditure ratio. Chart 2 shows the additional direct impact of the main consolidation measures on both the revenue and expenditure sides, from 2007 to 2010, according to the quantification of the Ministry of Finance.

Table 3 shows the general government accounts presented in the Stability Programme. As it can be seen, the narrowing of the deficit is expected to result from the reduction of expenditure as a ratio of GDP; the largest contribution will be made by "other expenditure", which covers inter alia compensation of employees and intermediate consumption. It should also be noted that there are expectations of a reversal in the growth trend of the ratio of social payments in cash in relation to GDP, chiefly as a consequence of the changes introduced in the civil servants pension scheme. Indeed, the measures recently introduced in the calculation and update of pensions under the general scheme will have a significant impact on the sustainability of public finances, although still without a sizeable effect over the Programme period. The Stability Programme also foresees a slight reduction in general government revenue as a ratio to GDP, solely accounted for by non-tax revenue (which includes other current revenue and capital revenue).The European Commission and the Council, in their assessment of the last update of the Stability Programme, considered that the fiscal policy guidelines set are broadly consistent with a correction of the excessive deficit by 2008, conditional on an effective implementation of all the measures announced and on the reinforcement of such measures in case of lower than projected economic growth. The focus of adjustment on the expendi-

Table 2

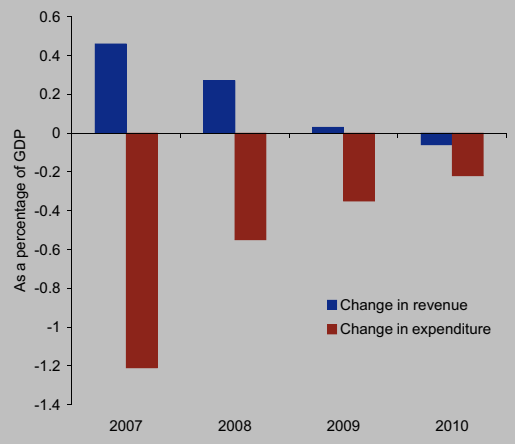
MACROECONOMIC SCENARIOS
Real percentage rates of change

	2006		2007		2008		2009	2010
	SP[a]	EC[b]	SP[a]	EC[b]	SP[a]	EC[b]	SP[a]	SP[a]
GDP	**1.4**	**1.2**	**1.8**	**1.5**	**2.4**	**1.7**	**3.0**	**3.0**
Private consumption	1.0	1.1	1.3	1.3	2.0	1.4	2.3	2.4
Public consumption	-0.2	0.0	-1.3	0.0	-1.5	-0.3	-1.2	-1.1
Investment	-2.6	-2.6	1.9	0.4	4.0	2.2	6.8	7.0
Exports	8.6	7.9	7.2	5.4	6.8	5.5	7.0	7.2
Imports	2.8	2.9	3.7	3.0	4.3	3.6	5.4	6.1

Sources: *Ministério das Finanças* and European Commission.
Notes: (a) December 2006 Stability Programme (SP) update. (b) Autumn 2006 European Commission (EC) projections.

Chart 2

DIRECT EFFECTS OF THE MAIN CONSOLIDATION MEASURES



Source: December 2006 Stability Programme update.

ture side and the absence of temporary measures are welcomed and the medium-term budgetary objective is considered adequate. Potentially less favourable macroeconomic developments are viewed by the European Commission and the Council as the main risk for the Programme, as its underlying scenario is more optimistic than the European Commission forecasts for 2007 and 2008 and above trend growth is assumed for 2009-2010. In addition, uncertainty about the budgetary effects of some measures on the expenditure side was also mentioned and, in the medium term, the performance-related risk of some public companies. The trend foreseen for the debt ratio, in addition to the risks with an impact on the deficit, may also be affected by unfavourable deficit-debt adjustments.

As the effects of the recent reform of the general pension scheme have not yet been incorporated in the long-term projections for the general government deficit, the Commission and the Council continue to consider that Portugal appears to be at high risk with regard to the sustainability of public finances. In this context, it was noted that the achievement of the planned budgetary consolidation coupled with the effect of the measures being implemented to contain age-related expenditure, will significantly contribute to reduce unsustainability risks. In this context, the recently revised law on the general scheme of social security will be crucial for the convergence of the sustainability

Table 3

GENERAL GOVERNMENT ACCOUNTS
As a percentage of GDP

	2006	2007	2008	2009	2010	*2010-2006*
Total revenue	**41.7**	**41.7**	**41.4**	**41.2**	**41.1**	***-0.6***
Tax revenue	36.6	36.9	36.8	36.8	36.7	*0.1*
Taxes on income and wealth	8.9	9.2	9.1	9.0	8.9	*0.0*
Taxes on production and imports	15.5	15.5	15.6	15.7	15.7	*0.2*
Social contributions	12.2	12.2	12.1	12.1	12.1	*-0.1*
Other revenue	5.1	4.8	4.6	4.4	4.4	*-0.7*
Total expenditure	**46.3**	**45.4**	**44.0**	**42.7**	**41.5**	***-4.8***
Social benefits in cash	15.0	15.0	14.8	14.5	14.2	*-0.8*
Social benefits in kind	3.5	3.4	3.3	3.2	3.2	*-0.3*
Interest	2.9	3.0	3.0	3.0	2.9	*0.0*
Subsidies	1.2	1.1	0.9	0.9	0.8	*-0.4*
Investment	2.5	2.3	2.3	2.4	2.6	*0.1*
Other expenditure	21.2	20.6	19.7	18.7	17.8	*-3.4*
Overall balance	**-4.6**	**-3.7**	**-2.6**	**-1.5**	**-0.4**	***4.2***

Source: December 2006 Stability Programme update.

indicators of Portuguese public finances towards the European average.

State Budget for 2007

As referred to above, the estimate for the 2007 general government accounts resulting from the 2007 State Budget is outdated, due to both a base effect resulting from the 2006 outturn, and the announced revision of the fiscal target for 2007 that necessarily changes the State Budget approved in December. Nevertheless, it is useful to analyse the guidelines underlying the main items of the Budget in force.

A comparison of the 2006 budgetary outturn with the estimate included in the 2007 State Budget shows a clearly higher level of total revenue (+1.3 p.p. of GDP), with an upward revision of all current revenue items, partially offset by a decline in capital revenue (Table 4). Expenditure, despite the smaller deficit, was higher than estimated last autumn (+0.6 p.p. of GDP), in particular due to the upward revision of primary current expenditure.

The 2007 State Budget planned the stabilisation of the public revenue ratio in 2007, in spite of the continued rise in the tax burden, mainly concentrated in the corporate income tax. Therefore, the improvement of the deficit would result from a reduction in primary expenditure as a percentage of GDP, in particular in compensation of employees.

According to the 2007 State Budget, in the current year, taxes on income and wealth are estimated to increase around 0.3 p.p. as a ratio of GDP. These developments would not stem from the direct and lagged impact of tax policy measures on the personal and corporate income taxes, as on the whole they are expected to imply a slight loss in revenue. In fact, revenue from the corporate income tax was foreseen to rise significantly (15.4 per cent), but due to the expected business activity of a very restricted number of large companies. It should be noted that the limits applied on eligible firms' provisions for the calculation of taxable income in the corporate income tax, introduced in the 2007 State Budget, are only expected to have a positive effect on revenue from this tax in 2008, when taxpayers make the assessment relating to the 2007 income.

Taxes on production and imports as a percentage of GDP were expected to stabilise in 2007. On the one hand, growth expected for VAT revenue would be lower than nominal GDP growth, in part due to the deferral in the payment of VAT on the imports from outside the European Union and to the changes in the car tax from July 2007 onwards, which will have a negative impact on revenue. On the other hand, the specific component of the tax on ci-

Table 4

GENERAL GOVERNMENT ACCOUNTS INCLUDED IN THE STATE BUDGET FOR 2007[a]
National Accounts

	2006	2007	2007/2006	*Memo:*
	As a percentage of GDP[b]		Rate of change	2006 outturn[b]
Total revenue	41.7	41.7	4.7	43.0
Current revenue	40.3	40.7	5.7	41.9
Taxes on income and wealth	8.9	9.2	8.0	9.0
Taxes on production and imports	15.5	15.5	4.6	15.6
Social contributions	12.2	12.2	4.5	12.7
of which: imputed contributions	0.9	0.7	-16.6	1.1
Other current revenue	3.7	3.8	9.2	4.6
Capital revenue	1.4	1.0	-24.7	1.0
Total expenditure	**46.3**	**45.4**	**2.6**	**46.9**
Current expenditure	42.7	42.0	2.9	43.4
Intermediate consumption	4.1	4.0	3.2	4.0
Compensation of employees	13.9	13.2	-0.9	13.7
Social benefits	18.5	18.4	4.1	19.0
Interest	2.9	3.0	9.3	2.9
Subsidies	1.2	1.1	0.9	1.4
Other current expenditure	2.2	2.3	9.6	2.4
Capital expenditure	3.6	3.4	-0.7	3.5
Investment	2.5	2.3	-3.0	2.3
Other capital expenditure	1.1	1.1	4.1	1.2
Overall balance	**-4.6**	**-3.7**		**-4.0**

Source: December 2006 Stability Programme update.Sources: *INE* and Ministério das Finanças (2007 State Budget Report).
Notes: (a) Figures may not add up due to rounding. (b) As a percentage of the GDP considered in the State Budget for 2007.

gars was increased by 11.5 per cent and the rates of the tax on oil products were projected to be increased by 2.5 cents per litre and in line with expected inflation.[2]

With respect to social contributions, the rise in actual contributions by 0.2 p.p. of GDP should be offset by a decline of the same magnitude in the value of imputed contributions. Part of this result is explained by a rise in the contribution of civil servants to ADSE (healthcare system of civil servants) from 1 to 1.5 per cent of the basic wage and of retired civil servants from 0 to 1 per cent in the 2007 State Budget. In addition, the estimate of the general social security scheme account included in the 2007 State Budget considered a rise in social contributions receipts higher than nominal GDP growth, assuming improved effectiveness in the collection and taking into account that the new civil servants are enrolled in this scheme and not in the civil servants pension scheme.

Also in revenue, it should be noted that despite the increase in the ratio of tax revenue to GDP, the 2007 State Budget assumed the stabilisation of total revenue as a percentage of GDP, chiefly due to a very significant reduction in capital revenue (-24.7 per cent).

On the expenditure side, the 2007 State Budget projected a slight decrease in intermediate consumption as a percentage of GDP. However, if account is taken of the substantial rise in expenditure with public-private partnership contracts in 2007, in particular, with regard to SCUTs (i.e. highways with no charge to users), these results are based on a marked reduction of nominal expenditure with the acquisition of goods and services, resulting in part from the reform of the central government..[3]

With regard to compensation of employees, a decline of approximately 0.7 p.p. of GDP is forecast in the 2007 State Budget. Part of this decline would result from the marked reduction in imputed contributions referred to above. In addition, it would also result from the moderate update in civil servants wages (1.5 per cent), the maintenance of the freeze of automatic career progressions until the end of 2007 and a reduction in the number of services and related resources in central government, together with the rules on mobility and hiring of civil servants.

Turning to expenditure with social payments, the slight decrease as a percentage of GDP would be the result of the combination of several items that show quite different developments, in particular, the one mentioned above for payments as a counterpart of imputed contributions. Expenditure on pensions of the general scheme is expected to continue to increase substantially in 2007 (7.4 per cent), as the changes introduced in the revision of the Framework Law of Social Security will have a minor impact in the short run. By contrast, expenditure on pensions of the civil servants scheme was expected to decelerate significantly in 2007, increasing by approximately 4 per cent, chiefly due to the gradual convergence of the civil servants pension scheme towards the general one, which has been in force since the beginning of 2006. On its turn, the changes to the rules on the unemployment subsidy introduced at the end of 2006 and better supervision will enable moderate growth of the related expenditure. With regard to social benefits in kind, it should be noted that in 2007 expenditure on medical services and medicines co-payments will make a positive contribution to tackle expenditure, following the measures approved within the scope of the 2007 State Budget.

Debt interest is expected to contribute, albeit slightly, to the deterioration of the 2007 deficit as a percentage of GDP, due both to the rise in interest rates and in the stock of the public debt.

Finally, it should be noted that according to the Budget for 2007, public investment is expected to record a further decline in nominal terms that may be reassessed following the very strong decrease observed in 2006.

(2) *The impact of these two measures on the 2007 tax revenue may be lower than assumed in the 2007 State Budget, as the anticipation of the introduction of tobacco products in distribution circuits was quite significant at the end of 2006 and in early 2007, and the rise in the rates of the tax on oil products in the beginning of 2007 was of only 2.5 cents per litre.*

(3) *Note that according to the last updated Stability Programme, savings from the introduction of toll charges in some SCUTs will be negligible in 2007.*

Box 2. Methodological changes in the computation of the HICP

In 2006 the National Statistical Institute (Portuguese acronym: INE) introduced methodological in the computation of the HICP. With the new methodology, endorsed by the Eurostat, this index reflects a new price collection scheme as regards clothing and footwear products, which account for around 21 per cent of the "non-energy industrial goods" component and for 6.5 per cent of the HICP. The interpretation of the annual inflation rates in the course of 2006 is conditioned by this methodological change, since year-on-year changes incorporate two different price collection schemes. The procedure adopted by INE follows the usual methodological guidelines underlying the HICP calculation method, which implies that only in January 2007 will year-on-year rates of change reflect a single collection scheme for these prices.[1]

Up to December 2005, the observation method of several prices of the "Clothing and Footwear" category was based on a quarterly rotation of the price sample. In order to reproduce price developments in the market of clothing and footwear more faithfully, the new methodology adopted a monthly price collection scheme, effective as from January 2006. By including information over three-months, the quarterly scheme originated a smoothing effect in monthly price developments, since only one third of the sample was updated each month. Given that the incorporation of the effects of new collections of clothing and footwear products arrivals, as well as of the sales season, was determined according to this rotation criterion, the monthly change in prices until then was less volatile in intra-annual terms than that observed during 2006.

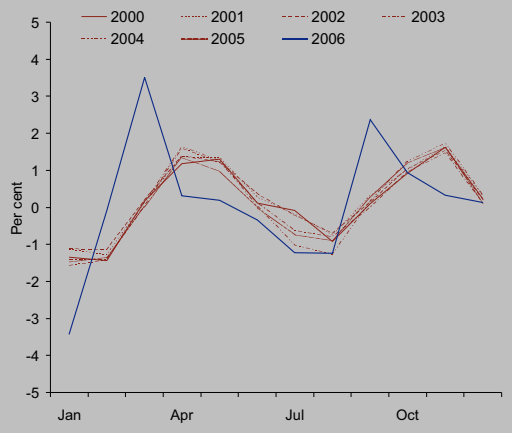
Chart 1(a) shows monthly rates of change in non-energy industrial goods prices in the 2000-2006 period. As seen, monthly rates of change recorded between 2000 and 2005 stand in clear contrast to those recorded in 2006, which are more volatile. Although the years shown comprise distinct annual average developments, the different magnitudes of intra-annual price changes mainly arise from the two information collection regimes. In 2006 monthly swings in year-on-year terms reflect the impact of the different price collection methods, and not necessarily general developments in the prices of this component.

Effects associated with the price collection monthly scheme seem to be particularly relevant when only the monthly frequency is taken into consideration. Chart 1(b) shows quarterly rates of change and, as seen, the mere quarterly aggregation reduces the differences between, on the one hand, quarterly changes in the 2000-2005 period and, on the other, those recorded in 2006. Given the existence of intra-quarterly changes that cancel each other out, these effects will tend to reduce a biased interpretation of the inflation in year-on-year terms. These findings are confirmed by the results of the comparison between developments in the official series of the "Clothing and Footwear"

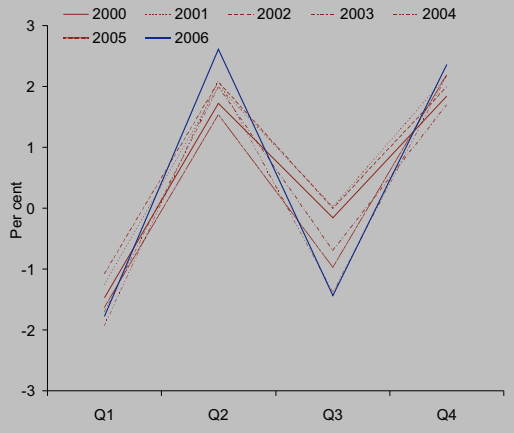
Chart 1

NON-ENERGY INDUSTRIAL GOODS

(a) Monthly rates of change



(b) Quarterly rates of change

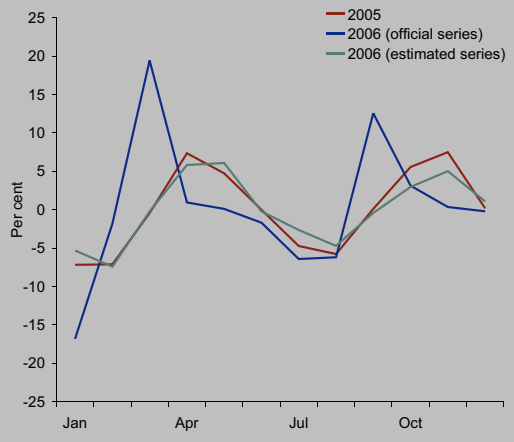


Source: Eurostat.

(1) *The methodological changes introduced by the INE have an identical reflection on CPI calculation.*

Chart 2

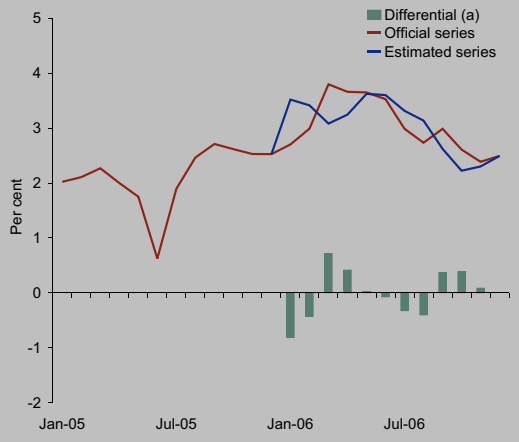
CLOTHING AND FOOTWEAR
Monthly rates of change



Sources: Eurostat and Banco de Portugal.

Chart 3

TOTAL HICP
Year-on-year rates of change



Sources: Eurostat and Banco de Portugal.
Note: (a) In percentage points.

category and an estimated series that attempts to correct the effects resulting from the price collection scheme in force as from January 2006. The simulation in 2006 is based on the technical assumption that the quarterly rotation of this category's price sample can be estimated by a three-month moving average (reference month and two previous months). The comparison between the monthly rates of change is shown in Chart 2.[2] As can be seen, the official series is more volatile than the estimated series for 2006, which shows an intra-annual profile similar to that in 2005.

Chart 3 compares year-on-year rates of change in the HICP calculated from official indices and on the basis of the estimated series (which results from replacing of the index of the "Clothing and Footwear" category actually observed by the index obtained on the basis of the old method). The results lead to conclude that, given the existence of intra-annual changes that cancel each other out, the differences between both series tend to disappear throughout the year, with a virtually nil quantitative impact of the methodological change on annual average terms.

