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ECONOMIC POLICY AND SITUATION

The Portuguese Economy in 2007

THE PORTUGUESE ECONOMY IN 2007

1. INTRODUCTION

The Portuguese economy maintained a recovery trend in 2007, with Gross Domestic Product (GDP) growth reaching a peak for the last six years. It should be underlined that these developments occurred in the context of the continuation of the fiscal consolidation process and the maintenance of a relatively moderate growth of private consumption. These trends should be evaluated in the light of the required correction of macroeconomic imbalances of the Portuguese economy. Labour market conditions deteriorated in 2007, and the average unemployment rate increased to historical highs. In addition, trend growth of the Portuguese economy continued to be lower than in previous economic cycles and also lower than in European countries with per capita income below the European Union (EU) average.

GDP growth stood at 1.9 per cent in 2007, compared with 1.3 per cent in 2006 (Table 1.1). On the supply side, the dynamism of the economy translated into an acceleration of total factor productivity. This acceleration was associated with the more intensive use of existing inputs, the usual cyclical lags in job creation and in the incorporation of new investments, as well as with the gradual ongoing business restructuring process in progress, against the background of stronger competition and sharp changes in the comparative advantages of the Portuguese economy.

On the demand side, the economic acceleration was associated with the behaviour of Gross Fixed Capital Formation (GFCF) and consumer durables, pro-cyclical and particularly volatile components of GDP. These variables, adjusted for the respective import content, amount to a share in GDP lower than 20 per

Table 1.1

MAIN ECONOMIC INDICATORS
Rate of change, per cent (unless otherwise indicated)

	2006	2007
GDP	1.3	1.9
Private consumption	1.2	1.5
Public consumption	-1.2	-0.1
GFCF	-1.6	3.2
Exports	9.2	7.5
Imports	4.3	5.7
Employment	0.7	0.2
Unemployment rate (as a percentage of labour force)	7.7	8.0
Fiscal balance (as a percentage of GDP)	-3.9	-2.6
Net lending (+) / net borrowing (-) of the economy (as a percentage of GDP)	-9.3	-8.5
HICP	3.0	2.4

Sources: *INE* and Banco de Portugal.

cent and contributed with 1 percentage point (p.p.) to the acceleration of GDP in 2007. These developments occurred after a long period when these aggregates evolved below their trend growth and in the context of an overall improvement of business confidence, of specific tax factors at the level of the acquisition of motor vehicles, and against a background where the international financial market turbulence had not yet visibly spilled over into the financing conditions of the non-financial private sector.

The development of exports in 2007 continued to reflect the growing overall integration of the Portuguese economy. In spite of the slower growth pace in 2007, exports of goods and services continued to be the most buoyant component of overall demand in a context of robust, albeit decelerating, expansion of world trade of goods and services. Against this background, exports of services gained momentum, with the nominal growth of 15.2 per cent exceeding the rates of growth observed in the world and in the euro area economies as a whole. This reflects an important aspect of the evolution of comparative advantages of the Portuguese economy. In contrast, nominal exports of goods decelerated sharply over the year from 12.7 per cent in the last quarter of 2006 to 4.3 per cent in the last quarter of 2007. This deceleration was especially apparent in sectors which recorded a strong acceleration in 2006, in particular machinery and appliances, motor vehicles, base metals, minerals and metal ores and fuels.

An important aspect of the Portuguese economy in 2007 was the deterioration of labour market conditions, with virtually nil growth of employment and an increase in the average unemployment rate to an historical peak of 8.0 per cent. Simultaneously, the process of polarisation of the labour market was reinforced, with a decline in permanent jobs and an increase in fixed-term contracts, in particular among younger workers and new jobs. These developments, together with the increase in the tax burden and the interest rate rise, contributed to the relatively contained growth of private consumption in 2007, which stood at 1.5 per cent.