(2) *The calculation of the three-month moving average for January and February 2006 requires a number of additional assumptions, given that the indices of the "Clothing and Footwear" category for November and December 2005, compatible with the new methodology, are not available. Chart 2 presents the results obtained assuming that monthly rates of change in January and February of the estimated series for 2006 are equal to the average of the rates of change in those months between 2000 and 2005. Other alternative assumptions were tested, which however did not lead to qualitatively different results.*

ARTICLES

PORTUGUESE BANKS IN THE EURO AREA MARKET FOR DAILY FUNDS

Luísa Farinha

Vítor Gaspar

Monetary policy operates through the money market. This is the market where banks trade overnight deposits at the central bank. In this paper, we call such a market the market for daily funds. Up to the end of 1998, the geographical region, which now corresponds to the euro area, was characterized by segmented money markets, reflecting different currencies, legal systems, operational frameworks, standard practices and much else. Hence, in the preparations for the start of operations of the single monetary policy, one of the priorities was to ensure smooth and integrated functioning of the interbank market for daily funds in the euro area. Proper functioning was clearly required for the effectiveness of the single monetary policy. In this context, it is important to refer to the payments infrastructure. TARGET, the European real time gross settlement system started operating on 4 January 1999, the first business day of Stage Three of Economic and Monetary Union. TARGET is the result of interlinking of Real Time Gross Settlement Systems, one for each European Union member state. Gaspar, Perez-Quirós and Sicilia (2001) document that after the introduction of the euro the national money markets integrated smoothly and rapidly. Moreover, they show that the transition to the new operational framework had no significant impact on the aggregate time series behavior of money market interest rates. Thus, it is legitimate to conclude that, from the viewpoint of monetary policy effectiveness, the transition to the euro was fully successful from its very start.

Padoa-Schioppa (2004, p. 22) argues that two changes in payments practices lie at the root of modern central banking. First, the use of paper money to substitute for commodity money. Second, the use of bank deposits to substitute for banknotes and coin in ordinary transactions. Payment of transactions through the transfer of bank deposits (e.g. through checks) became dominant. Interbank deposits were transferred through clearing schemes among banks. One main function of the banking system is to provide liquidity on demand. In other words, to provide payments services commensurate with the needs of the economy. It is often stated that when such a function is effectively performed, the economy benefits from having an elastic currency. The proper functioning of such system requires trust in the stability in the standard of value (a fiduciary regime must be based on price stability) and trust in the integrity and reliability of payments mechanisms. Hence, the interbank money market is at the roots of central banking. It immediately justifies the fundamental goals of monetary stability and financial stability.

Recent literature on monetary policy implementation has extended the classical framework of Poole (1968) to account for implementation of monetary policy through a corridor system (see Woodford, 2003 and Bindseil, 2004, for reviews of the literature and extensive references). At the same time, recent theoretical literature on financial stability has related relationship lending in the money market with contagion and systemic risk (see, for example, Freixas, Parigi and Rochet, 2000).

* 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.

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Most of the empirical work on the money market has overlooked micro-structure aspects. There are, however, some notable exceptions. Furfine (1999) examined the Fed funds market. He used a unique database that included individual transactions data between banks. He characterized trading patterns and relationships in the interbank market. Hartmann et al. (2001) analyzed the intra-day behavior of the overnight interest rate in four countries of the euro area. They have related those patterns to the operational framework of monetary policy.

In this paper, we use a database similar to Furfine's, and also his statistical procedure, to describe patterns of interbank transactions, in the unsecured market for daily funds in euro, and their evolution, in the period 1999-2005. The data includes all transactions involving one Portuguese bank, as a lender or a borrower, either local (that is transactions with another Portuguese bank) or cross-border. Our database is unique in the sense that it records, for each individual transaction, information on timing, price, quantity and the identity of the trading parties. In this paper, we make a first step in a research program aiming at characterizing in detail the micro-structure of the interbank market and relationships in this market involving Portuguese banks. We found that the statistical procedure, proposed by Furfine, is successful in identifying interbank money market transactions with a high degree of accuracy, providing almost full coverage of the full set of relevant transactions.

Our study aims at answering questions like:

- Is the market for daily funds segmented? Is there evidence of an integration process?
- How do Portuguese banks participate in the euro area wide market? How relevant are cross-border transactions for Portuguese banks?
- Can we detect a hierarchical structure? What is the role of the largest institutions?

The paper is organized as follows: in section 1 we describe the datasets made available for our study. We also describe the statistical process used to recover money market transactions and report on its accuracy. In section 2, we report results based price indicators (interest rates). In section 3, we report results based on transactions volumes. In section 4, we characterize structured relationships in the market. In section 5, we conclude.

1. DATA AND STATISTICAL PROCEDURE

In this paper, we have used three different datasets. The EONIA panel is constituted by large euro area banks. These banks contribute to the computation of EONIA interest rate. The rate corresponds to actual transactions, in which reporting banks participate as lenders. This dataset has been used in earlier research by, for example, Perez-Quirós and Rodriguez-Mendizábal (2006) and by Gaspar, Perez-Quirós and Rodriguez-Mendizábal (2007). It was provided by the European Banking Federation. The two other databases were provided by Banco de Portugal. Those were SITEME, the Market Electronic Payment System, provided by the Market and Reserve Department; and a Payments System database provided by the Payments Department. SITEME covers operations between Portuguese banks that choose to use the system. The Payments System database records all payments using the Real Time Gross Settlement System.

The SITEME and the Payments System Database are very rich databases. SITEME identifies the time of operation, the parties involved, the amount transacted, the interest rate practiced and the maturity of the operation. The caveat is coverage. It records only operations in which both parties involved are Portuguese banks. In turn, the Payments System Database identifies the time of operation, the parties

involved and the amounts. The caveat is that it records payments only. It does not record the nature or the maturity of the operation.

Fortunately, the drawbacks of the Payments System Database may be circumvented using a statistical procedure, originally described in Furfine (1999). The Furfine procedure enables the identification of overnight operations automatically. The idea is very simple and it is based on two steps:

- In the first step, the procedure selects candidate operations by focusing on large round amounts. The justification is that money market operations are made, as a rule, in large (round) amounts.

- In the second step, the procedure searches, on the following day for payments involving the same parties, with funds flowing in the opposite direction, in which the amount is only slightly larger than the original amount (corresponding to the overnight interest accrued).

In our case, we consider multiples of 100000 euro in the first step. For the second step, we have considered interest rates below the maximum rate in the EONIA panel plus 50 basis points and above the minimum rate, in the same panel, minus 50 basis points. Since we have the data for all operations involving two Portuguese banks registered in the SITEME we were able to partially test the accuracy of the procedure. The test was done in two steps. In the first step, we found that all the operations involving two Portuguese banks identified through the procedure as overnight operations were also classified as overnight operations in the SITEME. In the second step, we found that, excluding from SITEME the operations within the same bank group, which are more frequently not standardized, the procedure was able to identify 95 per cent of the operations. We are not aware of reasons to believe that accuracy would be significantly different for the case of cross-border operations. Thus, we conclude that the procedure is able to provide an almost complete sample of operations, in the market for daily funds, involving Portuguese banks.

2. EMPIRICAL EVIDENCE: INTEREST RATES

As already said in the Introduction, the interbank market for daily funds integrated smoothly and rapidly in the euro area, shortly after the start of operations of the single monetary policy. This may be verified examining Chart 1. Before 1999, Chart 1 plots the overnight interest rates in the market for the DM and the escudo. After 1999, it plots the EONIA rate and the average rate of operations involving Portuguese banks. Visual examination makes clear that the two series are virtually identical from 1999 to the end of 2005. Confirming the visual impression the correlation between the two series is almost perfect.

We can document interest rate convergence more precisely. In Chart 2, we report average interest rate spreads between EONIA rates and rates on operations involving Portuguese banks, both in cross-border operations and in local transactions[1]. The latter are operations involving only Portuguese banks. Spreads were relatively small already in the beginning of 1999. Perhaps surprisingly spreads in the cross border market increased in 2000 and 2001, in line with the increase in the reference ECB rates, before falling to very low levels in 2004 and 2005. Interestingly, a confrontation with Chart 1, suggests that a narrowing of spreads was associated with a reduction in the time series volatility of the EONIA. It is also noticeable from Chart 2 that, especially until 2001, the interest rate spreads were more volatile for operations where Portuguese banks were borrowers rather than lenders of daily funds.

(1) The computation of average interest rates in local transactions excludes operations within banking groups.

Chart 1

MONEY MARKET OVERNIGHT INTEREST RATES

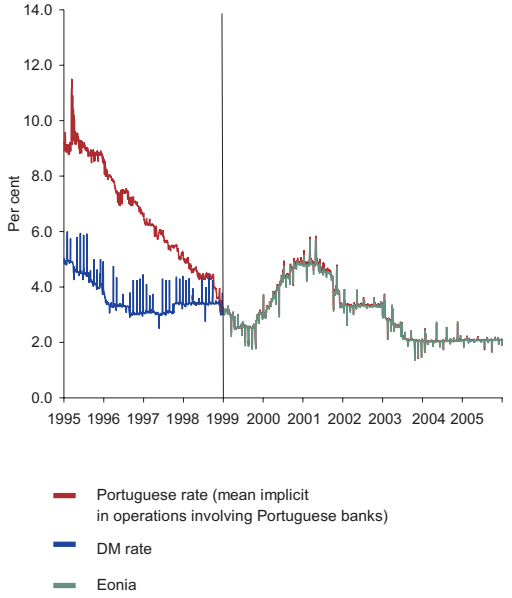
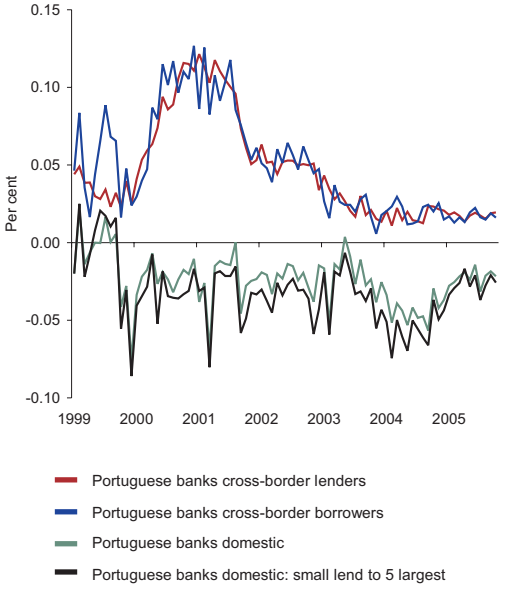


Chart 2

INTEREST RATES IN OPERATIONS INVOLVING PORTUGUESE BANKS: SPREADS VIS À VIS THE EONIA

(Average spreads during reserve maintenance periods)



The spreads in the operations involving only the Portuguese banks were also small in the beginning of 1999. Differently from the spreads in their cross-border operations they presented a negative sign. It is also apparent, from Chart 2, that, at times, interest rates on local operations differed visibly from interest rates on cross-border operations. It will be documented, in section 4, on relationships that, after 1999, most operations involving only Portuguese banks, the smaller financed the larger. On average these operations were effected with interest rates not only below the corresponding EONIA rates but also below the average rates on local operations (see Chart 2). Hence, the evidence suggests some hierarchical structure of banking relationships among Portuguese banks has prevailed in the first years of the monetary union.

As we will see in the next section, since 1999, operations with other Portuguese banks have been a small and decreasing proportion of total operations in the market for daily funds for the average Portuguese bank. However, this is not the case for smaller Portuguese banks. For the subset of small Portuguese banks, operations with other Portuguese banks are not negligible. It is interesting to point out that since mid-2004, the spreads implicit in operations involving only the Portuguese banks have been narrowing. This suggests that the integration process has progressed, albeit at a slower pace, for smaller banks as well.

Plotting the cross-section standard deviation of interest rates shows that the patterns of interest rate volatility in cross-border operations involving Portuguese banks and in operations of the EONIA banks are very similar (Chart 3). The association holds irrespective of Portuguese banks being lenders or borrowers in the cross-border market. However, in some selected periods, the volatility of interest rates for local operations was visibly different (this was the case from the end of 2003 to the beginning of 2005).

Chart 3

CROSS-SECTION STANDARD DEVIATION OF INTEREST RATES

(Averages within reserve maintenance periods)

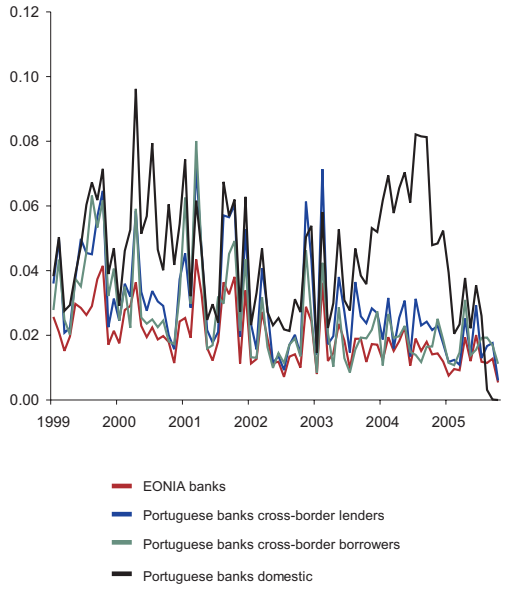
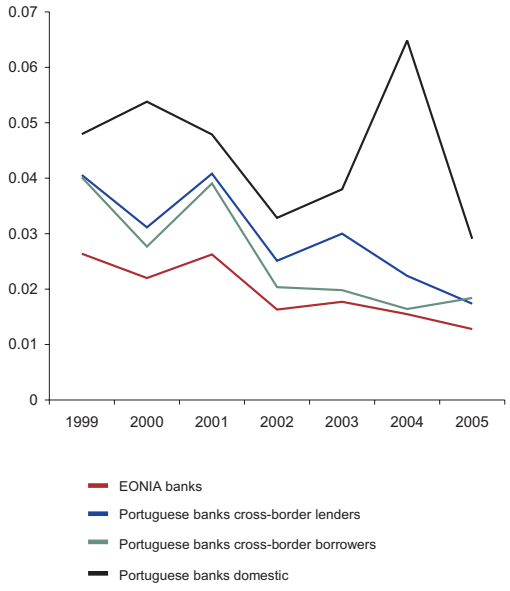


Chart 4

CROSS-SECTION STANDARD DEVIATION OF INTEREST RATES

(Annual averages)



The evolution of the annual average of the cross-section deviations of interest rates shows a decreasing pattern also in the case of the rates reported by the EONIA banks. This is consistent with the hypothesis of a gradual integration process.

Chart 5

CROSS-SECTION STANDARD DEVIATIONS OF INTEREST RATES

(Averages according to the number of days until the end of the reserve maintenance period)

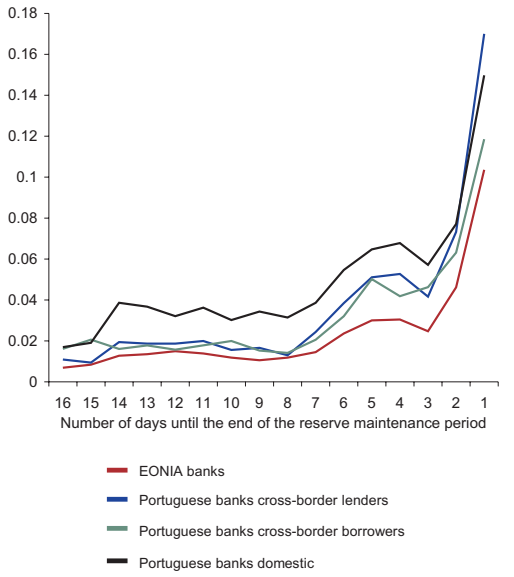


Chart 5 documents patterns of volatility on different days of a reserve maintenance period. As documented elsewhere, on the basis of EONIA panel data (see, for example Gaspar, Perez-Quirós and Rodriguez-Mendizabal (2007)) dispersion of rates is very low at the beginning and increases towards the end of the reserve maintenance period. The same pattern clearly holds for operations involving Portuguese banks. Not surprisingly it is not relevant whether Portuguese banks are borrowers or lenders, nor whether the transactions take place locally or cross-border.

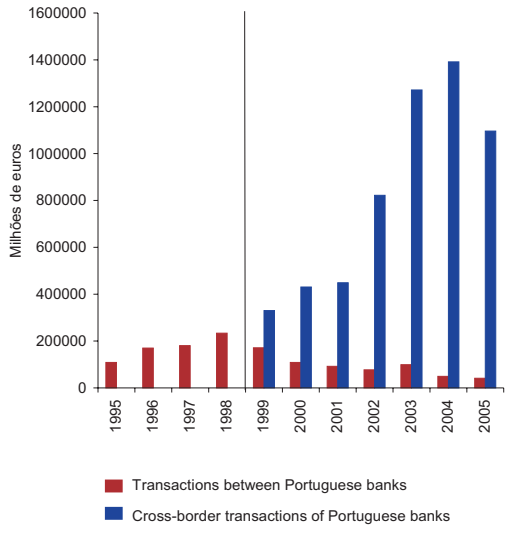
3. EMPIRICAL EVIDENCE: TRANSACTIONS VOLUMES

In section 2, we have documented that, according to price indicators, the interbank market for daily funds has integrated rapidly, right at the beginning of operations of the single monetary policy. This is also evident from the information reported in Chart 6 and Tables 1A and 1B. Immediately, in 1999, the amounts traded cross-border by Portuguese banks exceeded local transactions by a proportion of almost two to one. This is the case only excluding intra-group operations. Nevertheless, even including these operations, more than half of the operations involving Portuguese banks were cross-border. Interestingly, the proportions of amounts traded in the local market and traded cross-border show very gradual adjustment.

The share of cross-border operations increased continuously over time. Already in 2000 (excluding intra-group operations), it amounted to about 4/5 of all transactions involving Portuguese banks. And the increase still continued for some years. Only very recently, in 2004 and 2005, it seems to have stabilized. In both years the share of cross-border operations was about 97 per cent. In other words, the percentage of transactions involving only local institutions declined to only slightly more than 3 per cent of total transactions[2].

Chart 6

TRANSACTIONS OF THE PORTUGUESE BANKS IN THE MARKET FOR DAILY FUNDS



(2) It is curious to point out that the percentage of Portuguese institutions, in the total number of eligible counterparties for monetary policy operations is also slightly above 3 per cent (3.1 per cent), suggesting that the probability that an overnight transaction involves two Portuguese banks is similar to the weight of the Portuguese banks in the market for the euro.