The process of consolidation of public accounts continued to be pursued in 2007. Its full attainment remains crucial to create a framework of macroeconomic stability leading to a sustained growth of the Portuguese economy in the medium and long run. The fiscal deficit narrowed again significantly and more than expected from 3.9 per cent of GDP in 2006 to 2.6 per cent in 2007. This result implies a clear fulfilment of the reference value for the deficit as laid down in the Stability and Growth Pact. According to Banco de Portugal estimates for the evolution of the structural deficit, the fiscal policy stance was restrictive in 2007, reflecting significant contributions from total revenue and primary expenditure. These estimates indicate a structural deficit of 2.4 per cent of GDP in 2007. This figure compares with the commitment within the scope of the Stability and Growth Pact to attain a medium-term objective of 0.5 per cent for the structural deficit in 2010, which illustrates the magnitude of the indispensable fiscal consolidation effort in coming years.

In intra-annual terms the second half of 2007 experienced two external shocks with important spillovers in a small open economy as the Portuguese, fully integrated both in economic and financial terms. The first shock was the significant turbulence in international financial markets, associated with a major revaluation of investors' risk, which implied a sudden increase in bond and stock market volatility, a substantial widening of spreads in private debt markets, the occurrence of significant disturbances in interbank money markets and an increase in uncertainty concerning the evaluation and the interaction between financial markets and the economic activity at a global level. The second shock was the even higher increase in commodity prices in international markets, in particular oil and food commodities. In both cases, the price acceleration reflected, in particular, the strong buoyancy of demand, namely in emerging market economies. The developments observed in the first months of 2008 confirmed that the persistence and magnitude of these shocks are expected to be higher than initially anticipated, and that their final magnitude and impact on the Portuguese economy are still surrounded by a high degree of uncertainty.

2. MAJOR INTERNATIONAL ECONOMIC DEVELOPMENTS

In 2007 as a whole the world economic activity expanded at a similar pace as in the previous year. World trade flows, in spite of robust growth, slowed down somewhat (Table 2.1). The year saw a further increase in international commodity prices, albeit less marked than in 2006, in particular when assessed in euros. In annual average terms, inflation declined slightly in advanced economies, but rose in emerging market and developing economies. Conditions in international financial markets continued to be generally favourable in the first half of the year, but deteriorated significantly in the second half of the year. Volatility in bond and stock markets rose sharply and spreads widened considerably in private debt markets. Interbank money markets also saw substantial disturbances. In the foreign-exchange markets, the depreciating trend of the US dollar observed in the previous year was more pronounced.

2007 was marked by the strong instability in financial markets started in the summer. It was triggered by growing concerns regarding developments as to developments in the sub-prime mortgage loan market in the United States of America (USA).[1] The sharp increase in the delinquency rates of these loans and the ensuing bankruptcy of companies specialising in this segment led to the exposure of vulnerabilities in other financial markets and raised further difficulties to financial institutions in general. In the first half of the year, problems were restricted to sub-prime markets. Around mid-year, as mortgage loan quality continued to deteriorate and losses started to accumulate, investor confidence declined in markets for these structured credit products and, in general, in asset-backed securities. This loss of confidence implied a risk re-evaluation, leading to a broadly-based flight from higher-risk assets and to a sharp decline in financial market liquidity in main advanced economies. Therefore, volatility increased and prices declined in major stock markets in the second half of the year, in parallel with widening spreads in private debt markets of advanced economies. Interbank money markets saw a liquidity crisis associated with an increase in counterparty risk. These developments led to the intervention of central banks, which injected substantial amounts of liquidity. In early 2008, the financial market situation continued to be surrounded by uncertainty and volatility, with strong falls in stock markets and broadly-based increases in risk premia and in demand for less risky assets. These developments were associated with announced losses in some large banking groups, new downward revisions of the outlook for economic activity – with an increase in the probability of occurrence of a recession in the USA – and with the emergence of problems in some credit insurance corporations and, more recently, in a large North-American investment bank. It should be highlighted that the current instability in financial markets is affecting more sharply the companies in the financial sector of advanced economies. This is a distinctive feature characterising the current instability episode, when compared with previous episodes,[2] and is reflected in the strong widening of spreads in private debt markets, in particular for companies in the financial sector.

In spite of continued strong economic growth at global level in 2007 as a whole, the strong instability in international financial markets in the second half of the year contributed to a deceleration in activity and world trade in the last quarter of the year (Chart 2.1). The deceleration in activity was more apparent in advanced economies. In addition, economic growth prospects for 2008 have been revised downwards (Chart 2.2). According to International Monetary Fund (IMF) forecasts (April 2008), world growth is expected to be 3.7 per cent in 2008, 1.2 percentage points (p.p.) less than in the previous

(1) For a more detailed analysis of the sources of turbulence and of pass-through channels into financial markets, see "Box 1 *Recent turbulence in international financial markets*", *Economic Bulletin-Autumn 2007*.

(2) Such as Russia's long-term capital management and default crisis, the bursting of the technology bubble and September 11.

Table 2.1

DEVELOPMENTS IN WORLD ECONOMY
Rates of change, per cent

	2005	2006	2007
GDP			
World economy	4.4	5.0	4.9
Advanced economies	2.6	3.0	2.7
USA	3.1	2.9	2.2
Japan	1.9	2.4	2.0
Euro area	1.7	2.9	2.6
Germany	1.0	3.1	2.6
France	1.7	2.2	1.9
Italy	0.6	1.8	1.5
Spain	3.6	3.9	3.8
Portugal	0.9	1.3	1.9
United Kingdom	1.8	2.9	3.1
Newly industrialised Asian economies [(a)]	4.8	5.6	5.6
Emerging market and developing economies	7.1	7.8	7.9
Central and Eastern Europe	6.1	6.6	5.8
Commonwealth of Independent States	6.5	8.2	8.5
Russia	6.4	7.4	8.1
Developing Asian countries	9.0	9.6	9.7
China	10.4	11.1	11.4
India	9.1	9.7	9.2
Middle East	5.7	5.8	5.8
Latin America	4.6	5.5	5.6
Africa	5.7	5.9	6.2
World trade volume of goods and services	7.6	9.2	6.8
International commodity prices			
Brent			
In USD	45.0	20.1	9.5
In Euros	45.0	19.0	0.4
Non-energy commodities			
In USD	9.5	26.3	19.1
In Euros	9.4	24.8	9.2
Consumer prices			
Advanced economies	2.3	2.4	2.2
Emerging market and developing economies	5.7	5.4	6.4

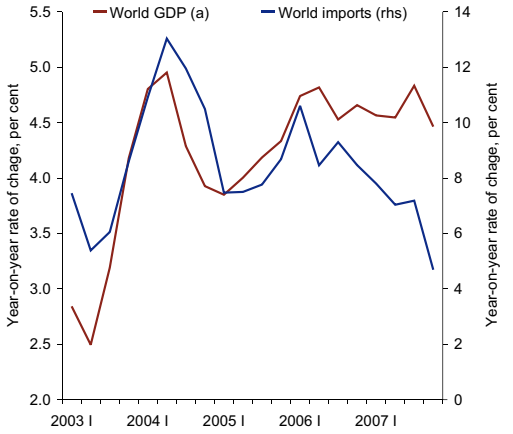
Sources: IMF, HWWI, *Istituto Nazionale di Statistica*, Thomson Financial Datastream and Banco de Portugal.
Note: (a) Korea, Hong-Kong, Taiwan and Singapore.

year. Growth in advanced economies is estimated to fall from 2.7 per cent in 2007 to 1.3 per cent in 2008, with focus on the deceleration projected for the United States (from 2.2 to 0.5 per cent) and, to a lesser extent, for the euro area (from 2.6 to 1.4 per cent). Emerging market and developing economies, in spite of significant momentum, are also forecast to decelerate in 2008. The uncertainty surrounding these prospects is higher than usual and the balance of risks continues to be biased downwards. This reflects, in particular, the current turbulence in international financial markets, of which the spillovers into the economic activity are difficult to gauge but may turn out to be more severe than initially forecast. The risk of a stronger-than-projected economic deceleration is high in the USA, due to the possibility of deterioration in financing conditions, with negative effects on internal demand – in particular, by reinforcing the housing market correction – which in turn may amplify the size and duration of the financial crisis. Other downward risks are associated with the high levels and volatility of the international prices of oil and other commodities, and to the persistence of current account imbalances worldwide, in a context of higher financial market instability.