Table 1

VOLUME OF TRANSACTIONS OF PORTUGUESE BANKS IN THE MARKET FOR DAILY FUNDS (10^6 EURO)

A – Excluding intra-group operations

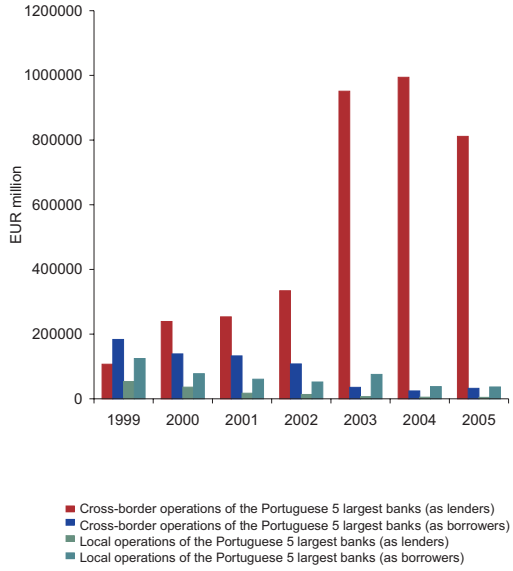
	1999	2000	2001	2002	2003	2004	2005
Transactions between Portuguese banks	171063.5	108739.8	92115.2	77022.6	99240.8	49313.5	41334.9
as a percentage of transactions involving a Portuguese bank	**34.1**	**20.2**	**17.0**	**8.6**	**7.2**	**3.4**	**3.6**
SITEME transactions (excluding intra-group operations)	170992.5	108679.8	92065.2	76972.6	99240.8	48967.5	39274.7
as a percentage of transactions involving a Portuguese bank	100.0	99.9	99.9	99.9	100.0	99.3	95.0
Non-SITEME transactions (excluding intra-group operations)	71.0	60.0	50.0	50.0	0	346.0	2060.2
as a percentage of transactions involving a Portuguese bank	0.0	0.1	0.1	0.1	0.0	0.7	5.0
Cross-border transactions of Portuguese banks	329982.8	430818.1	448952.7	821879.1	1271520.8	1391611.5	1095965.3
as a percentage of transactions involving a Portuguese bank	**65.9**	**79.8**	**83.0**	**91.4**	**92.8**	**96.6**	**96.4**
Total transactions involving a Portuguese bank	501046.3	539557.9	541067.9	898901.7	1370761.6	1440925.0	1137300.2

B – Including intra-group operations

	1999	2000	2001	2002	2003	2004	2005
Transactions between Portuguese banks	250369.1	189153.2	141406.1	170189.1	193936.9	213141.0	218587.6
as a percentage of transactions involving a Portuguese bank	43.1	30.5	24.0	23.8	13.2	13.3	16.6
SITEME transactions (including intra-group operations)	247123.3	183712.0	128043.5	158348.6	169938.2	181107.1	191566.0
as a percentage of transactions involving a Portuguese bank	98.7	97.1	90.6	93.0	87.6	85.0	87.6
Non-SITEME transactions (including intra-group operations)	3245.8	5441.2	13362.6	11840.5	23998.7	32033.9	27021.6
as a percentage of transactions involving a Portuguese bank	1.3	2.9	9.4	7.0	12.4	15.0	12.4
Cross-border operations of Portuguese banks	329982.8	430818.1	448952.7	546170.7	1271520.8	1391611.5	1095965.3
as a percentage of transactions involving a Portuguese bank	56.9	69.5	76.0	76.2	86.8	86.7	83.4
Total transactions involving a Portuguese bank	580351.9	619971.3	590358.8	716359.8	1465457.7	1604752.5	1314552.9

Chart 7

TRANSACTIONS IN THE MARKET FOR DAILY FUNDS INVOLVING ONE OF THE 5 LARGEST PORTUGUESE BANKS



In Table 1B we see the same process of integration in progress, in the period 1999-2005, looking at transactions including intra-group operations. The main difference is that the share of cross-border operations is now significantly smaller with the corresponding share stabilizing at more than 80 per cent of the total in the period 2003-2005. In 2005, the share of local transactions was still 16.6 per cent.

It is important to add that almost all banks active in the money market are also active cross-border. Thus, globally, cross-border activity became clearly dominant for Portuguese banks. Transactions involving local banks have ceased to assume any special significance. There is one important qualification. Since 2003, the Portuguese banks share a tendency to participate in the market, mostly as lenders. In that year, the proportion of total cross-border transactions involving a Portuguese bank in which it is a lender increased from 64 to 81 per cent (38 per cent in 1999). More recently, in 2004 and 2005, this proportion increased to approximately 90 per cent. Thus, the Portuguese banks had to find suitable trading counter-parties cross-border.

This global pattern is dominated by the largest Portuguese banks. However, as already mentioned in the previous section, for the set of small Portuguese banks, operations with other Portuguese banks are not negligible. This is evident from the inspection of Charts 7, 8 and 9. A few small banks do not trade cross-border, but their transactions represent only a tiny fraction of the market for daily funds. In the case of the small banks that also trade cross-border the penetration in the cross-border market has apparently been more gradual than for the largest banks.

Chart 8

TRANSACTIONS INVOLVING ONE OF THE SMALLER PORTUGUESE BANKS THAT GO TO THE CROSS-BORDER MARKET

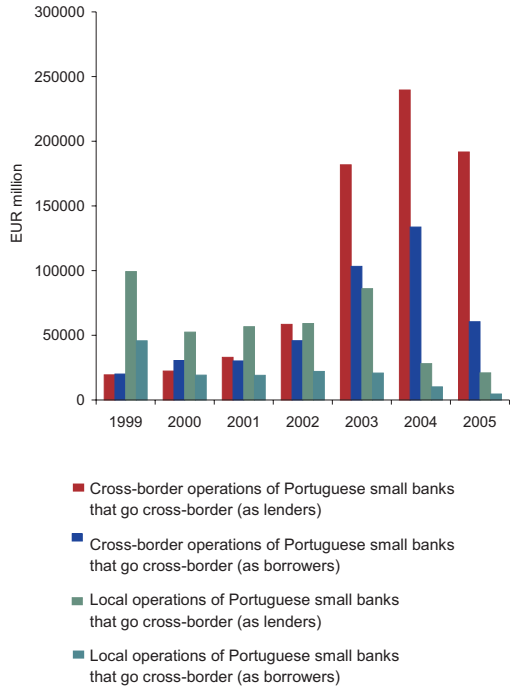
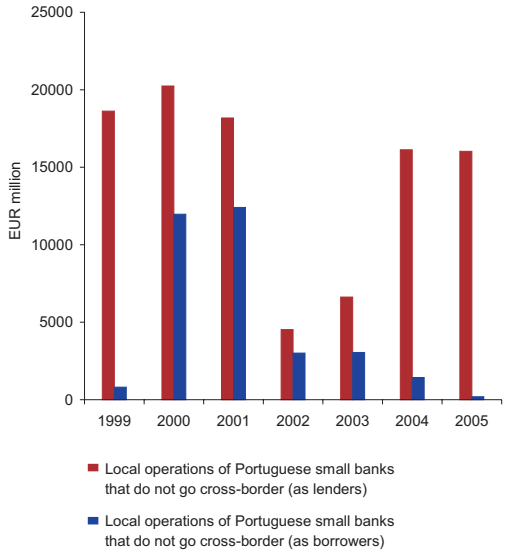


Chart 9

TRANSACTIONS INVOLVING ONE OF THE SMALLER PORTUGUESE BANKS THAT DO NOT GO TO THE CROSS-BORDER MARKET



4. EMPIRICAL EVIDENCE: HIERARCHIES AND RELANTIONSHIPS

Looking at relationships in the market for daily funds it appears that, as a rule, Portuguese banks are active cross-border. For example, in 2005, in a set of 30 bank groups, 22 participated in the daily funds market as lenders (21 participated as borrowers). In 2005, all five large banks went frequently cross-border, mostly as lenders (in 80 per cent of the number of their cross-border transactions, corresponding to 96 per cent of the amounts they traded cross-border, the largest banks were lenders). Additionally, 11 of the smaller went cross-border as lenders and 6 as borrowers. They went cross-border as lenders 86 per cent of the times they traded (corresponding to 76 of the amount they traded cross-border).

Most of the time during the 1999-2005, Portuguese banks participated in the euro area inter-bank money market as lenders. As documented in charts 7 and 8 in the previous section, in terms of the yearly accumulated amounts of cross-border transactions, only in 1999 the proportion of transactions in which the Portuguese banks were borrowers was larger than the proportion in which they were lenders (72 per cent, that is 65 per cent of the number of transactions).

Tables 2A and 2B present a matrix with the relative importance of transactions, where Portuguese banks act, respectively, as lenders and borrowers. We may start by looking first at transactions with Portuguese banks participating as lenders

First, the overall volume of transactions is (predictably) dominated by the five largest Portuguese banks. Second, when the largest Portuguese banks lend, on the inter-bank market for daily funds, they

Table 2

TRANSACTIONS OF PORTUGUESE BANKS IN THE MARKET FOR DAILY FUNDS ACCORDING TO THE NATURE OF RELATIONSHIPS (%)

A – Portuguese banks are lenders

Borrower \ Lender	Large Portuguese bank	Small Portuguese bank that goes cross border	Other small Portuguese bank cross-border	Portuguese bank
1999				
Portuguese large bank	13.25	22.61	3.98	39.83
Portuguese small bank	4.64	10.74	2.28	17.67
Foreign bank	35.97	6.54		42.50
	53.85	39.89	6.26	100.00
2000				
Portuguese large bank	7.27	10.39	3.30	20.96
Portuguese small bank	2.48	3.75	2.17	8.40
Foreign bank	64.60	6.04		70.64
	74.34	20.19	5.47	100.00
2004				
Portuguese large bank	0.17	1.66	1.09	2.92
Portuguese small bank	0.21	0.52	0.17	0.90
Foreign bank	77.50	18.68		96.18
	77.88	20.86	1.25	100.00
2005				
Portuguese large bank	0.28	1.70	1.37	3.35
Portuguese small bank	0.05	0.31	0.06	0.42
Foreign bank	77.84	18.39		96.23
	78.17	20.40	1.43	100.00

B – Portuguese banks are borrowers

Borrower \ Lender	Large Portuguese bank	Small Portuguese bank that goes cross border	Other small Portuguese bank cross-border	Portuguese bank
1999				
Portuguese large bank	7.05	3.44	3.71	14.20
Portuguese small bank	16.96	8.75	5.73	31.45
Foreign bank	49.00	5.35		54.35
	73.01	17.54	9.45	100.00
2000				
Portuguese large bank	9.68	2.16	1.14	12.97
Portuguese small bank	18.23	4.74	3.15	26.12
Foreign bank	49.93	10.98		60.91
	77.84	17.88	4.28	100.00
2004				
Portuguese large bank	1.04	1.20	0.11	2.35
Portuguese small bank	17.05	3.69	0.58	21.32
Foreign bank	11.69	64.63		76.33
	29.79	69.52	0.69	100.00
2005				
Portuguese large bank	2.25	0.26	0.11	2.62
Portuguese small bank	24.20	2.87	0.03	27.10
Foreign bank	24.51	45.77		70.28
	50.96	48.90	0.14	100.00

typically go cross-border. Already in 1999 about 67 per cent of these operations were cross-border (about 87 per cent in 2000). In 2004 and 2005 their importance expanded to cover almost the totality of lending operations for these banks (and almost 78 per cent of all lending operations of Portuguese banks). Third, the situation is contrasting when the lender is a Portuguese bank not active cross-border. In such a case the most likely borrower is one of the five largest Portuguese banks. Such pattern was already present in 1999. Over time it accentuated with, in 2005, large Portuguese banks absorbing almost the totality of funds traded by small banks. The importance of the values traded, however,

has declined significantly over time. Fourth, and perhaps the most interesting case, is that of relatively small Portuguese banks but active cross-border. Until 2002, most lending transactions of these banks were effected with larger local banks (see Chart 8 in the previous section). In that year the percentage was still around 50 per cent. However, over time, the importance of cross-border transactions increased sharply. In fact the importance cross border transactions for this subset of the Portuguese smaller banks was over 90 per cent in 2005.

Turning to borrowing operations of Portuguese banks affords us some interesting insights as well. First, when the largest Portuguese banks borrow they rely both on local and cross-border transactions. In 1999 and 2000, already almost 2/3 of their borrowing transactions were cross-border. However, the proportions were smaller, both in 2004 and 2005, with values under 50 per cent on both years. Second, in the early stages, small Portuguese banks active cross-border would rely both on local and cross-border transactions when borrowing. In 1999 and 2000, the proportion of funds they obtained from other small Portuguese banks exceeded the funds they got from the five largest, in a proportion of 2 to 1. Over time these patterns changed noticeably. Small Portuguese banks, active cross-border, relied, to a very large extent, in the last years, on cross-border transactions to satisfy their daily liquidity needs. In fact the proportion of cross-border operations was about 93 per cent in both years. For the remainder they relied on transactions with other small Portuguese banks. The share of operations with the five large Portuguese banks dried out almost completely. Lastly, it is interesting to point out that the smaller Portuguese banks that do not trade actively cross border hardly borrowed in the inter-bank market for daily funds both in 2004 and 2005.

Table 3A reports information on lending operations of Portuguese banks. Table 3B does the same for borrowing operations. Table 3 makes it clear that the largest Portuguese banks trade cross-border with a number of counterparties, while smaller Portuguese banks trade with only a few. Moreover, in general, Portuguese banks have had fewer relationships when acting as borrowers. It also evident that cross-border transactions are concentrated. Transactions are more concentrated, as expected, for smaller banks. In fact, the largest counterparty, for smaller Portuguese banks, in 2005, had a weight of about 31 per cent of the total volume of operations, in the case of lending operations, and of more than 90 per cent for bor-

Table 3

NUMBER OF RELATIONSHIPS OF PORTUGUESE BANKS IN THE CROSS-BORDER MARKET

A – Lending relationships

	1999	2000	2001	2002	2003	2004	2005
Average number of relationships							
Large banks	79.0	83.8	89.6	86.2	101.8	85.6	76.0
Small banks	11.3	14.4	14.7	17.7	20.1	20.4	17.1
Weight of largest relationship (%)							
Large banks	17.9	18.2	13.4	11.3	12.4	16.1	16.8
Small banks	46.0	49.8	33.1	24.6	30.9	27.8	31.2

B – Borrowing relationships

	1999	2000	2001	2002	2003	2004	2005
Average number of relationships							
Large banks	105.5	79.0	65.6	45.0	27.6	25.6	24.6
Small banks	4.7	6.6	6.4	7.0	2.9	2.6	2.3
Weight of largest relationship (%)							
Large banks	20.5	23.6	30.2	28.6	36.7	42.6	35.6
Small banks	85.3	75.0	71.5	75.2	83.7	84.1	90.2

rowing operations. For the largest Portuguese banks the corresponding numbers are, naturally, lower with, again for 2005, almost 17 per cent and 36 per cent, respectively.

5. CONCLUSIONS

In the Introduction we listed a set of questions, which we proposed to answer in this paper. We will now collect the answers:

- Is the market for daily funds segmented, as far as Portuguese banks are concerned? Is there evidence of an integration process?

We found that average interest rates in operations involving Portuguese banks were very close to EONIA rates since the beginning of 1999. In other words, integration, measured by convergence of interest rates, occurred almost instantaneously, right at the beginning of the third stage of EMU. The correlation between average interest rates involving Portuguese banks and the EONIA average has been virtually one and average spreads have been small. In 2005, the average difference was only 1.7 basis points. We also found that there is also a very strong association between the dispersion of interest rates, measured in the EONIA panel, and the dispersion of interest rates across Portuguese banks. In particular, we have found that the dispersion of interest rates increases as the end of the reserve maintenance period approaches.

Using transactions volumes, we confirm a strong integration story. In fact, in 2004 and 2005, the share of transactions, involving two Portuguese banks, on the total of transactions in which at least one of the counterparties was a Portuguese bank, stabilized at about only 3.5 per cent.

Focusing on transactions volumes the process appears more gradual. In any case, already in 1999, almost 2/3 of the transactions volumes corresponded to cross-border operations, with only 1/3 corresponding to transactions between Portuguese banks. The latter share declined rapidly. Already in 2002 less than 10 per cent of transactions volumes were locally traded. The same gradual process is apparent when we focus on interest rate spreads for operations involving local counterparties, in particular on operations involving small Portuguese banks with a larger local counterparty. The share of these operations declined steadily over time. Moreover, even for these operations, it is the case that spreads, in 2005, at the end of our sample period, were very low.

- How do Portuguese banks participate in the euro area wide market? How relevant are cross-border transactions for Portuguese banks?

Almost all Portuguese banks that are active on the money market are also active cross-border. We interpret the evidence as strongly supporting the view that the relevant market is euro area wide. During the period 1999-2004 cross-border operations increased steadily from around 2/3 right at the time of the introduction of the euro, to about 97 per cent in 2004 and 2005.

- Can we detect a hierarchical structure? What is the role of the largest institutions?

Patterns of banking relationships in the inter-bank market for daily funds are seen as evolving over time. It is, however, clear that larger Portuguese banks have a richer set of counterparts cross-border and are more active in the market. Moreover, the behavior of interest rates in operations involving small Portuguese banks is visibly different from the rest of the operations in our data sample. Spreads were noticeable at the beginning of our sample period. In 2005 spreads for operations involving small Portuguese banks narrowed noticeably. At the end of our sample period the largest Portuguese banks

concentrated their lending activity cross-border and were not a significant source of daily financing for smaller banks.

One last contribution of the paper is methodological and relates to the fact that the procedure proposed by Furfine (1999) is successful identifying daily market operations, when applied to European RTGS data. Such dataset is very rich because it permits the recovery, for each individual transaction, of information on price, quantity and the identification of the trading parties.

Therefore, it is clear that the methodology by Furfine may be used for any other country where a similar database could be made available. It would be particularly interesting to look at cases of larger countries, where the share of transactions among local banks could be non-negligible and the market share of the largest banks smaller. In such a case, it would be more likely to find a hierarchical structure in local transactions. Research prospects would be greatly enhanced if it were possible to obtain a representative sample for the euro area. In such a case one could test the empirical implications from equilibrium models of the money market. Such a rich database would allow testing for implications for the distribution of equilibrium prices, quantities traded and for the use of standing facilities.

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FOREIGN COMPETITORS' PRICE AGGREGATION IN COMPUTING PRICE-COMPETITIVENESS INDICATORS: AN APPLICATION TO THE EU15 COUNTRIES*

*Paulo Soares Esteves***

1. INTRODUCTION

This paper discusses the different ways of computing real effective exchange rates. It shows the implications of using the information on price levels for each country, instead of the usual procedure where the foreign price indicator is computed using growth rates of prices in each of the economies considered as competitors.

This approach may imply major differences in an analysis of the reasons underlying the recent evolution of the real exchange rate, in the light of increasing competition from some emerging economies with very low production cost levels. In contrast with the most common approach, this indicator is able to gauge the effect of the trade structure on the level of price-competitiveness. Very low-cost countries may be increasing their presence in international markets and thus putting additional pressure on domestic exporters, but traditional indicators point to an increase of national price-competitiveness if those third countries have a higher inflation rate.

In this context, the use of information on price levels, although subject to some drawbacks, may contribute to a better understanding of the evolution of export market shares. This was pointed out in Turner and Van´t dack (1993), who suggested using information on cost levels to account for the competition from emerging countries, as the traditional indicators – based on growth rates – tend to minimize the competitiveness effects of their increasing presence on world markets. This problem has certainly become even more acute over recent years due to the participation of new players in international trade, in particular China, other developing Asian economies and countries from Central and Eastern Europe.

This paper is organized as follows. Section 2 presents the implication of using information on price levels, emphasizing the differences from the results obtained with the most common real exchange rate indicator. Section 3 presents an application to the EU15 market, describing the evolution of market shares between member countries and outside competitors for the period from 1980 to 2005, and computing the two price-competitiveness indicators for the period after 1993. Finally, Section 4 summarizes the main conclusions.

2. AGGREGATING INTERNATIONAL PRICES

The Real Effective Exchange Rate (*REER*) indicators compare the evolution of domestic prices (*P*) with a weighted average of the prices in each *i* competitor country (P^i) converted to domestic currency using the bilateral exchange rate (E^i). The weights used in the aggregation of international prices de-

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pend on whether the objective is to measure national price-competitiveness in domestic or external markets.

Traditionally, this aggregation is carried out by using international prices expressed in growth rates. Even when the weights are updated, this is done through a chain linking procedure, which means that the growth of the aggregated foreign price results from a weighted average of the evolution of prices in the countries considered as competitors.