Chart 2.1

GROSS DOMESTIC PRODUCT AND WORLD IMPORTS

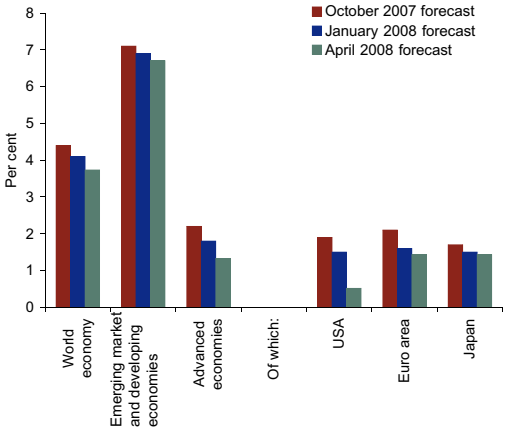
In volume



Sources: CBP and Banco de Portugal calculations.
Note: (a)The world GDP series was calculated on the basis of a sample of countries representing around 90 per cent of world GDP in 2004, expressed in purchasing power parities. The weighting assigned to each country is calculated on the basis of the weights disclosed by the IMF, which correspond to the share of the respective GDP in world GDP, expressed in purchasing power parities.

Chart 2.2

WORLD GDP GROWTH IN 2008



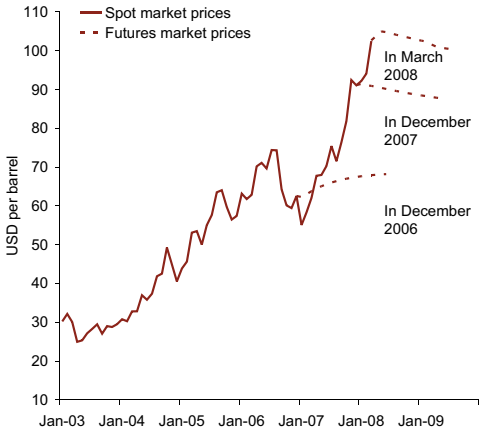
Source: IMF.

In 2007 commodity prices, denominated in US dollars, rose again significantly in international markets (Table 2.1). The oil price followed an upward trend in the course of the year – only interrupted temporarily in August, in the wake of the financial market turbulence – to reach historical peaks in both nominal and real terms in November (Chart 2.3). At the end of the year, the price of Brent stood at around USD95, implying a change of more than 55 per cent, when compared with the level observed at the end of 2006 (the change in euros was almost 40 per cent in the same period). In annual average terms, the increase was less marked (9.5 per cent in US dollar terms), with a virtually nil change in euros, as a result of the depreciation of the US dollar over the year. The oil price increase in 2007 may be attributed to continued high demand, in particular by emerging market economies, to the stagnation of supply and to new episodes of geopolitical tension. There is some evidence suggesting that the US dollar depreciation has also contributed to the oil price surge.[3] The US dollar fluctuations may affect international commodity prices in several ways. Most international commodity prices are fixed in US dollars, wherefore a depreciation of this currency makes these commodities less expensive for consumers in regions with other currencies, implying an increase in demand and upward pressures on prices. On the supply side, the depreciation of the US dollar entails a cut in profit margins in the national currency of producers outside the dollar zone, which may also give rise to pressures on prices. In addition, the depreciation of the dollar curtails national currency-denominated returns on US dollar-denominated financial assets. This may make investments in alternative assets such as gold or oil more attractive. In early 2008, the oil price continued to be volatile and reached again new nominal and real peaks. At the end of March, futures market quotations pointed to the maintenance of the oil price above USD 100/barrel up to the end of 2008. As regards non-energy commodities, US dollar-denominated prices remained high in the course of 2007 (Chart 2.4), with a 19.1 per cent rise in annual average terms. In the first half of the year, there was a broadly-based price rise in both industrial and food commodities. In the second half of the year, food commodity prices maintained an upward trend, totalling a 28.2 per

(3) See "Box 1.4 *Dollar Depreciation and Commodity Prices*", IMF's *World Economic Outlook*, April 2008.

Chart 2.3

INTERNATIONAL OIL PRICE (BRENT)

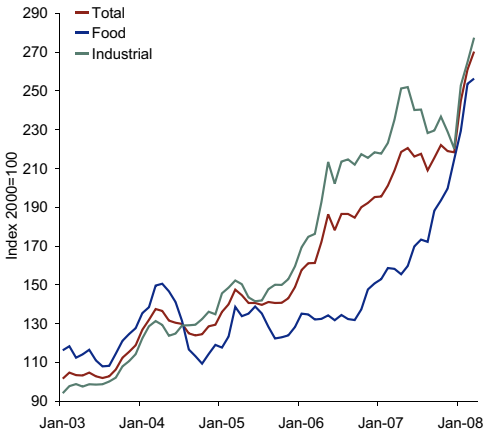


Source: Bloomberg.

Chart 2.4

INTERNATIONAL PRICE OF NON-ENERGY COMMODITIES

USD



Source: HWWI.

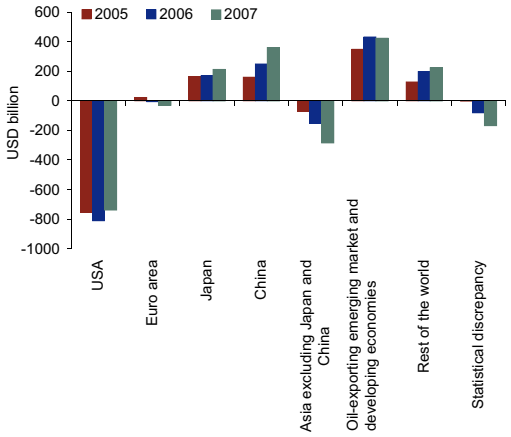
cent increase in US dollars, on annual average terms. These developments reflected increased demand for this type of products – associated with the expansion of overall economic activity, in particular in emerging market economies, but also with the use of some cereals and oil seeds in the production of bio-fuels – and disturbances in production in some countries, due to adverse weather conditions. In contrast, prices of industrial commodities declined in the second half of the year, reflecting in particular the behaviour of metal prices that had been affected by concerns as to the deceleration of industrial activity at global level and increasing stocks. In the year as a whole, US dollar-denominated industrial commodity prices rose by 15.8 per cent from the previous year. In early 2008 there were sharp rises in non-energy commodity prices: food commodity prices saw further increases and there was a reversal in the declining trend of metal prices. The recent recovery of metal prices may have been related to problems on the supply side.

Global imbalances eased somewhat in 2007, but remaining at very high levels (Chart 2.5). In the United States, the current account deficit narrowed from 6.2 to 5.3 per cent of GDP, reflecting the sustained robust growth in exports and the deceleration in imports, against the background of lower growth of domestic demand, continued buoyancy of external demand and depreciation of the US dollar in real effective terms. In oil-exporting countries, the current account surplus narrowed slightly, in spite of the increase in oil prices, reflecting an acceleration in domestic demand in these countries (which in the case of Middle East countries was induced by expansionary fiscal policies). The aggregate surplus of Asian emerging market and developing economies also narrowed in 2007. In China, however, the surplus rose further, reflecting the maintenance of stronger growth of exports than imports. In spite of the higher pace of appreciation of the renminbi *vis-à-vis* the US dollar in 2007 – by approximately 6 per cent, compared with around 3 per cent in 2006, in end-of-period terms – China's nominal effective exchange rate index appreciated modestly (around 2 per cent). *Vis-à-vis* the euro, the Chinese currency depreciated by 4.6 per cent in 2007, in end-of-period terms.

Growth of global economic activity in 2007 continued to be sustained by the momentum of emerging market and developing economies (7.9 per cent growth, virtually identical to the level observed in 2006), particularly in China, India and Russia (Table 2.1). In contrast, GDP growth of advanced econo-

Chart 2.5

CURRENT ACCOUNT



Source: IMF.

mies declined from 3.0 per cent in 2006 to 2.7 per cent in 2007, largely reflecting the deceleration in activity in the United States and, to a lesser extent, in the euro area and Japan.