Assuming n foreign countries, the usual indicator of real effective exchange rate (*REER*) is easily computed following recursively:

$$REER_t = REER_{t-1} \frac{\left(\frac{P_t}{P_{t-1}}\right)}{\prod_{i=1}^{n}\left(\frac{P_t^i / P_{t-1}^i}{E_t^i / E_{t-1}^i}\right)} \quad (1)$$

In logarithmic terms (lower case letters) its evolution may be expressed as:

$$\Delta reer_t = \Delta p_t - \sum_{i=1}^{n} w_{t-1}^i \left(\Delta p_t^i - \Delta e_t^i\right) \quad (2)$$

It is possible to obtain relative price levels through the difference between market exchange rates and purchasing power parity (*PPP*) exchange rates – the ones usually used to compare GDP levels across economies. The direct use of that information leads to the following real effective exchange rate (*REER**):

$$REER_t^* = \prod_{i=1}^{n}\left(\frac{P_t}{P_t^i / E_t^i}\right)^{w_t^i} \quad (3)$$

The main difference is that foreign prices are aggregated in levels, and the respective weights are allowed to change in two consecutive periods. The evolution of this indicator is given by:

$$\Delta reer_t^* = \sum_{i=1}^{n} w_{t-1}^i \left[\Delta p_t - \left(\Delta p_t^i - \Delta e_t^i\right)\right] + \sum_{i=1}^{n} \Delta w_t^i \left[p_t - \left(p_t^i - e_t^i\right)\right] \quad (4)$$

Defining Pr^i as the relative price in relation to each competitor i, the difference between the two indicators is:

$$\Delta reer_t^* - \Delta reer_t = \sum_{i=1}^{n} \Delta w_t^i \, pr_t^i \quad (5)$$

This difference could be interpreted as an international trade structure effect.[1] As the changes in weights add up to zero and price levels are measured in relative terms, this structure effect implies an additional real appreciation (depreciation) of the domestic currency if competitor countries with lower prices (higher prices) are increasing their market share.

(1) Estimations of this structure effect have been made to measure the impact on import prices of increasing international competition from countries with very low cost levels [see for example, Bank of Finland (2006), ECB (2006) e Sveriges Riskbank (2005)]. The same type of analyses was done in Røstøen (2004) when building an international price indicator able to explain the evolution of the imported consumer goods deflator.

3. AN APPLICATION TO THE EU15 MARKET

This section presents an application to the EU15 market, computing a real effective exchange rate indicator based on price levels to measure price-competitiveness of EU15 countries exports. Given the lack of information in real terms, market shares are calculated in nominal terms. Thus, the analysis has been limited to manufacturing trade, as the traditional high volatility of commodity prices tends to distort the trade shares for total goods based on nominal data. These market shares are computed for the period 1980 - 2005, while the real exchange rate indicators are calculated only for the period after 1993, due to the lack of information for the earlier period.

The information on trade flows is obtained from the CEPII-CHELEM database until 2004, updated with the growth rates for 2005 obtained from the World Trade Atlas (WTA). Relative price levels were obtained from the IMF (2006 September World Economic Outlook database) by taking the difference between the PPP exchange rate used to compare the GDP level across countries with the observed exchange rates.[2]

The use of data for relative price levels is subject to limitations over the problems posed by the more usual real exchange rate indicators. Differences in price levels in various countries are based on indicators such as the CPI or the GDP deflators, which also cover the non-tradable sector and are not adjusted by productivity growth differentials, and these differences may be influenced too by structural factors that are not related with the ability to compete in world markets. In particular, as the differences in price levels across countries are particularly relevant for the non-tradable sector[3], the use of this price level data to compute competitiveness indicators tends to overestimate the differences between prices of traded goods. Additionally, there are questions about the availability and robustness of the PPP data for some developing countries, given the fact that some of this information is only estimated.[4]

3.1. The EU15 market

Considering the EU15 market, the intra and extra import shares allows to evaluate the relative position of competing countries. It should be mentioned that these intra shares not only measure competitiveness on the import side, but they also reflect export performance of the EU15 countries. In fact, as total imports include both intra and extra imports, the share of intra imports is equal to the sum of member country export shares in this market.

As can be seen from Chart 1, there was a downward trend of intra EU15 share on total imports of manufacturing from the beginning of the 90s, from figures close to 73 per cent to a level slightly above 65 per cent in 2005. Part of this decline might possibly be related with the increasing integration of markets, and therefore it might not reflect a decline of competitiveness if EU15 countries were gaining market share in external markets. However, a recent evaluation of extra euro-area exports points also to a decline in market share over the most recent years - see ECB (2005) for an analysis of the export performance of the euro area.

(2) The same type of information was used in Røstøen (2004) to compute price levels for a number of countries.

(3) On this issue see Bhagwati (1984) that formalizes an idea early presented in Balassa (1964) and Samuelson (1964) and points an alternative explanation to understand why services are cheaper in poor countries.

(4) In the case of the IMF, these estimations are derived from a cross-section regression between PPP-based GDP per capita and GDP per capita at market rates. See Box A2 of April 2004 World Economic Outlook for the last update of PPP weights, based on benchmark surveys of national prices of 2000 released by the World Bank as part of the United Nations International Comparison Project. A description of this estimation process is presented in Box A1 of the May 2000 World Economic Outlook.

Chart 1

INTRA EU15 TRADE IN MANUFACTURING

(% of total imports)

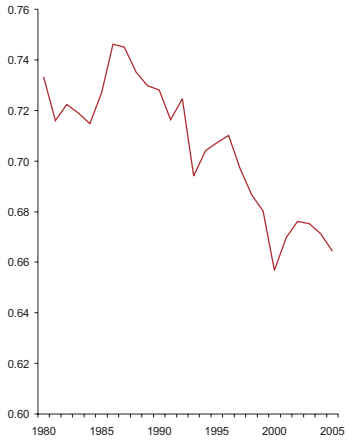
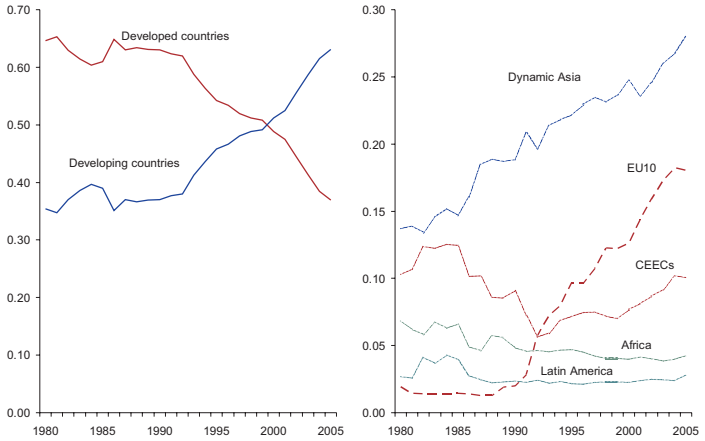


Chart 2

EXTRA EU15 IMPORTS OF MANUFACTURING(*)

(% of extra EU15 imports)



Note: (*)
- Developed countries include Australia, Canada, Iceland, Israel, Japan, New Zealand, Norway, Switzerland and the United States.
- Dynamic Asia includes Bangladesh, Brunei, China, Hong Kong, India, Indonesia, Malaysia, Pakistan, Philippines, Singapore, South Korea, Sri Lanka, Taiwan, Thailand and Vietnam.
- EU10 includes 8 of the 10 new member states of the EU (excluding Cyprus and Malta). Before 1992, this aggregate did not include Slovenia, Estonia, Latvia and Lithuania (included in the CEECs).
- CEECs (Central and Eastern European Countries) include the Commonwealth of Independent States (CIS), the former Yugoslavia, Central Europe (Albania, Bulgaria and Rumania) and Turkey. All new member states of the European Union are excluded since 1992..
- Africa includes Algeria, Cameroon, Cote d'Ivoire, Egypt, Gabon, Kenya, Morocco, Nigeria and Tunisia.
- Latin America includes Argentina, Bolivia, Brazil, Chile, Colombia, Ecuador, Mexico, Paraguay, Peru, Uruguay and Venezuela.

The decline of the intra import share is associated with some structural changes concerning the relative importance of the main foreign suppliers (Chart 2). The share of imports from other developed countries recorded a big decline from the beginning of the 90s, from average levels close to 65 per cent in the 80s to a share of around 35 per cent in 2005. The increase of developing economies' shares in the EU15 market over the last 15 years has been related with the maintenance of strong market share gains of Asian countries, and the new dynamics of some countries from Central and Eastern Europe, certainly in the wake of the major political and economic changes after the Berlin wall collapse. In this period shares of manufacturing imports from Africa and Latin America remained basically stable at levels close to 3 per cent. Obviously an analysis based on broad aggregates may mask important differences between certain countries, and thus it may therefore be helpful to look at more detailed information.

Table 1 considers the non EU15 countries that recorded higher market share gains and losses in the EU15 market. Over the last 25 years, the main gainers were China and some countries from Central and Eastern Europe, in particular the Czech Republic, Hungary, Poland and Turkey. Against this, the main losers in manufacturing exports to the EU15 were some important developed countries, in particular the US and Japan.

This change in suppliers is more evident from 1993 onwards, and has become even more pronounced in the most recent years, as the pace of market share gains of developing countries has increased. This is notably evident for China: the annual growth of its market share in EU15 manufacturing imports increased from 0.05 percentage points during the 80s to a figure 10 times higher (more than 0.5 percentage points in the most recent years).

The decline in the market share of developed countries in the EU15 only became clear during the 90s. Over the 80s the gains of some emerging economies were offset by the losses of other emerging coun-

Table 1

MAIN GAINERS AND LOSERS IN THE EU15 MANUFACTURING MARKET

Market share evolution, annual average change in percentage points

Gainers

1980-2005		1980-1993		1993-2005		2000-2005		2003-2005	
China	0.16	China	0.05	China	0.27	China	0.44	China	0.57
Czech Re.	0.07	Czech Re.	0.04	Czech Re.	0.10	Czech Rep.	0.13	Czech Rep.	0.13
Hungary	0.05	Taiwan	0.04	Hungary	0.08	Poland	0.12	Russia	0.09
Poland	0.05	Turkey	0.03	Poland	0.08	Turkey	0.07	Poland	0.09
Turkey	0.04	Singapore	0.03	Turkey	0.05	Hungary	0.05	Morocco	0.08

Losers

1980-2005		1980-1993		1993-2005		2000-2005		2003-2005	
Norway	-0.02	Hong Kong	-0.02	Taiwan	-0.03	Philippines	-0.04	Philippines	-0.04
Canada	-0.02	Rumania	-0.02	Hong Kong	-0.03	Malaysia	-0.04	Hong Kong	-0.04
Hong Kong	-0.03	Former Yugosl.	-0.03	Switzerland	-0.06	Taiwan	-0.10	Taiwan	-0.05
Japan	-0.03	Canada	-0.04	United States	-0.18	Japan	-0.26	Japan	-0.16
United States	-0.10	Former USSR	-0.12	Japan	-0.19	United States	-0.53	United States	-0.28

tries, in particular the ex-Soviet block economies. Thereafter, the situation changed. The gains of developing countries corresponded to losses among developed countries. Japan, the US and Switzerland were the countries that have recorded the worst performance since 1993, followed by Hong Kong and Taiwan.

3.2. Real exchange rate indicators

The real exchange rate compares prices in the EU15 countries with external prices aggregated according to the following weights:

$$W_i^* = \frac{M_{EU\,15}^i}{\sum_{i=1}^{n} M_{EU\,15}^i}, \; i = 1, 2, \ldots, n \qquad (6)$$

where $M_{EU\,15}^i$ represents the EU15 imports from each of the n external competitors considered. It is possible to show that the index built to explain the intra trade share in total imports can be written as an aggregation of the real effective exchange rates oriented to measure export-competitiveness of each EU15 country. Assuming that the EU15 is a single market, i.e not considering any geographical or product specialization, it is easy to reach a real effective exchange rate to measure export competitiveness of each country *j* to these market, using the following weights for the EU15 countries and for each foreign competitor:

$$W^{j}_{EU\,15} = \frac{Y_{EU\,15}}{Y_{EU\,15} + \sum_{i=1}^{n} M^{i}_{EU\,15}} \quad W^{j}_{i} = \frac{M_{EU\,15}}{Y_{EU\,15} + \sum_{i=1}^{n} M^{i}_{EU\,15}},\ i = 1,2,\ldots,n \tag{7}$$

where Y_{eu15} is the value of the domestic production of the manufacturing sector in the EU15 - this corresponds to a particular application of the usual double weight scheme presented in a very intuitive way in Turner and Vant´t dack (1993). In this case, the current overall index (REER) can be obtained as an aggregation of the real effective exchange rates for each EU15 country (REERj)

$$REER = \left[\prod_{j} \left(REER_{j} \right)^{\alpha_{j}} \right]^{\frac{Y_{EU\,15} + \sum_{i=1}^{n} M^{i}_{EU\,15}}{Y_{EU\,15}}} \tag{8}$$

where α_{j} represents the weight of each country in the EU15 price aggregate.

Thus, the indicator built to explain the intra-import share on total EU15 imports may be seen as a price-competitiveness indicator of any specific member country's exports to this market.

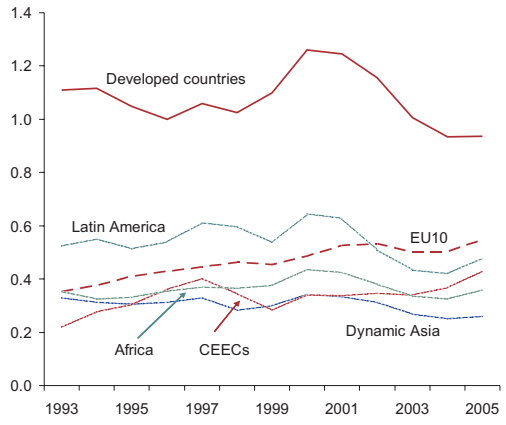
However, the direct application of this methodology to obtain results for national economies is not the most suitable because it would imply that the weight given to each foreign competitor would be the same for every EU15 country. For a better evaluation of the international competitiveness of each country it would be better to consider the different product specialization across EU15 countries and this would imply differentiated weights [see Esteves and Reis (2005)].

3.2.1. Relative price levels

The relative prices between the EU15 and its foreign competitors are the first items necessary to compute real effective exchange rate indicators. Chart 3 presents these relative prices from 1993 onwards, considering the set of country aggregates used above. Note that these aggregated figures are not the ones directly used for computation of the real effective exchange rate. The use of individual data for the price level in each foreign country may produce different results, given that the weight of each econ-

Chart 3

RELATIVE PRICE LEVELS
(EU15 = 1)



omy in the respective aggregate may differ significantly from its importance as a competitor in the EU15 market.

Two main results seem to emerge from these figures. The first is that the relative price level against the non-EU15 developed countries was relatively stationary, around an average slightly above one. The fluctuations of this relative price reflected mainly the evolution of the US$ exchange rate against the EU15 countries - the two series show a correlation coefficient of 0.86.

The second main result is the persistent lower relative price levels in emerging countries over the period considered. Special attention should be given to the Dynamic Asia aggregate. This is the region with the fastest and most sustainable market shares increase in the EU15 market, but where no price convergence has taken place. During the 90s, their prices levels were around 20 per cent of those observed in the EU15. The European developing countries also recorded a stronger presence in the EU15 market from the beginning of the 90's, but they faced some price level convergence.

3.2.2. Aggregation weights

Table 2 presents the weights for external competitors, using the available information for 63 individual countries and presenting the 20 most important competitors according to their weights in 2005.

Table 2

SHARES ON EXTRA EU15 MANUFACTURING IMPORTS

(%)

	1993-2005	1993-2000	2001-2005	1993	2005
United States	0.215	0.233	0.187	0.245	0.156
China	0.064	0.045	0.096	0.033	0.128
Japan	0.119	0.135	0.093	0.166	0.081
Switzerland	0.089	0.095	0.080	0.107	0.078
Czech Republic	0.033	0.026	0.045	0.016	0.052
Poland	0.037	0.030	0.047	0.024	0.052
Hungary	0.029	0.022	0.041	0.013	0.042
South Korea	0.032	0.032	0.033	0.028	0.036
Turkey	0.025	0.021	0.031	0.019	0.034
Russia	0.024	0.024	0.024	0.018	0.027
Taiwan	0.031	0.034	0.026	0.036	0.022
Norway	0.025	0.027	0.022	0.028	0.020
Brazil	0.018	0.019	0.018	0.021	0.019
India	0.016	0.016	0.017	0.015	0.018
Slovakia	0.011	0.008	0.016	0.005	0.017
Rumania	0.011	0.009	0.015	0.006	0.016
Malaysia	0.020	0.022	0.018	0.020	0.016
Singapore	0.018	0.020	0.015	0.020	0.016
Thailand	0.017	0.017	0.016	0.016	0.015
Canada	0.018	0.019	0.015	0.020	0.014
Coverage	0.854	0.854	0.854	0.855	0.859

As suggested in the previous section, there was a remarkable decline of the weight attributed to competition from other developed countries, in particular the US and Japan, but also Switzerland and Canada. These four economies are the only developed countries selected according to the above mentioned criterion. In the opposite direction, there was a remarkable increase in competition from some emerging economies, in especially China and the new EU members. The share of imports from China increased almost 10 percentage points from 1993, and this country is catching up with the US as the main exporter to the EU15 market; the Czech Republic, Poland and Hungary are becoming almost as important as Japan or Switzerland.

3.2.3. Real effective exchange rates

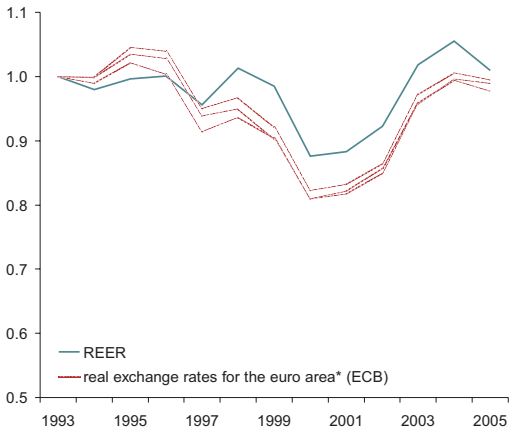
Using the weights and the price levels of the 63 countries mentioned above, it is easy to compute the two real exchange rate indicators (growth vs level aggregation). These are presented in Chart 4, along with the real effective exchange rate indicators computed and published by the ECB for the euro area.[5] Additionally, Chart 5 compares these price-competitiveness indicators with the EU15 countries' export market shares.

The computed indicator based on growth rates is relatively close to the figures for the euro area published by the ECB (correlation coefficients of 0.85), even though it covers different aggregates (EU15 vs euro area) and considers different foreign competitors and weighting schemes. These growth-based indicators do not show a clear trend, with the figure for 2005 being relatively close to the average observed during the period considered. This means that the negative trend of the EU15 countries' market shares cannot be explained by these price-competitiveness indicators.