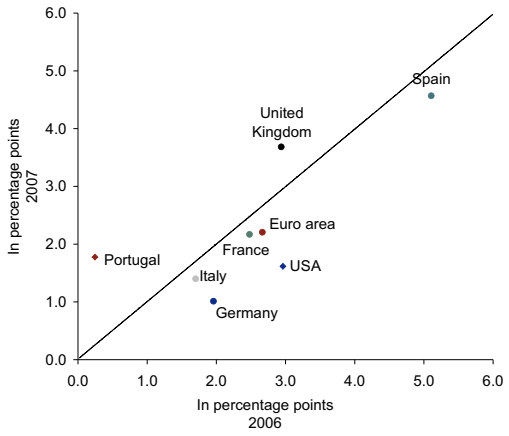
In the United States, growth of economic activity declined from 2.9 per cent in 2006 to 2.2 per cent in 2007, chiefly reflecting the fall in total investment determined by the behaviour of the residential component. The decline in residential investment attained 17 per cent (-4.6 per cent in 2006), and intensified in the course of the year, against a background of growing deterioration of the housing market and difficulties in the mortgage loan market. Business investment expenditure grew by 4.7 per cent, 1.9 p.p. less than in the previous year. Growth of private consumption was relatively sustained (2.9 per cent, compared to 3.1 per cent in 2006), in line with continued growth of employment and disposable income. As regards international trade flows, growth of imports of goods and services declined significantly (from 5.9 per cent in 2006 to 1.9 per cent in 2007), while exports continued to be buoyant (an increase of approximately 8 per cent in both years). Behind these divergent developments were the effective depreciation of the US dollar, the slowdown in domestic demand and continued robust growth in the United States' main trading partners. As a result, net exports made a significant and positive contribution – which was not observed since 1995 – to GDP growth in 2007 (Chart 2.6). The developments in economic activity in the course of 2007 were marked by some volatility. In the last quarter of the year growth declined significantly – the quarter-on-quarter rate of change was only 0.1 per cent, compared with 1.2 per cent in the third quarter. Available indicators for early 2008 continue to point to some deceleration in economic activity, in spite of some uncertainty as to its magnitude and duration.

In the euro area, the pace of economic expansion declined from 2.9 to 2.6 per cent in 2007. These developments were the result of the reduction of the contribution of domestic demand, since the contribution of net exports to growth increased (Chart 2.6). Private consumption slowed down (1.4 per cent rise *vis-à-vis* 1.8 per cent in 2006), influenced, inter alia, by the announced increase in indirect taxation in Germany, effective as of January 2007.[4] In turn, government consumption continued to grow as in the previous year. The consolidation of public accounts in the euro area saw limited progress in 2007. Investment remained significantly buoyant, in spite of some moderation *vis-à-vis* the previous year, as a result of the behaviour of residential investment. Exports of goods and services continued to grow considerably in 2007 (6.0 per

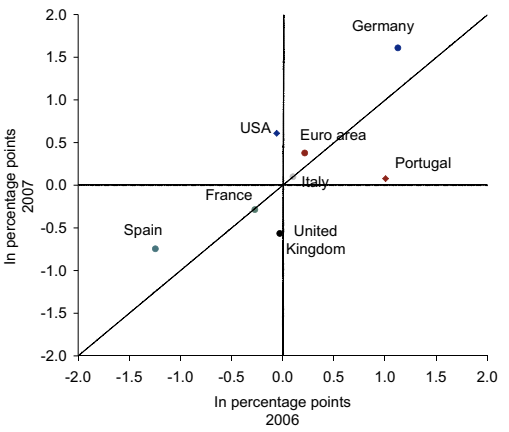
(4) In the first quarter of 2007, consumption expenditure decelerated significantly (nil quarter-on-quarter rate of change, compared with the 0.4 per cent rise in the last quarter of 2006).

Chart 2.6

DOMESTIC DEMAND
Contribution to GDP growth



NET EXPORTS
Contribution to GDP growth



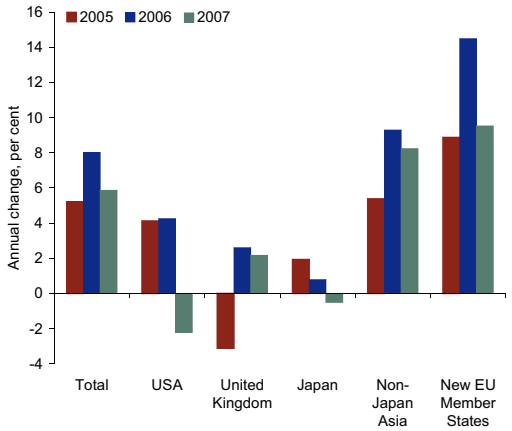
Sources: *Istituto Nazionale di Statistica*, Thomson Financial Datastream and Banco de Portugal.