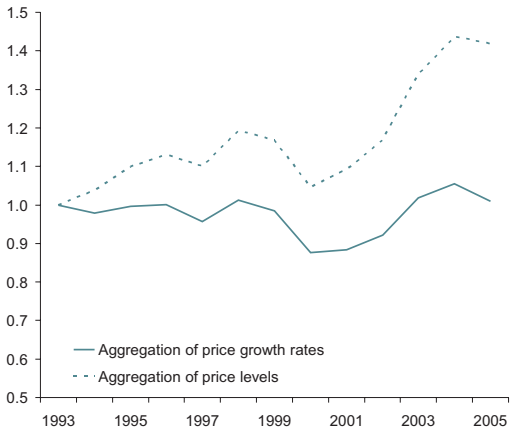
Chart 4

REAL EFFECTIVE EXCHANGE RATE FOR THE EU15 COUNTRIES

Indicators based on growth rates (1993=1)



Comparison between indicators based on price levels and growth rates (1993=1)

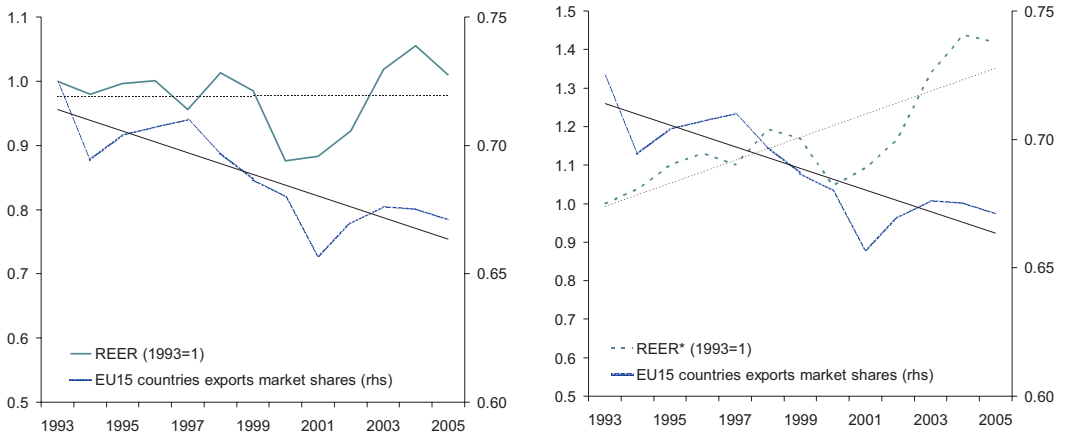


Note: (*) Taking into account the CPI (for the groups with 23 and 42 currencies) and GDP deflators for the 23.

(5) In order to improve comparability between the various competitiveness measures, these ECB indicators were also rebased to 1993=1. For detailed information on the calculation of these aggregates see Buldorini, Makrydakis and Thimann (2002) and the Box 10 entitled "Update of the overall trade weights for the effective exchange rates of the euro and computation of a new set of euro indicators" in the September 2004 issue of the ECB Monthly Bulletin.

Chart 5

REAL EFFECTIVE EXCHANGE RATE AND EXPORTS MARKET SHARES



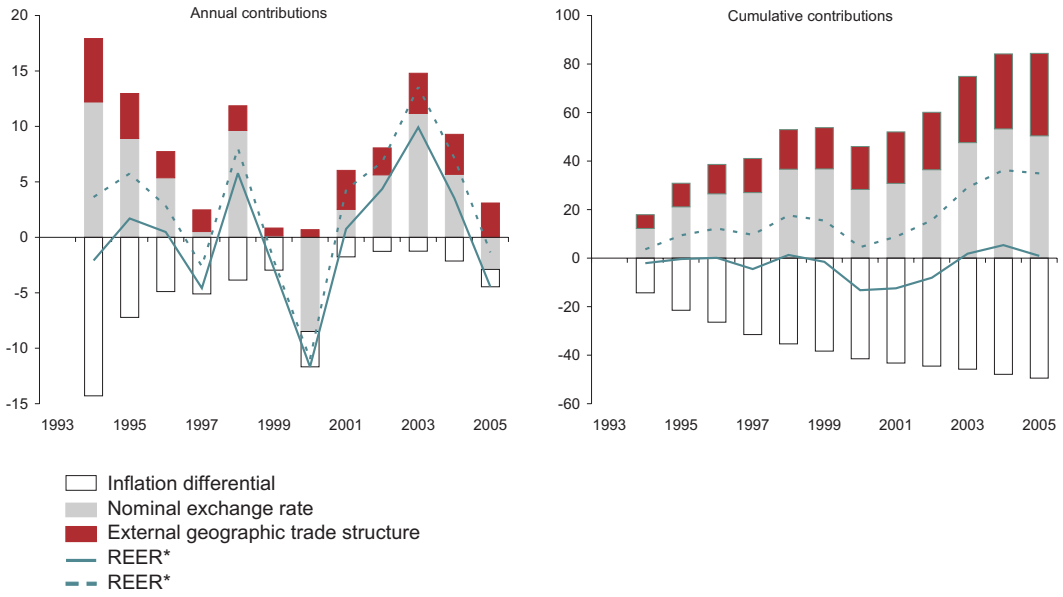
The results are somewhat different when the alternative indicator (price level aggregation) is considered. This indicator suggests a significant loss of price-competitiveness in the EU15 countries over the period considered. Since 1993, the loss of competitiveness implicit in this indicator has been close to 42 per cent, while the traditional indicators point to a real appreciation of just 0.9 per cent. This indicator exhibits a negative correlation of around 0.5 with the EU15 market shares, and thus the existence of a relationship between the two variables should not be immediately disregarded. This may be explained by the strong endogenous feature of this indicator, which takes into account the recent evolution of the international trade structure and thus measures the effects related with the increasing openness of markets.

Chart 6 decomposes the evolution of the real effective exchange rate, and clearly shows the differences between the two indicators. As expected when facing this type of structural effect, the differences are less pronounced when the two series are evaluated in terms of first differences. Thus the choice between the two indicators becomes really important when the objective is to consider the level of competitiveness, instead of just explaining its short-run variation. The results confirm the effects of the international trade structure on price-competitiveness in the EU15 countries. The impact of this on the real appreciation of the exchange rate (see equation 5) was constantly positive, reaching an accumulated value of around 40 percentage points.

This real appreciation has been particularly impressive during the most recent years. Contrary to what occurred during the 90's, the nominal appreciation of the euro from 2000 onwards was not offset by a substantial negative inflation differential, reflecting the generalized decline in inflation across the world economy. Furthermore, this real appreciation of around 15 per cent measured by the traditional indicator was reinforced by the increasing competition from some emerging countries with very low price levels - the level-based indicator points to a real appreciation of 35 per cent.

Chart 6

DECOMPOSITION OF REAL EXCHANGE RATE INDICATORS
(Contributions in p.p.)



4. CONCLUSIONS

This paper examines an alternative way of aggregating foreign prices when computing real effective exchange rate indicators. The common procedure to compute real exchange rate indicators is to build the foreign price indicator as a weighted average of the growth rates of prices in the countries selected as competitors. An alternative to this conventional procedure is to make direct use of the information on price levels that are aggregated with variable weights. This different approach may be particularly important when the structure of international trade is changing markedly, as has occurred over the recent years, reflecting the increasing competition of some emerging economies from Asia and Central and Eastern Europe where production costs are very low.

Firstly, the paper analyses the geographical structure of the EU15 manufacturing market over the last 25 years. During the 80s, the export market shares of member countries remained broadly stable – the intra-trade share on total imports stood at levels slightly above 70 per cent. In that period, 2/3 of extra EU15 imports came from other developed countries, against 1/3 from developing countries. But this structure has changed markedly in the last 15 years. Both the export market shares of EU15 countries and of other external developed economies started to decline. The share of imports from developing countries in total EU15 countries' imports has almost doubled since 1993 (from 10 to 20 per cent), and its weight on extra EU15 imports increased from 1/3 to 2/3. During this period, China was the country that recorded most gains, followed by the Czech Republic, Hungary, Poland and Turkey.

Secondly, the paper tries to evaluate the ability of price-competitiveness indicators to explain the decline of the EU15 countries' market shares. The most common indicator based on growth rates does not show any trend since 1993, and thus is not able to explain the negative evolution of these market shares.

When the level-based indicator is considered, the results become very different, pointing towards a sustainable loss of competitiveness in EU15 countries. Traditional indicators point to a real apprecia-

tion of just 0.9 per cent since 1993, whereas the loss of competitiveness implicit in this indicator is close to 42 per cent. This difference reflects the effects of the international trade structure, related with increasing competition from some emerging market countries with very low price levels. Judging by the negative correlation of this level-based indicator with the EU15 market shares, the existence of a long-run relationship between the two variables should not be disregarded as it is when the more traditional indicator is used.

The use of price-competitiveness indicators raises important problems. The low empirical adherence of the price competitiveness indicators seem to be associated with a variety of factors: the lack of theoretical fundamentals, the relevant measure errors related with the available statistics and the endogenous behaviour of the real exchange rate in relation to the economic growth. This article also points to an additional problem, related to the inability of these indicators to gauge the effects from the recent geographical changes in international trade.

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THE EFFECTS ON EQUITY OF AN INCREASE IN THE VALUE-ADDED TAX*

*Isabel Correia***

1. INTRODUCTION

Although tax reforms are a recurrent phenomena in every developed economy for the last decades, most tax codes are characterized by extremely complex rules mainly around business taxes and personal taxation of income. The high costs involved with such systems motivated concerns from politicians and academics, leading to a broad discussion on the advantages of a fundamental tax reform. One goal of such reform would be to simplify the existing systems. In addition to these theoretical concerns, in the last decade some countries, namely countries in development have adopted very simplified tax systems, and there seems to be no doubts about the good performance of these systems in those economies. These experiences have led to an increase in the number of supporters of a change to a system that favors a flat tax[1].

As fairness is the argument widely used to justify the high complexity of the actual tax regimes, the most commonly expressed objection to this radical reform proposal concerns its distributional consequences.

This note shows the effects on equity of a study that analyzes the foundations of such concerns. In an economy where the existing tax system is based on capital and labor taxation, what are the effects on equity of a change to a system based on consumption taxation, with identical taxes across goods? That is, in the limit, if income wasn't taxed anymore and government revenues came exclusively from valued added taxation with a flat tax, which would be the effects on equity? Agents with the higher welfare in the economy would gain or loose with the reform? And the average economic agent? And the median agent? And the "poorest" in this economy? That is, the aim of this note it is to analyze the effects of the reform of taxation across agents with different levels of welfare.

With this objective an economic model that measures the effects that a reform of this type has on the general equilibrium of the economy is built. The reason why there has been a widening consensus of the positive aspects of this reform is very much related with the idea that the effects on the economic efficiency are quantitatively significant. These effects are uniquely derived from the change of the equilibrium, namely from different allocations of time, and from different decisions of consumption, savings and investment due to the reform. If these effects are significative over the efficiency they should be significant over any individual in the economy. Therefore we cannot answer our question assuming that they face different taxes, ceteris paribus. The main channel through which every individual will be affected by the reform is related with the general equilibrium effects. The exercise we perform is the one of a permanent reform of the tax system to which there is commitment that is, once implemented there would be no change to the *status quo* or to any other regime and, in addition, we suppose that private agents believe that this is the case. Thus, the effects that we will describe are permanent but they

* The opinions are solely those of the author and do not necessarily represent those of the Banco de Portugal. This note is based on recent research of which the main reference is Correia (2005).

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(1) Hall and Rabushka (1995) is perhaps the most well known proposal of a flat tax system.

will not be evenly distributed across time. There is a transition period until the economy enters in a stationary trajectory given the new regime. The aim of this paper it is to study the effects on equity comparing the *status quo* with this new path.

We construct a model that simplifies the usually used for this objective [2]. In that way we get a clearer understanding of the main channels through which a change in taxation affects the welfare distribution, and of the importance for the results of the type of exogenous heterogeneity imposed across agents. In addition the results are robust to very different distributions of the exogenous heterogeneity. We use a general equilibrium competitive model where agents have an infinite horizon in which we impose the type of intragenerational heterogeneity that we observe in most developed economies.

This model allow us to conclude that, when a tax reform that eliminates the taxes on capital and labor income is undertaken, and the financing of public expenditures is through a value-added tax, economic efficiency as well as welfare distribution improve. That is, one can guarantee that the welfare of those households that are worse off than the average of the population increase. We can also show that the introduction of deductions on the tax code, or anonymous transfers, allow us to improve equity without losses of efficiency, when an increase of the tax on consumption is used to finance these transfers.

This note is organized in the following way: in the next section we discuss the characteristics specific to the consumption tax. We determine which are the equivalent taxes to any household and we develop the intuition of how the Pareto optimal could be achieved and, more important to our argument, why relying more on the consumption tax, instead of the tax on labor income, increases efficiency. Section 3 answers to the fundamental question of this note, namely the effect on the welfare distribution of moving from a tax code based on income taxes to a tax code based on consumption taxes. We determine how this effect depends on the type of heterogeneity that characterizes the economy. For the characterization that we defend, which represents most industrialized economies, we show numerically that equity improves with the proposed fiscal reform. We show the consequences for individual welfare of improving simultaneously the efficiency and the equity of the economy. In section 4 deductions are introduced in the tax code and we show how the consumption tax allows for improvements in equity without losses in efficiency. Therefore we can replicate the actual progressivity of tax codes, which is associated to increasing marginal tax rates, with gains in economic and administrative efficiency, due to the flat tax. Section 5 concludes.

2. THE ROLE OF THE VALUE-ADDED TAX

In this section we develop the intuition that the advantage of a fiscal code that includes a tax on consumption comes from the fact that with this tax it is possible to replicate a tax with which the Government could discriminate across households, in a non-distortionary way. This advantage leads to the well known consensus in the literature that increasing the share on revenues of taxation of consumption improves efficiency in the economy.

To determine the more efficient way of financing a given path of public expenditures it is equivalent to compute the less distortionary way of doing it. In addition to the income transfer from the private to the public sector of the economy, which is implied always by that financing, the aim is that the change of incentives introduced by the fiscal system would be the smallest possible. Nevertheless the way this change of incentives acts in the economic equilibrium is counter-intuitive: when the economic agent cannot react to the tax it is exactly when the distortionary effect is zero; on the contrary, when given a change in incentives the economic agent alters its decisions and does “legal evasion”, it is when the

(2) For example the overlapping generations models developed by Altig *et al* (2001).

distortionary effects make the tax less efficient. For example, if the Government uses to finance its expenditures a tax per household [3], this tax would not change the economic incentives and therefore it is not distortionary. On the other hand if the financing would come from a tax on labor income it would be less attractive to use time in the market and the intensive margin (hours of work), as well as the extensive margin (number of persons in the labor market), would change. It is this reaction to the change of incentives that makes the tax on labor income distortionary. What is counter-intuitive is that, when for the individual agent there is no way to escape legally, in the end the agent would be better off when compared with the situation where the type of tax would allow a voluntary change of its economic choices. This is a representative case of the importance of using economics to evaluate policies since the impact effects are always dominated by feed-back, or general equilibrium, effects.

To understand the positive effect of having the consumption tax in the tax code it is important to understand how its effects can be derived from equivalent taxes. With this aim we need to describe the instruments that are available to the Government and the way they can affect directly the choices of households. Our set up is one of a non-monetary deterministic closed economy where markets are competitive. Government has no information about the characteristics that differentiate agents so it treats every agent anonymously. For simplicity we will suppose that the only distortion that exists in this economy comes from public consumption, which is a well defined exogenous path. This public consumption, as well as transfers, *Tr*, to private agents, have to be financed with distortionary taxes. There are taxes on capital income, on labor income and on consumption (value-added), which are constant over time. These tax rates are represented respectively by τ_n , τ_k e τ_c . Therefore the exercises reported in this note compare policies with flat taxes, that is with marginal taxes identical across agents and constant over time.

Preferences are identical across households, indexed by *i*, and defined over a sequence of aggregate consumption goods, $\{C_{it}\}_{t=0}^{\infty}$, and over a sequence of hours of work, $\{N_{it}\}_{t=0}^{\infty}$. Diversity across agents in the economy results from different initial assets holdings, i.e. wealth that can be accumulated, mainly physical capital and bonds[4], as well as from different labor efficiency levels which are exogenous to agents decisions. Households are price takers and anonymous in the markets, which implies that every individual faces identical prices.

Then the intertemporal budget constraint for agent *i* can be written as:

$$\sum_{t=0}^{\infty} d_t \left(1+\tau_c\right) C_{it} = \sum_{t=0}^{\infty} d_t \left[\left(1-\tau_n\right) W_t E_i N_{it} + Tr\right] + \left(1+r_o\right) A_{io} \qquad (2.1)$$

where d , w , τ_c , τ_n , Tr and r_o represent, respectively the discount factor (net of the tax on capital) and the gross real wage at period t the tax rate on consumption, the tax rate on labor income, the amount of transfers from the government, and the net real return on initial wealth. E_i and A_{io} represent the exogenous factors that differentiate agents in this economy. E_i is the labor efficiency level of agent *i* and A_{io} represents the initial level of non-human wealth of agent *i*, that is, the endowment that, together with E_i , differentiates agents in this economy. Prices, $p = \{d_t, w_t, \tau_c, \tau_n, \tau_k\}_{t=0}^{\infty}$ and r_o and transfers are exogenous to the individual household. The anonymity of households implies that the government is not able to raise revenue (or make transfers) designed for a special individual *i*. Discriminatory lump-sum taxes and transfers are therefore excluded from the tax code.

(3) The so called poll tax.

(4) We could also have human capital as an asset that could be chosen after period zero. This would imply that the technology would depend on human capital. For simplicity we consider that just raw non-accumulated labor and physical capital are productive.

General equilibrium depends on the consistency of different choices realized by different agents: households and firms. Firms are very simple entities in this environment that every period hire labor and rent capital which, given the technology, produce just one final good. All firms use the same technology and are price takers in the markets in which they operate. The unique good produced in this economy is used for private or public consumption, and for investment which increases the stock of physical capital of the economy.

The straightforward analysis of equation 2.1 reveals the role of the tax on consumption in this economy. It is immediate to verify that for agent *i* it is indifferent to pay a given tax on consumption, or not paying this tax and alternatively paying a higher tax on labor income and a tax on initial wealth. That is, the tax on consumption can be decomposed into two components: one distortionary component that acts on households decisions exactly like a tax on labor income, and a non-distortionary component because taxing initial wealth does not allow for "legal evasion" by economic agents. Once understood this decomposition of the tax on consumption it is easy to understand that in a system which simultaneously taxes consumption and subsidizes labor income, in a way that incentives to work are not affected, the tax on consumption can finance public expenditures and the labor subsidy, just through the non-distortionary component of the consumption tax. The first-best, or maximum of efficiency, would be achieved with this optimal tax code. In the model that we describe efficiency can be measured by the welfare of the representative household, and maximum of efficiency means that the economy is in a Pareto optimum, that is given preferences and technology it is not feasible to finance the exogenous path of public consumption and improve the welfare of one household without deteriorating at least the welfare of another one.

The policy recommendation that labor should be subsidized is difficult to implement due to incentive to over-reporting and the high (perhaps infinite) verification costs of the hours of work. When the restriction that labor income taxes cannot be negative is imposed, this restriction is active and the first best is no longer achievable. We therefore compare in efficiency terms a sequence of policies where taxes on consumption are increasing and labor taxes cannot be negative. The decline of labor income taxation when the tax on consumption increases allows for a less distortionary system since part of the revenue now comes from the non-distortionary component of the consumption tax. As the system now has a higher non-distortionary component, the higher tax on consumption accompanied by a lower tax on labor income it is more efficient. In the limit, when the tax on labor income is zero, and it is substituted by the tax on consumption, efficiency is at the maximum, given the restriction that the tax on labor income cannot be negative.

This positive effect on efficiency of the consumption tax is well known and the costs of increasing the importance of this tax are usually related to the negative effects on equity that this change would imply against the positive effects on efficiency just described. However, the way we used to describe the effects on efficiency raises immediately doubts about the robustness of the negative effects on equity when the tax on consumption is used to substitute the actual taxes on income. As we just describe, an increase of the tax on consumption increases the non-distortionary component that taxes initial wealth, and declines the distortionary component, which changes labor decisions. Heterogeneity across agents in this economy comes exactly from these two components: agents with higher welfare in the economy have higher stocks of initial wealth, or higher labor efficiency, or both. Therefore it is not clear whether the reform would improve the "rich" or the "poor" in this economy. Besides, as we said before, the reform leads to important general equilibrium effects which are transmitted to agents essentially through different equilibrium prices. To compute the effects of this policy change a general equilibrium model has to be solved. This is the subject of the next section.

3. EFFECT ON EQUITY OF AN INCREASE OF THE VALUE-ADDED TAX

In this section we describe the effects on equity of a reform in which the tax on labor income is substituted by a tax on consumption. However to start from a *status quo* more similar with the actual tax systems we consider that the initial system finances an exogenous stream of public consumption with a tax on capital and a tax on labor income. We compare the equilibrium that results from this financing mix with the one where the tax on capital income is eliminated, and after with the ones where the tax of labor income declines and the tax on consumption increases, maintaining the path of public consumption. In this section we consider that the system does not use transfers (lump sum transfers), or deductions, $Tr = 0$.

As we said before the set up is such that the method is much simpler than the ones usually used in the literature. One assumption that allows this simplification is that, although he economy is inhabited by heterogeneous households, the aggregate equilibrium can be replicated by the representative household paradigm. That is, the aggregate equilibrium, namely prices, can be computed with no information on the distribution of initial wealth, A_{io} or labor efficiency, E_i or the distribution that results from the equilibrium. This separability between aggregate and individual allocations is due to quite weak assumptions: in addition to the ones already mentioned, namely that households are price takers in the markets in which they operate and anonymous to the Government, preferences are identical across households and belong to a given class. From this class we chose for this exercise a sub-class that is able to replicate the major characteristics of the cross-section empirical evidence. [5]

Those preferences are represented by:

$$U_i = \sum_{t=0}^{\infty} \beta^t \frac{\left(C_{it} - \chi N_{it}^{\varphi}\right)^{1-\sigma}}{1-\sigma}, \sigma > 0, \chi > 0, \varphi > 1 \qquad (3.1)$$

where C_i and N_i represent respectively agent i choices for consumption and work hours.

Each household maximizes the utility function 3.1, subject to the budget constraint, represented by equation 2.1.

The optimal choice of hours of work by agent i which solves that problem is given by

$$N_{it} = \left[\frac{\left(1-\tau_n\right) w_t E_i}{\chi\varphi\left(1+\tau_c\right)}\right]^{\frac{1}{\varphi-1}}$$

This first order condition reflects the fact that, for this sub-class of preferences, there are no wealth effects on labor supply. Labor supply, in a given period, depends exclusively on the net wage rate and the tax rate on consumption. Note that the tax on labor income and the tax on consumption affect labor decisions in the same way. As households face identical prices this implies that labor choices by "poor" and "rich" households differ exclusively due to different labor productivity. Workers with higher productivity have higher labor supplies than workers with lower productivity. The labor supplies coincide for identical values of the efficiency level, E_i. In this case "poor" and "rich" agents are differentiated exclusively by their consumption decisions.

The effects on equity of the tax reform are measured through the effects on welfare distribution. From the proposed utility function we can express the indirect utility, V_i as:

(5) For more details see Correia (2005).

$$V_i^{\frac{1}{1-\sigma}} = \frac{\Gamma(p)}{1-\sigma}\left[\theta(p)E_i^{\frac{\varphi}{\varphi-1}} + \xi(p)A_{io} + \alpha'(p)\right] \tag{3.2}$$

where p represents the vector of prices and taxes over time, as defined above.

Note that this indirect utility function is a transformation of an expression that is affine on $E_i^{\frac{\varphi}{\varphi-1}}$ and A_{io}, because the functions $\Gamma(p), \theta(p), \xi(p)$ and $\alpha'(p)$ do not depend on individual characteristics. This property is a direct consequence of the conditions imposed for aggregation, namely that agents face the same prices and the assumed class of preferences, and it will be very important to allow for welfare distribution comparisons in a straightforward way.

The interpersonal comparison of utilities, or welfare levels, has been always problematic due to its cardinal characteristic. In this work we minimize this problem using for interpersonal comparison the indirect utility for household i.

$$v_i = \theta(p)E_i^{\frac{\varphi}{\varphi-1}} + \xi(p)A_{io} + \alpha'(p)$$

In order to compare the indirect utility index between any two households, i and j, the ratio v_j / v_i is computed. This ratio has a simple interpretation because it can be read as the ratio between consumption of every good transformed by the desutility of work of agent i and j. The value of this ratio is the answer to the question: How much would the consumption of agent i have to grow, so that agent j would be indifferent to change its position with agent i? It is in the sense of using the consumption equivalent criteria, that we can say that interpersonal utility comparisons are free from cardinality.

To rank policies by their distributional effects is to compare the vectors of individual utilities. We compare changes in inequality induced by different policies, by ordering the v distributions using the relative differential concept.[6] Then policy 1 dominates policy 2 if and only if the percentage increase in consumption of a "poor" agent necessary to equalize his consumption with any "richer" agent is lower in policy 1 than in policy 2. The individual welfare indicator and the inequality criterion chosen imply that the inequality ranking is, in the sense defended before, free from interpersonal utility comparisons.

We can prove that when there is just one dimension of heterogeneity, in our exercise when for example $E_i = 1$ or $A_{io} = A_o$, that is when individual utility can be written as

$$v_i = \gamma(p)H_i + \alpha(p)$$

where H_i represents the dimension of heterogeneity, ordering by equity depends just on equilibrium prices

(6) Policy 1 dominates policy 2 in relative differentials, $v^1 \succ_{rd} v^2$, *iff*

$\frac{v_i^1}{v_j^1} > \frac{v_i^2}{v_j^2}$, for $v_i < v_j$,

For any two distibutions, Lorenz dominance implies relative differential dominance and relative differential dominance is equivalent to Lorenz dominance for every partition of the population set.

$$v^1 \succ_{rd} (\prec_{rd} \text{ or } \approx_{rd}) v^2 \text{ when } \frac{\alpha(p^1)}{\gamma(p^1)} > (<\text{or} =) \frac{\alpha(p^2)}{\gamma(p^2)} \tag{3.3}$$

that is, if the change from policy 2 to policy 1 implies an increase (decrease) of the ratio $\frac{\alpha(p)}{\gamma(p)}$, equity improves (declines).

The advantage of this method is the possibility to infer qualitative distributional effects of policy reforms, with no explicit knowledge on the distribution of characteristics of agents in the economy. Since in our model economy agents differ by two dimensions we will analyze separately two cases:

Case A: Households differ exclusively by the stock of initial non human wealth. In this case, $E_i = 1$ and $H_i \equiv A_{io}$.

Case B: Households differ on the stock of accumulated wealth as well as on the labor efficiency index, such that $\frac{E_i^{\frac{\varphi}{1-\varphi}}}{A_{io}} = \frac{1}{A_o}$,i.e., the consumption index of labor efficiency is perfectly correlated with initial non-human wealth across individuals. We can prove that, in this case, if $Tr = 0$, the ratio $\frac{\alpha(p)}{\gamma(p)}$ is always identical to zero, and it is therefore independent of the policy. An economy characterized by this heterogeneity and by a tax code that does not include transfers, will not experience any effect on welfare distribution when the tax policy changes.

The reason to focus on these two extreme cases is related to the empirical evidence on the cross section data. The literature on this question concludes that concentration is higher in wealth than in income, and that these two variable are correlated. Therefore heterogeneity should come mainly from potentially accumulated assets, being a smaller share due to exogenous characteristics of agents. In our characterization the economy distribution should be between cases A and B.

Therefore to determine the effect on equity of the described tax reforms it is necessary first to compute the effects on the aggregate equilibrium such that the vector *p* associated with every policy can be obtained. These vectors are used afterwards to compute the ratio $\frac{\alpha(p)}{\gamma(p)}$ in case A. To obtain the vector *p* associated with every policy it is necessary to solve numerically the general equilibrium model of the economy associated to that policy.

Table 1 summarizes the results obtained, which allow us to order policies by equity.

The last row in this table shows that after the fourth column, where $\tau_N = .15, \tau_K = 0$ and $\tau_c = .18$ inequality declines when compared with the *status quo*. In this case the elimination of the tax on capital and its substitution by the tax on labor, and afterwards by an increasing tax on consumption increases efficiency, as well as equity when the tax on consumption is significative.

Note that these effects are the ones when heterogeneity is characterized by Case A. As we saw when heterogeneity is determined simultaneously by initial wealth and labor efficiency, and those characteristics are perfectly correlated, there are no effects on equity (Case B). In this case the effect on individual welfare is proportional to the effects of the policy change on the welfare of the representative agent. Because the sequence of the described policy changes leads to an increase of efficiency, the increase of consumption taxation in Case B, leads to a Pareto movement.

Table 1

INCREASING THE TAX RATE ON CONSUMPTION					
Income taxes	*status quo* $\tau_K = .5, \tau_N = .23$	$\tau_N = .35$ $\tau_K = 0$	$\tau_N = .21$ $\tau_K = 0$	$\tau_N = .15$ $\tau_K = 0$	$\tau_N = 0$ $\tau_K = 0$
Consumption taxes	$\tau_c = 0$	$\tau_c = 0$	$\tau_c = 14$	$\tau_c = .18$	$\tau_c = .29$
Equity effects $\frac{\alpha(p)}{\gamma(p)}$ *	3.8	2.9	3.7	4	4.8

Note: *Increases in the ratio imply increases in equity.

Using the cross section evidence that allow us to define the case A and B as the two extreme cases that accommodate that evidence, we can summarize the results of this section by saying that the change from a system based on constant taxes on capital and labor income to a system based on a uniform and constant tax rate on consumption, with no transfers, has a positive effect on equity.

As we described in section 2 the changes of policy represented in the table after column two increase always efficiency, that is the welfare of the representative household. We can therefore conclude that the increasing role of consumption tax on government revenues increases simultaneously equity and efficiency. As consequence the more the system is based on consumption taxes the stronger are the effects on the welfare of the agents that belong to the left part of the welfare distribution. In other words, the "poor" are always better off with the change in policy.

4. CONSUMPTION TAXES AND DEDUCTIONS OR REDISTRIBUTION WITH NO LOSSES IN EFFICIENCY

That a fiscal reform to a consumption tax has a positive effect on equity was the qualitative result derived in the above section. However we could argue that the relevance of this result should be quantitative or that it depends heavily from the distribution at the point of departure, or the *status quo*. The initial system used in the exercise was characterized as one where, although marginal taxes on labor and capital income are constant, the marginal tax on total income is increasing. We know that existing codes have increasing marginal taxes, even if it is often claimed that effective marginal taxes are only slightly increasing. Anyway this fact could have characterized the abstract initial system as less equitative then the actual one. In this section we want to claim that once we allow for deductions on the tax code we can aim at any[7] desirable level of progressivity. We could improve the equitative gains of the reform described in the last section by introducing deductions in the system. This novelty of the consumption tax that we also want to stress in this paper, comes from the fact that when the government can use deductions financed with the consumption tax it is possible to redistribute with no loss in efficiency.

The introduction in the tax code of the possibility to make deductions is equivalent to introduce transfers from the government to every household. Maintaining the discipline of avoiding discriminatory

(7) This desirable level is constrained if we impose a certain level of efficiency, due to the non-negativity of the tax on labor income.

lump-sum transfers we introduce an annual deduction in the tax code, identical across households. Therefore the limit situation, the one where the taxes on labor and capital income are zero, is characterized by a constant transfer (across time and across households) and a constant tax rate on consumption (across time and across goods). This system is characterized by a constant marginal tax but by an increasing average tax and is therefore a progressive system.

We first show how the introduction of non discriminatory transfers can have no effects on aggregate equilibrium, and therefore efficiency can be maintained. Afterwards the effects of these transfers on equity (or individual equilibrium) are discussed.

We can prove that the use of deductions allows the maintenance of the aggregate equilibrium when these deductions are financed by an increase of the consumption tax and accompanied by a decline of labor income taxation. This result comes directly from the role of consumption taxes that we discussed in section 2. Suppose that starting from a positive tax on labor income we increase the tax on consumption and decline that tax on labor income such that the ratio $\frac{(1-\tau_n)}{(1+\tau_c)}$ does not change. We saw that the increase of the consumption tax is equivalent to an increase of the tax on initial wealth. If the present value of the sum of deductions, or transfers, is equal to this increase of taxation of the initial wealth for the representative household, the aggregate general equilibrium is the same and therefore efficiency is maintained.

However the described policy, which is neutral in terms of efficiency, has effects on individual decisions and on individual welfare. The increase of the tax on consumption and the decline of the tax on labor income affects different households differently. Also the transfer, although being identical across households, affects the households' welfare distribution.

The effect on equity depends again on the type of heterogeneity considered. We can again analyze the two extreme cases, Case A and Case B. We can verify that in both cases the introduction of deductions as we just described leads to an improvement of equity. As efficiency is maintained and equity improves we get the result that this type of policy improves the welfare of the "poor". A redistribution is possible with no efficiency losses even if the government does not use discriminatory lump-sum taxes or transfers.

5. CONCLUSIONS

To avoid the potential complexities of the actual income based regimes, the change to a flat tax is being advocated. In this work it is discussed how the tax burden distribution change if this flat tax is on consumption. The conclusion of this paper is based on heterogeneous agents which we pretend to represent the empirical evidence. We show that the reform to a system where the only tax is a flat tax on value-added and where we can make transfers identical across households has simultaneously a positive impact on efficiency and equity. This conclusion is in sharp contrast with the conventional wisdom of a system based on a year by year base where "poor" agents have a higher consumption to income ratio than "rich" agents.

These results are different from the ones found in the literature, in general equilibrium models similar to the one used in this work, due to the hypothesis of heterogeneity: those works assume that the main difference across households is labor efficiency while we impose that agents are differentiated by initial assets, that can be accumulated, and by exogenous labor efficiency, that cannot be accumulated, and that these two dimensions of heterogeneity are positively correlated.

These results could also be used to state that the median voter would be in favour of the reform, since the median is lower than the average in the welfare distribution. Therefore a reform like the one proposed would imply that "poor" households would have necessarily an increase in welfare due to the reform.

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EFFICIENCY OF SECONDARY SCHOOLS IN PORTUGAL: A STOCHASTIC FRONTIER ANALYSIS*

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1. INTRODUCTION

The scores in the national examinations taken by students at the end of their secondary courses have received much public attention in recent years, partly justified by the importance they have among the criteria for admission to higher education. These scores also have been used to evaluate the performance of Portuguese schools offering secondary courses. The aim of this paper is to analyse such performance, employing the stochastic frontier methodology in order to investigate the respective determinants and the degree of efficiency in the utilization of resources. The research presented in this article goes beyond a simple analysis of score-based school rankings that does not take into account the quantity of resources used and the impact of other factors like the environment in which schools operate.

The decision to enrol and invest in schooling is, in the first place, taken by the students and their families considering costs and expected benefits. However, such a decision has important externalities for the society as a whole, since education is believed to be one of the key factors behind a sustained increase in labour productivity. The educational attainment indicators for the Portuguese population lag behind those for other developed countries, and this is often pointed out as the main structural obstacle in Portugal's catching up process to higher income levels. The question is particularly relevant as those indicators coexist with comparatively high levels of public spending on education. In this context, research on the education production function and resource allocation for Portuguese schools is well justified.

The Stochastic Frontier Analysis (SFA) builds on the microeconomic concept of production function which represents the maximum output attainable given a certain quantity of inputs. The transposition of this methodology to the field of education is relatively straightforward in theoretical terms but faces important empirical difficulties. They concern, in the first place, the definition of output and the multiplicity of factors that may influence the learning process. For instance, relevant factors like some teacher characteristics, the innate capacities of students and the interaction with colleagues are difficult to incorporate into an empirical model. Additionally, the relationship between inputs and output in the educational process is rather complex and can only be summarised imperfectly in a production function. Such difficulties have been addressed in detail in the education economics literature and we will touch upon them in the course of this article.

Production frontier estimation in the field of education has mainly used non-parametric techniques like the Data Envelopment Analysis and the Free Disposable Hull (FDH), sometimes complemented with regression analysis (see, for instance, Bessent *et al*. (1982), Ray (1991) and Ruggiero (1996)). SFA has been already used in this context as well, like in Mizala *et al*. (2002). This methodology is more de-

* This article summarises the research presented in Pereira and Moreira (2007). See this reference for more details, in particular concerning the data and the econometric results. The opinions expressed in the article are of the authors and do not necessarily reflect those of the Banco de Portugal.

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manding in terms of assumptions, since it requires the specification of a functional form for the production function, but it is less sensitive to the presence of outliers and allows the possibility of making inference about the contribution of inputs. The last two aspects led us to favour the SFA for this study.

There are very few production frontier-type applications to education based on micro data for Portugal. Most of the evidence available in this domain comes from analyses at a rather aggregated level for groups of countries including Portugal, using non-parametric techniques. Such studies present rankings of countries based on performance and input indicators, like Clements (1999) and Afonso and St. Aubyn (2005). Clements (1999) is a valuable reference because it provides a thorough and critical review of the Portuguese educational system. As far as studies based on disaggregated data are concerned, we are only aware of Oliveira and Santos (2005) that applies the FDH to a sample of public secondary schools, measuring output by approval rates. Carneiro (2006) albeit with a different methodology – OLS regression followed by decomposition of variance – investigates the link between student achievement and a number of school and family background variables, exploiting the database from the 2000 OECD's Programme for International Student Assessment (PISA). The present study differs from those just mentioned as far as methodology is concerned, but also in that it measures output through national examination scores and considers almost the full population of schools offering secondary courses in Portugal, both public and private.

This article is organised as follows. Section 2 presents a brief overview of secondary education in Portugal, while Section 3 describes the stochastic production frontier methodology. Section 4 makes some considerations about the specification of the education production function and data relevant for studies in this area, both in general and for the Portuguese secondary schools. Section 5 presents and analyses the econometric results, focusing on the way the school, teacher and environmental variables determine performance through the education production function. Special attention is devoted to the relative efficiency of schools in public and private sectors. We also address the use of the SFA to rank schools on the basis of the estimates of school-specific technical efficiency. Section 6 concludes.

2. SECONDARY EDUCATION IN PORTUGAL

In the Portuguese educational system basic compulsory education comprises (since 1986) nine years, divided in three cycles: the first cycle covers the first four years, for children from the age of six onwards, the second cycle covers the 5th and the 6th year and the third cycle the 7th through 9th year. Secondary education encompasses three further years of schooling (10th to 12th).[1] Approval in the 12th grade depends partially on the scores in a set of national examinations. Otherwise assessment is made exclusively within each school, even though on the basis of common curricula, which at the secondary level differ according to the field chosen by the student, for example, natural or social sciences, humanities, and arts.

Table 1 presents a number of enrolment and resource indicators for secondary education in Portugal and, in some cases, the corresponding OECD figures. In a context of population ageing, the number of students enrolled in secondary courses has decreased markedly since 1995. This decline occurred along with a stabilization of the enrolment rates (percentage of population at typical school age enrolled), at almost 60 per cent, over the last decade. Most students attend public schools but in the last years the weight of private schools has increased steadily. Due to high dropout and repetition rates, a significant share of the secondary student population consists of overaged students attending special

(1) Corresponding to the third level of ISCED (International Standard Classification of Education), also called upper secondary education. Schools offering secondary courses in Portugal comprise secondary schools proper, secondary schools with the third cycle of the basic education, and basic schools (second and third cycles of basic education) with secondary courses.

Table 1

SECONDARY EDUCATION IN PORTUGAL: SOME ENROLMENT AND RESOURCE INDICATORS

	PORTUGAL				OECD
	1989/90	1994/95	1999/00	2003/04	2003
Students enrolled*	309 568	457 194	417 705	382 212	-
by school nature(%)					
public schools	92.3	87.5	84.9	82.4	79.5
private schools	7.7	12.5	15.1	17.6	20.5
by courses (%)					
ensino regular	83.8	82.0	87.1	79.5	-
ensino nocturno / recorrente	16.2	18.0	12.9	20.5	-
Total expenditure as % of GDP**[(a)]	-	-	1.2	1.2	1.4
Expenditure per student					
in US dollars (PPP adjusted)**[(a),(b)]	-	-	5, 422	6, 022	7, 582
as % of GDP per capita**[(a),(b)]	-	-	32	34	28
weight of teachers' compensation (%)**[(a),(b),(c)]	-	-	-	78.3	58.4
Teachers per 100 students**[(d),(e)]	-	-	12.7	13.7	7.9
public schools	-	-	-	13.2	7.7
private schools	-	-	-	16.4	8.6
Teachers with higher university degree (%)*[(f)]	68.6	75.9	85.8	-	-
Tenured teachers (%)*[(f)]	56.6	69.7	75.7	82.3	-

Sources: * Ministério da Educação (2003, 2004) , ** OECD (2002, 2006)
Notes: (a) Portugal's data are for 1999 and 2003. (b) Figures for Portugal include only public schools. (c) Refers to non-tertiary education. (d) Measured in full time equivalents; includes only schools of continental Portugal. (e) Portugal's data are for 2000 and 2004 and OECD's data for 2004. (f) Teachers at the secondary level and third cycle of basic education; includes only schools of continental Portugal.

repeater courses, designated as *ensino recorrente* (former *ensino nocturno*). These are courses designed for students who left school without completing secondary education.

In 2003, the last year with information available, expenditure on secondary education in Portugal amounted to 1.2 per cent of GDP, slightly below the OECD average. The expenditure per student was also lower than the OECD average, although this represented a higher-than-average spending effort when measured against the Portuguese GDP per capita (for which the gap to the OECD average is wider). Considering the composition of outlays, the most salient fact is the very large weight of teachers' compensation in the total. This is mainly due to an abnormally high headcount for teaching staff in Portugal common to all levels of non-tertiary education, as shown by teacher-student ratios much above the OECD average. In addition, teachers' salaries taken in relation to GDP per capita are comparatively high. In contrast there is evidence that both the other current and capital expenses are quite low in relative terms. For instance, the number of computers per student in 2003 was one of the lowest among OECD countries (OECD (2006)). Clements (1999) presents scattered evidence indicating that the wage bill may have squeezed other inputs like teaching materials and infrastructures. An additional aspect worth highlighting is the improvement in the academic qualifications of teachers in public schools since the beginning of the nineties, which took place along with a considerable rise in the proportion of teaching staff with tenure.

Educational attainment in Portugal has improved among recent generations, but remains well below the OECD average. In 2004, less than 25 per cent of the Portuguese adult population aged 35 to 54 had completed the secondary level of education. Considering the age group from 25 to 34 this percentage rose to about 40 per cent, but the corresponding figure for the OECD average was over 75 per cent. The performance of Portuguese students in recent international examinations has shown in general poor competency levels. For example, in the 2003 OECD's PISA for proficiency in mathematics of 15-year-olds, Portugal occupied the 25th position among 29 countries.

Given that overall financial input indicators in Portugal are not much below the OECD average (or even above if taken as a ratio of GDP per capita) while performance indicators are generally poor, it should

come as no surprise that studies (like the aforementioned by Clements (1999) and Afonso and St. Aubyn (2005)) find that Portugal achieves little with the resources employed. This is even more the case when the input indicators used relate to physical resources, as the teacher-student ratio.

3. THE STOCHASTIC FRONTIER ANALYSIS METHODOLOGY

3.1. The basic model

The SFA methodology adds to the production frontier an error term with two components: one that allows for technical inefficiency and another that allows for any random events (see, for instance, Kumbhakar and Lovell (2000)). The basic formulation can be represented as

$$y_i = f(x_i, \beta) TEF_i \, e^{v_i}, \tag{1}$$

where y_i is the output of producer *i*; x_i is a vector of inputs; β is a vector of K+1 technology parameters to be estimated and $f(x_i, \beta)$ the deterministic production frontier. The variable e^{v_i} represents the random shocks on each producer, and $f(x_i, \beta) e^{v_i}$ the stochastic production frontier. Finally, TEF_i is the output-oriented technical efficiency, computed as the ratio of observed output to the maximum feasible output, given by the stochastic production frontier. Producer *i* attains the maximum feasible output if, and only if, $TEF_i = 1$, otherwise $o < TEF_i < 1$, and the producer is inefficient.

In order to estimate the stochastic production frontier model in (1), it is necessary to specify $f(.)$ further, which is normally assumed to take a Cobb-Douglas form. In this case and defining $TEF_i = e^{-u_i}$ with $u_i \geq 0$ to ensure that, $TEF_i \leq 1$, the model (in logarithms) is given by

$$\ln y_i = \beta_0 + \sum \beta_k \ln x_{ki} + v_i - u_i, \tag{2}$$

where v_i is symmetric. The error term $\varepsilon_i = v_i - u_i$ is negatively skewed, since it is composed by a two-sided 'noise' term and a nonnegative technical inefficiency term. Model (2) can be estimated by maximum likelihood[2], upon making assumptions about the distributions of v_i and u_i. The original specification put forward in the literature assumed that: (a) v_i has a normal distribution with mean 0 and variance σ_v^2; (b) u_i is a truncation below at 0 of a normal distribution with mean 0 and variance σ_u^2; (c) v_i and u_i are independent of each other and of the regressors. Later other specifications were suggested for the distribution of u_i, in particular, a positive mean μ for the underlying distribution. This assumption, the commonest in the empirical literature, has the advantage of modelling the inefficiency term with a positive mode, fitting better the case of producers with levels of inefficiency farther from zero.

Prior to the maximization of the likelihood function, a reparameterization of the type $\sigma^2 = \sigma_u^2 + \sigma_v^2$ and $\gamma = \sigma_u^2 / (\sigma_u^2 + \sigma_v^2)$ is typically introduced. The parameter γ measures the relative importance of the variances of u_i and v_i. Note that if $\sigma_v^2 \to +\infty$ and/or $\sigma_u^2 \to 0$, then $\gamma \to 0$, case in which the production frontier would comprise the deterministic frontier plus a two-sided error. In the context of this methodology, testing the significance of γ assumes particular importance, since if the null hypothesis $\gamma = 0$ was accepted, no stochastic frontier methodology would be necessary and all parameters in β could be consistently estimated by OLS.

After the estimation, it is possible to obtain the 'composed error' term for each producer ($\hat{\varepsilon}_i$), which is then used to obtain the estimates for the producer-specific efficiency scores (TEF_i). These efficiency

(2) The estimation of equation (2) by OLS is consistent for all parameters in β, except for β_0, since $E(\varepsilon_i) \leq 0$.

predictors are always based on the distribution of u_i conditional on the value assumed by ε_i. We will use throughout this article the predictor proposed by Battese and Coelli (1988) which takes the expression for $E(e^{-u_i} | \varepsilon_i)$ (remember that $TEF_i = e^{-u_i}$).

3.2. Incorporation of 'exogenous' influences on efficiency

The SFA methodology may have two components. The first one concerns the estimation of the stochastic production function, used as a reference to estimate the degree of technical efficiency, as explained in the preceding section. The second one is related to the incorporation of 'exogenous' variables that are not at the discretion of the producer but nevertheless influence the outcome of the production process (in the literature this is sometimes referred to as producer heterogeneity), as it can be the case of variables that characterize the environment where production takes place. Such variables are not supposed to influence the shape and/or location of the production frontier, but determine how far away the producer is from it.

The incorporation of inefficiency determinants into the SFA has initially been done in a kind of second step, after estimating the frontier in the first one, by regressing the TEF_i on a vector of producer-specific variables. While this approach may give an informal indication of possible explanatory variables for efficiency, it is econometrically flawed (see Kumbhakar and Lovell (2000)). Several approaches have been suggested in the literature to incorporate appropriately the inefficiency effects into the SFA. The one we follow in this paper was introduced by Battese and Coelli (1993), and assumes that u_i is a truncation below at zero of a normal distribution with mean $\mu_i = \delta_0 + \sum \delta_m z_{mi}$ (and variance σ_u^2), where z_{mi} are M producer specific variables that determine inefficiency. In case the δ's, except δ_0, are statistically equal to zero, then $\mu_i = \delta_0$ for all producers and the specification reduces to the model presented in the preceding section. The model with this modified assumption about the distribution of u_i can likewise be estimated by maximum likelihood.

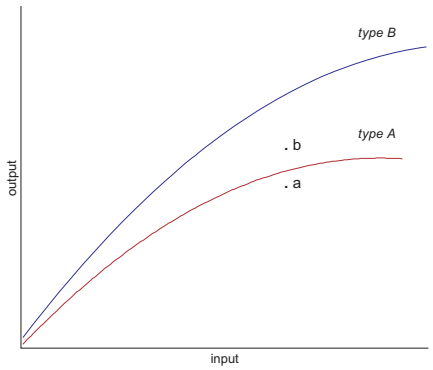
The trickiest issue in modelling 'exogenous' variables is that, very often, the location of a variable outside the discretion of the producer in the inefficiency term, as opposed to the production function, is a matter of judgement. For instance, variables related to environment may be nevertheless a determinant of technology. The econometric results do not always provide guidance. In fact, if a relevant variable is omitted from the production function, producers that 'use' it more intensively are likely to appear more efficient. That is, as the efficiency scores were estimated without controlling for such variable (see the Section 3.3), the latter may appear to have explanatory power for efficiency. Therefore, in doubtful cases there is merit in testing alternative specifications.

3.3. Model specification and measured technical efficiency

The SFA yields predictors that, by definition, measure technical efficiency after controlling for (i.e. net of) all variables in the production frontier. However, there may be variables that determine the production possibilities, but that one would not like to control for when measuring efficiency. At this point, it is useful to make a (simplifying) distinction between two categories of variables entering the production frontier. The first category refers to inputs proper whose variation implies a change in the utilization of costly resources from the point of view of the producer. One will always want to control for those by definition of efficiency as a relationship between outcomes and costly inputs. The second category covers variables that influence production, but whose variation does not come at a (visible) cost to the producer. These variables may, for instance, relate to 'organisation' of production or may be environmen-

Chart 1

PRODUCTION FRONTIER FOR TYPE-A AND TYPE-B UNITS



tal variables. When measuring efficiency, one will typically want to control for such variables only if the producers take them as given, for the sake of comparability among units.

Consider the case in which there are two types of producers (A and B) with different management practices, so that type B-producers always attain more output, for each given combination of other inputs. Such an effect should be incorporated into the production function, and a way of doing this is by means of a dummy variable that differentiates both types of producers. This amounts to estimating two separate production frontiers, and the efficiency scores from this model will be measured against each of two, depending on the type of producer. Chart 1 illustrates this point, for the case of one input (plus the dummy variable) and a deterministic frontier. Unit 'b' of type B vis-a-vis the outer frontier is less efficient than unit 'a' vis-a-vis the inner frontier; however, vis-a-vis a common (outer) frontier, unit 'b' is more efficient than unit 'a'.

When one wants to measure efficiency without controlling for one or more variables in the production function, it is not correct to exclude them because that would cause a problem of omitted variables. Nor it is appropriate in many cases to model them as 'exogenous' in the inefficiency term (as presented in the previous section), for instance, when such variables are at the discretion of the producer. Therefore it is necessary to introduce a modified efficiency predictor (TEF_i^*), which can be obtained by replacing the original estimate for the 'composed error', $\hat{\varepsilon}_i = \ln y_i - \ln \hat{y}_i$, by $\hat{\varepsilon}_i^* = \ln y_i - \ln \hat{y}_i^*$, where $\hat{y}_i^*$ is calculated taking, instead of the value for the variable at issue for producer i (x_i), the value x^* that maximizes the contribution of that input to output over the whole sample (see Coelli *et al.* (1999)).

4. THE PRODUCTION FUNCTION OF PORTUGUESE SECONDARY SCHOOLS

4.1. Conceptual issues

The first step in order to assess school performance using the SFA is to specify a production function. Summarizing the learning processes in a function is quite problematic due to its complexity.[3] The first issue arising is how to measure the outcomes of schooling. Most studies use standardized achievement test scores, however, other indicators have been used such as school approval rates (Oliveira and Santos (2005)) or dropout rates (Kanep (2004)). Theoretically, the main purpose of education is to develop the skills and knowledge of students in order to make them more productive in the labour market. The fact that empirical investigations tend to detect correlation between the level of schooling and post-school achievement offers some support for concentrating on examination results. In a broader sense, schools have the role of promoting values and contributing to integration in society, aspects hardly measurable by an indicator.

The second difficult issue concerns the factors determining the educational output. Ideally, the analysis should include not only school inputs, but also family background and influence of peers, as well as innate endowments and learning capacities. Many factors affecting the educational production process are not observed and/or quantifiable, and ultimately are difficult to incorporate mechanically into a production function. Inputs relating to teachers are typically included using proxies of their objective characteristics, like qualifications and experience, but ignoring other non-quantifiable features that can be important such as communication skills, teaching methods or classroom management. Furthermore the information on some school organisational aspects like curricula, textbooks or school day is limited or otherwise difficult to incorporate into the models. Another shortcoming concerns accuracy of measurement, since for some inputs (in particular those related to the school) one should possibly use a 'value added' specification by employing measures of cumulative influence over the years. This approach is very demanding in terms of data, which may explain the low number of studies that followed it. It is fair to say that some of these difficulties are more relevant in the context of disaggregated studies that attempt to model individual student performance, than in the context of modelling performance across schools, as we do. This is, in particular, true for student inputs like innate endowments and learning capacities which should average out at the same level across schools. Studies taking the school as a reference are less informative to the extent they do not consider intra-school heterogeneity, but are less demanding in terms of data.

4.2. Data

4.2.1. Output indicator

The output measure selected in this study was the average score in the 12th grade national examinations by school, for the academic year 2004/05 (see Table 2 for some descriptive statistics of the variables).[4] In Portugal, national exams have an important role as a selection mechanism for further schooling, thus relating directly to 'real' outputs. Students, parents and policy makers use them to as-

(3) Hanushek (1979) and Hanushek (1986) provide a comprehensive discussion of this topic.

(4) In Pereira and Moreira (2007) additional details about the variables and their sources are presented.

sess secondary schools' performance and implicitly the quality of education that they provide. Moreover other indicators such as school completion rates have the drawback that they are not comparable across schools due to different approval or success criteria.

National examinations evaluate student's knowledge on specific subjects. There is no set of exams obligatory for all pupils; the requirements depend on the area in which the students are and the post-secondary courses they wish to attend. In this study, we use examination scores for all subjects, which might pose a comparability problem, since the weight of the various disciplines is not uniform among schools. However, the alternative of focusing on one discipline seemed also quite arbitrary, as our input variables relate to the school as a whole (or to the environment).

4.2.2. School and teacher variables

The school data comprise the number of students (split between *ensino regular* and *recorrente*), teachers and classes, all variables relating only to secondary courses, and whether the school has private or public management. Arguably we are lacking a measure of capital, for instance regarding school facilities. The school data were supplied by the *Gabinete de Informação e Avaliação do Sistema Educativo* and cover the academic year 2004/05. Concerning teacher data, we dispose of information about seniority, age, academic background, tenure (only for public schools) and average wage, for the whole school. For these variables the source was the *2º Recenseamento Geral da Administração Pública* (2nd General Government Census) for the public schools and the *Quadros de Pessoal* survey for the private.[5] Since the last General Government Census dates from December 1999, for the sake of comparability, we used the *Quadros de Pessoal* survey of 1999 (October).[6]

Concerning the set of regressors included in the model, we chose the average number of teachers per 100 students as an input quantity measure. However, this variable was not available in 'full time equivalents', thus being an imperfect measure of the 'teaching effort' put into the educational production process. Therefore we included another variable in the regression, the teacher-class ratio, as an indicator for the degree of 'intensity' in the utilization of the teaching staff. In fact, tenured teachers in public schools may be relieved of teaching duties for several reasons.[7] On the other hand, due to the decline of the student population over the last decade, it may also happen that there is an excess of teaching staff allocated to some public schools for their needs. While it is reasonable to assume that other tasks carried out by teachers also contribute positively to school performance, their contribution is likely to fall short of that of teaching.

There is a general perception that students are not equally involved in their educational project. Students in *ensino recorrente* perform on average worse than their counterparts in *ensino normal*, and thus it is important to control for the relative weight of both groups in schools. Further we included in the regression an indicator for the (secondary education) production scale - a ranking based on both the number of students and teachers - given that our input quantity variable does not have a scale dimension. We also considered a dummy variable to differentiate between public and private institutions.

Concerning teacher data, in the place of seniority in the job that was not defined using the same criteria in the two sources used, it was taken on board in the regression the average teacher age (see Pereira

(5) *Quadros de Pessoal* is an annual mandatory employment survey, carried out by the *Ministério do Trabalho e da Solidariedade Social*, and covers private sector employees.

(6) Thus teacher data refer to the academic year 1999/2000, a different academic year from that of the school data (2004/05). We take them on board under the assumption that the relative position of schools regarding the characteristics of the teaching staff has not changed substantially in the intervening period.

(7) Apart from particular cases like disability and performing administrative tasks at school, teachers are entitled to a progressive reduction of weekly teaching hours when they are 40 or older and have 10 years of seniority or more. This reduction can add up to a maximum of 8 hours (out of a normal workload of 20 hours at the secondary level).

Table 2

DESCRIPTIVE STATISTICS

	All schools				Public		Private	
	mean	std.dev.	p25	p75	mean	std.dev.	mean	std.dev.
Output								
Average scores in exams	108	12	101	115	107	11	113	17
Inputs								
Schools								
Teachers per 100 students	12.6	4.1	10.2	14.7	12.7	3.9	12.5	5.4
Teachers per class	2.8	0.8	2.2	3.3	2.9	0.8	2.3	0.8
Students per class	22.4	4.0	20.3	24.8	22.8	3.6	19.6	5.3
Size (ranking)	-	-	-	-	320	148	144	106
Share of students in ens. recorrente	0.17	0.17	0.00	0.27	0.17	0.16	0.13	0.24
Teachers								
Average age (years)	38.9	4.0	35.7	41.7	39.0	3.9	38.2	4.4
Average wage (euros)	1399	256	1235	1571	1456	213	1051	216
Share with university education	0.97	0.04	0.96	1.00	0.98	0.03	0.93	0.07
Environmental								
Health status (index)	223	19.0	212	238	-	-	-	-
Household electricity consumption (Kw/h)	2.0	0.6	1.6	2.4	-	-	-	-
Illiteracy rate (perc.)	12.7	5.2	8.7	16.4	-	-	-	-

Notes: Statistics based on 490 schools, 419 public and 71 private, except for teachers' average wage and share with university education which refer to 489 schools, 419 public and 70 private. Statistics for environmental variables are based on data for 241 municipalities.

and Moreira (2007)). Average teachers' wage was not considered, given the high colinearity with seniority (and correlated variables), in particular for public schools. We tested the significance of other candidates to enter the regression, namely, the proportion of teachers with a university degree but results pointed to its non-inclusion. In fact such proportion is likely to have increased significantly over the last years (in line with the evidence in Table 1) and shows currently reduced variability (Table 2).

4.2.3. Environmental variables

One can expect that the region where schools are located influences attainment. In the public debate about the examination scores it is often stated that schools in predominantly rural areas have worse outcome than their counterparts in more developed urban centres. In order to study the impact of school location on output, the educational production frontier must include environmental variables. We considered three environmental indicators at the municipality (*concelho*) level, related to the living standard, education level and health conditions. Those were, respectively, the average household electricity consumption, the illiteracy rate and a Health Status Index elaborated by Santana *et al*. (2004).[8]

4.3. Model specification

We first considered a stochastic production frontier without environment given by

$$\ln y_i = \beta_0 + \beta_1 \left(\frac{T}{S}\right)_i + \beta_2 \left(\frac{T}{S}\right)_i^2 + \beta_3 \left(\frac{T}{C}\right)_i + \beta_4 \ln A_i + \beta_5 \ln S_i + \beta_6 P_i + \beta_7 R_i + v_i - u_i \qquad (3)$$

where *i* refers to the ith school, *y* is the average score in the national examinations; *(T/S)* and $(T/S)^2$ are the number of teachers per 100 students and its square; *T/C* is the number of teachers per class; *A*

(8) For each indicator it was considered the last year available (see Pereira and Moreira (2007)). Note that the illiteracy rate is an 'inverse' indicator of the educational level.

is average age of teachers; *S* is a measure of school size; *P* is a dummy variable which takes on value 1 if the school is private and 0 if the school is public; *R* is the share of the student population in *ensino recorrente*. Variables *v* and *u* are defined as described in the Section 3.1. We followed a log-linear specification for the teacher-student ratio (approximated by a quadratic function), average age and school size, in order to allow for a decreasing marginal contribution to output (see Pereira and Moreira (2007)), while the coefficients of the remaining variables are semi-elasticities.

As to the environmental regressors, the fact that schools do not have control over the environment would speak for modelling them in the inefficiency component. This is nevertheless a debatable assumption since in the traditional education production modelling, socioeconomic characteristics enter the production function.[9] This question is related to the discussion presented in Section 3.2 about whether the impact of 'exogenous' variables should be considered in the technology or in the efficiency. Both alternatives were estimated, the first one consisting of an extended version of equation (3) encompassing the three socioeconomic variables - living standard (*LivSt*), educational level (*Educ*) and health conditions (*Health*). The second one including those variables in the mean of the distribution underlying u_i that becomes $\mu_i = \delta_0 + \delta_1 LivSt_i + \delta_2 Educ_i + \delta_3 Health_i$.

5. RESULTS

5.1. Estimated stochastic production function

The estimation results are shown in Table 3. All models were estimated by maximum likelihood using FRONTIER 4.1 (Coelli (1996)). The null hypothesis of absence of random technical inefficiency ($\gamma = 0$) is rejected in the different specifications and thus the SFA seems quite appropriate for the data. In the models with the environment modelled in the one-sided error component, the estimate of γ goes down, in line with a lower value of σ_u, since some heterogeneity previously captured by this parameter now goes into the producer specific mean. The parameter μ, or the δ'*s* in the model with inefficiency effects, are statistically not significant at a conventional level of significance, pointing to a null mode for the distribution of u_i. The average measured efficiency level is near 90 per cent (see also Section 5.3, where we propose a different efficiency predictor), but this result is sensitive to the academic year on which the estimation is based.[10]

The school and teacher variables are significant in all specifications, also in the ones including environmental variables, although in some cases the respective impacts change when the latter are taken on board in the regressions (see below). As to the environmental regressors, the health conditions indicator is not significant in any of the models, a result that may be explained by the homogeneous situation in the different municipalities in this regard, mirrored by the reduced variance of the indicator. The other environmental variables are significant only when incorporated into the production function, which suggests this modelling alternative as more adequate.[11] Note that the sign of such variables in the production frontier is the opposite of that in the inefficiency term, and rightly so, because they determine the maximum output level in the former, and the deviation from it in the latter.

(9) See Coelli *et al.* (1999) for a similar discussion in another context.

(10) When we include data for the academic year 2003/04, in a panel-type formulation, the measured efficiency is near 10 per cent lower (and the null hypothesis $\mu = 0$ is rejected) (see Pereira and Moreira (2007)).

(11) This conclusion is not so clear-cut in the panel formulation, in which an inclusion in the inefficiency term is also not rejected by the data. However, as regards the adequacy of the model and the impacts of the different variables, the results are largely coincident. The main exception concerns the teacher-student ratio. In fact, its significance is below the conventional level in the models corresponding to the ones presented in the first two columns of Table 3.

Table 3

ESTIMATED STOCHASTIC PRODUCTION FRONTIER

		Without environment	Environment in production	Environment in inefficiency
Production Function	Teacher/student	0.014	0.014	0.013
		(2.8)	(2.8)	(2.5)
	(Teacher/student)$^{2(a)}$	-0.040	-0.040	-0.040
		(-2.4)	(-2.4)	(-2.4)
	Teachers/class	-0.024	-0.023	-0.021
		(-2.3)	(-2.3)	(-2.1)
	ln(Age)	0.369	0.217	0.235
		(7.6)	(4.0)	(3.9)
	ln(Size)	0.037	0.025	0.026
		(4.6)	(3.2)	(3.1)
	Share *ens.recorrente*	-0.071	-0.056	-0.074
		(-3.0)	(-2.3)	(-2.9)
	Private school	0.096	0.064	0.069
		(6.9)	(4.4)	(4.7)
	Living std.	-	0.026	-
			(2.8)	
	Educacional level$^{(a)}$	-	-0.396	-
			(-2.9)	
	Health Conditions$^{(a)}$	-	0.033	-
			(1.2)	
	Constant	3.142	3.663	3.708
		(19.2)	(17.8)	(17.5)
Distributions of u and v	Living std.	-	-	-0.074
				(-1.4)
	Educacional level	-	-	0.006
				(1.8)
	Health Conditions	-	-	-0.001
				(-0.9)
	μ or δ_0	-0.351	-0.316	0.233
		(-1.7)	(-1.3)	(1.6)
	σ^2	0.037	0.031	0.013
		(2.9)	(2.4)	(2.9)
	γ	0.835	0.806	0.560
		(13.6)	(9.8)	(3.0)
	σ_u	0.176	0.158	0.087
	σ_v	0.078	0.078	0.077
Efficiency Predictors	Average TEF_i	0.94	0.94	0.93

Notes: Results based on data for 490 schools, for the academic year 2004/05, except for the average age (academic year 1999/00). Environmental variables are for the last year available (see Pereira and Moreira (2007)). t-ratios in brackets. (a) Coefficient multiplied by 100.

The impact of the number of teachers per 100 students on output is positive and marginally decreasing, since the quadratic term is negative. In the calculation of this impact it is assumed that the average relationship between teachers and classes is kept, that is, in the case of an increase in the number of teachers, that 'new' teachers are engaged in teaching to the same degree as the 'older'. Thus the number of classes increases proportionally, or the number of students per class (class size) goes down. It is also possible to estimate the impact on performance of a positive variation in the number of teachers not accompanied by a change in the class size, which also reflects the offsetting effect of the rise in the teacher-class ratio. In this case, the marginal impact is much lower, because of the negative sign of the coefficient associated with this last variable.

As referred in Section 2, in Portugal over the last decade there has been a fall in the number of students in secondary courses, implying a strong increase in the teacher-student ratio in some schools. Given the low flexibility to move teachers with tenure across schools, the positive impact on output that should have ensued might have been restricted to the schools affected by the phenomenon and with relatively high figures for the class size (along with a reduction in that variable). Schools already featuring small class sizes had a reduced margin to obtain output gains from further reductions. For those,

as there are government regulations that fix a minimum value for that size[12], the decrease in the number of students was most likely accompanied by a reduction in the number of classes. In our specification this would be captured by a rise in the teacher-class ratio, offsetting the impact of the change in the teacher-student ratio.

Hanushek (1986) provides a survey of much econometric work in this area, most of which finds no significant impact of the teacher-student ratio on output. Hanushek points out, as a possible reason for this, the fact that the relationship between the number of students and teachers, or students and classes, is often subject to regulations that reduce much the sample variability. As said, there are such regulations in Portugal, applying to the class size, but the variable shows sample variability (Table 2).

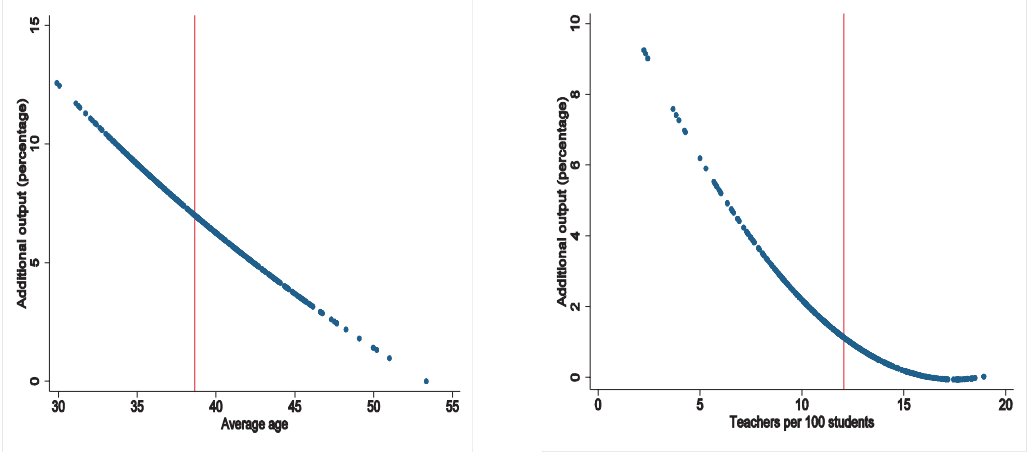
Teacher seniority, proxied by age, appears important for educational output in all specifications considered. However, controlling for the influence of environmental variables on output, the estimated elasticity goes down from 0.369 to 0.217 or 0.235, when those are included in the production function or in the inefficiency term, respectively. This may be explained by the fact that this regressor in the model without environment, beyond the pure effect of teacher experience, is most likely capturing the impact of school location. Clements (1999) states that there is 'a systematic movement of teachers from less desirable areas to developed urban centres' as they become more experienced. This smaller impact of experience, correcting for the fact that more developed regions tend to attract more senior teachers, is likely to be more accurate.

It is interesting to compare the potential output gains stemming from an increase in the number of teachers (per 100 students) and more experience of the teaching staff. Chart 2 presents the output gains at the estimated frontier (in percentage) of an increase in each of these factors from the current level where the school is, to the sample level yielding the maximum output. The vertical lines indicate the respective sample medians. Contrary to seniority, for the teacher-student ratio a great proportion of schools operate at levels where output gains are very low. Such evidence is likely to reflect the abnormally high value of the teacher-student ratio in Portuguese schools vis-a-vis international standards.

The share of *ensino recorrente* influences negatively the outcome, as expected. School size (comprising only secondary education) appears as a positive determinant of output. This speaks for concentrat-

Chart 2

ADDITIONAL OUTPUT FROM INCREASES IN THE UTILIZATION OF RESOURCES



(12) As a general rule, 24 pupils (and a maximum of 28) (see *Despacho 13 765/2004 do Ministro da Educação*).

ing resources in fewer schools, whenever possible. Other studies like Rainey and Murova (2003) and Mizala *et al*. (2002) also find scale economies in education production, albeit in different contexts. The impact of the private school dummy on educational output is positive and precisely estimated across the specifications, meaning that it is possible to estimate separate frontiers for the two groups. When location is taken into account (which corrects for the prevalence of private schools in relatively more developed regions), private institutions feature output gains between 6 and 7 per cent. This result is, as always, conditional on the variables included in the regression and this point deserves a more detailed discussion, so we come back to it in a separate section below.

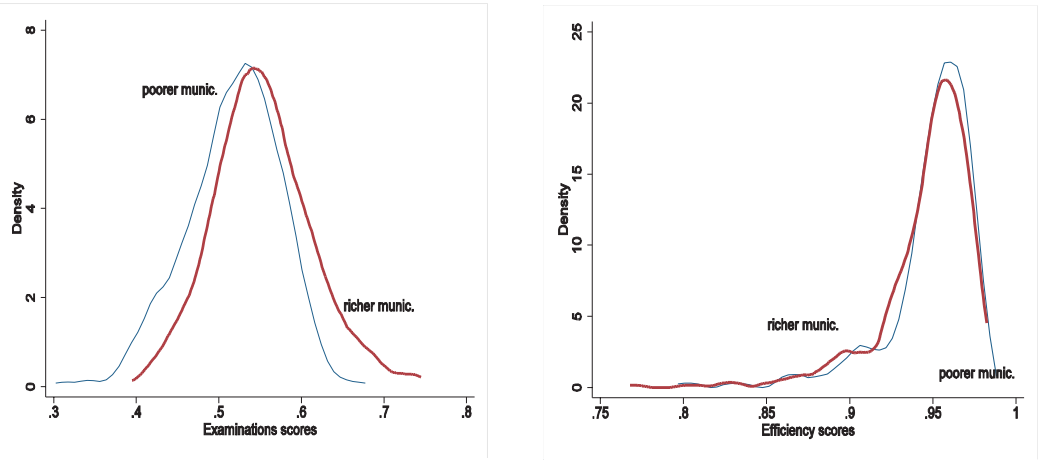
As already mentioned, socioeconomic variables are globally significant and therefore influence school output, in line with the conclusions reached by Oliveira and Santos (2005), although they use a different methodology and other variables. In order to highlight the impact on efficiency scores of controlling for school location, Chart 3 (right side) presents the respective density functions for schools in poorer and richer municipalities.[13] The predictor densities, net of the effect of the environmental variables, almost overlap. By contrast, on the left side, the density function of the examinations scores (divided for 200, the maximum) for richer municipalities is clearly shifted to the right in comparison to the corresponding density for poorer municipalities.

5.2. Efficiency of public and private schools

Clements (1999) stated in his conclusions that evidence suggested that private schools were more efficient than their public sector counterparts, as they achieved higher success rates employing less resources, in particular, as far as the relationship between teachers and students was concerned. Regarding the performance in national examinations, the general perception is that private schools outdo those in the general government. Nevertheless, a careful analysis of the distribution of examination scores (see Pereira and Moreira (2007)) shows that private schools have better results only at the upper percentiles, while at the intermediate and lower percentiles the results in both groups are similar. On the other hand, figures in Table 2 indicate that schools in public and private sectors employ a similar

Chart 3

EXAMINATION SCORES AND EFFICIENCY SCORES IN POORER AND RICHER MUNICIPALITIES



(13) The criterion used to differentiate between poorer and richer municipalities was the average value for the *Indicador per capita do Poder de Compra Concelhio 2004* (see Pereira and Moreira(2007)).

level of resources, as far as one can measure by the teacher-student ratio, although private institutions employ teachers 'more intensively', allowing them to have lower class sizes. The average teacher age is almost identical in both groups.

We have seen in the preceding section that, after controlling for the use of resources and other school and environment variables, the results clearly indicate that private schools are more efficient. It is worth noting that if we had run a regression with financial inputs (like average expenditure per student), instead of physical one, the efficiency gap between private and public schools would have been most likely larger, as average teachers' salary in general government seems to be considerably higher than in the private sector (see Table 2).

The results obtained are likely to be biased by the fact that students attending private schools typically come from households with higher social status. Carneiro (2006) presents evidence pointing to a strong importance of family background variables as determinants of educational outcomes in Portugal, and this is very much in line with the empirical findings for other countries. Unfortunately information on the socioeconomic background of students who took the examinations (or, more generally, of the students attending a given school) was not available. Actually, for this type of insights, it would be important to focus on a lower aggregation level - that of the student. By considering school averages one already looses information on intra-school variance, very important in this context.

We conjecture that controlling for the family background of students would reduce the magnitude of the private sector dummy, but it would not obliterate its significance. In the first place, not all private schools are financed by students' families. About 1/4 of pupils in private schools attend institutions privately run but financed by government, and for those the household background argument does not apply. Secondly, such an argument is normally put forward in connection with private schools featuring outstanding results, at the very top of the distribution of examination scores. However, observing that distribution, one sees considerable dispersion for private schools, with a number of institutions ranking very low in terms of performance. In the light of abovementioned findings in Carneiro (2006), for those schools there seems to be no reason to assume *a priori* that their students come from advantaged households.

5.3. A proposal for an efficiency ranking of secondary schools

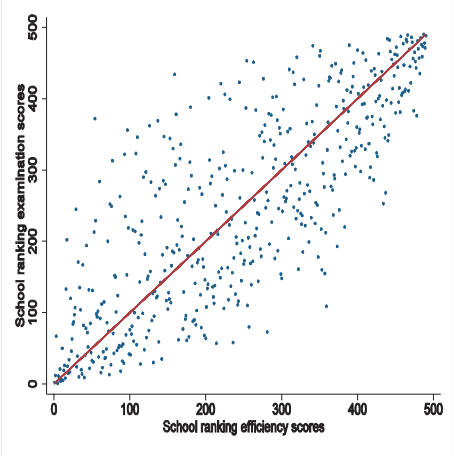
In Section 3.3 it was explained that it is possible to measure efficiency not controlling for some of the variables in the production frontier. This idea is here applied to the construction of a ranking of Portuguese secondary schools. This ranking is based on a modified predictor that controls for all regressors considered above, except for the teacher-class ratio and the private school dummy (see Pereira and Moreira (2007)). Indeed, these two variables capture aspects relative to the organisation and management of schools that are under its discretion (in case of public schools, under the discretion of the Ministry of Education) and whose change would affect output without an evident impact on the production costs.

This approach leads to a measured efficiency level of about 90 per cent.[14] Chart 4 presents the loci of individual schools in the ranking resulting from the original examination scores and the ranking on the basis of the efficiency scores computed with the proposed methodology. The latter ranking entails considerable changes in comparison with the original one (the 45º line indicates the schools whose position is unchanged).

(14) In the panel formulation, the corresponding figure is slightly under 80 per cent.

Chart 4

ORIGINAL AND PROPOSED RANKINGS OF SCHOOLS



6. CONCLUSIONS

In this article we studied the determinants of the educational output of Portuguese secondary schools – measured by the average scores in the 12th grade national examinations – and provided estimates of the respective technical efficiency level. SFA models with school, teacher and environmental variables were estimated. Further a proposal for an efficiency ranking of secondary schools was put forward.

Our analysis points to the existence of technical inefficiency: examination scores could be on average about 10 per cent higher for the current level of resources. This value is sensitive to the academic year on which the estimations are based. On the other hand, the production frontier underlying the measurement of efficiency takes as a reference the most efficient Portuguese schools that implicitly establish a benchmark. It would be interesting to apply the same techniques to a panel of schools from several countries. The cross-country analysis of global performance and input indicators suggests that the Portuguese benchmark might be inefficient when compared to other countries. In this case, the measured inefficiency level of the Portuguese schools could be higher.

Results indicate that the 'quality' of teachers has more effect on output than the 'quantity'. That is, the variation in the number of teachers per student appears to have less influence on output than differences in their characteristics proxied by seniority. On the other hand, there seems to be a high proportion of schools operating at teacher-student levels for which changes in this variable have little effect on output. This should reflect, in particular, the fact that many schools have lost students over the recent years and did not adjust the number of teachers. Therefore, enhancing the flexibility in the allocation of teachers could free resources without a noticeable effect on scores. Part of the reduction in outlays obtained could be applied on non-personnel spending items, in which Portugal ranks very low in international comparisons. Such added flexibility would also be the way to achieve a greater uniformity in the average class size across schools.

As far as the school network is concerned, we found evidence of scale economies in secondary education production, indicating potential gains from the concentration of resources.

The study demonstrates that there is a sizeable influence of geographical location of schools on outcome. Schools located in municipalities featuring higher living standards and education levels achieve a comparatively better performance.

The comparison between schools in the general government and in the private sector shows that the latter are more efficient, after resources and other outcome determinants have been taken into account. It was not possible to control for the influence of the socio-economic background of students in the regressions which introduces a bias in the results. Nonetheless evidence points to the attainment of efficiency gains with the introduction in the general government schools of some management practices of the best schools in the private sector.

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CHRONOLOGY OF MAJOR FINANCIAL MEASURES

January to February 2007

January

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

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

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

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

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

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

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

  Provides for the supply of data on credit portfolio developments.

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

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

February

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

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

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

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

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

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

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

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

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

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