cent, compared with 8.1 per cent in 2006), notwithstanding the nominal effective appreciation of the euro, in a context of robust expansion of external demand. An analysis of geographical destinations shows that goods exports to non-Japan Asia and to the new Member States continued to be particularly dynamic, pursuing the trend observed in past years, while exports to the USA declined (Chart 2.7). Imports of goods and services grew by 5.2 per cent in 2007 (7.8 per cent in 2006). The larger contributions to growth of goods imports were given by imports from non-Japan Asia and the new Member States – in line with developments in recent years – as well as from the USA.

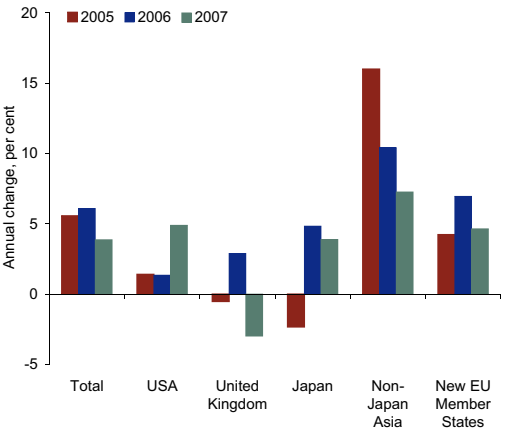
The slowdown in activity in 2007 was observed in all large euro area economies except Spain, where growth remained at the level observed in the previous year. Some small euro area economies, including Portugal, showed an acceleration. Hence, growth of the Portuguese economy got closer to the

Chart 2.7

VOLUME OF EXTRA-EURO AREA EXPORTS OF GOODS BY COUNTRY OF DESTINATION



VOLUME OF EXTRA-EURO AREA IMPORTS OF GOODS BY COUNTRY OF ORIGIN

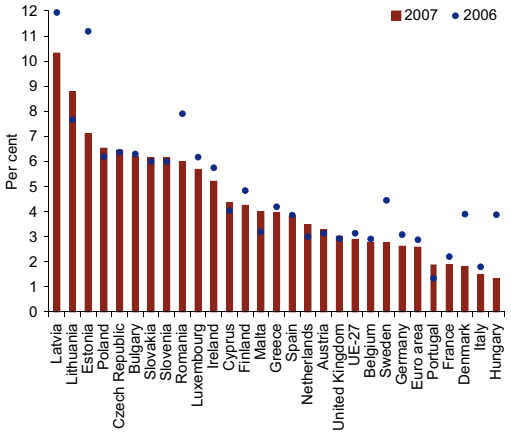


Sources: Eurostat and Banco de Portugal calculations.

Chart 2.8

GROSS DOMESTIC PRODUCT IN EUROPEAN UNION COUNTRIES

Real rate of change



Sources: Eurostat, IMF, *Istituto Nazionale di Statistica* and Banco de Portugal.

euro area average in 2007. Nonetheless, and in line with developments in recent years, the Portuguese economy continued to present one of the lowest growth rates among euro area and EU countries (Chart 2.8).

Major Portuguese trading partners in the European Union continued to show rather differentiated growth paces in 2007. On the one hand, the economic activity in Spain and the United Kingdom maintained strong dynamics, growing by 3.8 and 3.1 per cent respectively. In Germany growth fell from 3.1 per cent in 2006 to 2.6 per cent in 2007. In France and Italy activity decelerated also, and growth stood at 1.9 and 1.5 per cent respectively. As regards developments in the composition of growth, all countries excluding the United Kingdom evinced weaker domestic demand (Chart 2.6). In 2007, the contribution of net exports to growth was higher in Germany and Spain, contrary to the United Kingdom.

Economic developments in main countries of destination of Portuguese exports saw a significant slowdown in goods imports, which led to lower growth of the indicator generally used to measure the developments of external demand for Portuguese goods and services (Table 2.2). In 2007, this indicator rose by 5.1 per cent, 3 p.p. less than in the previous year, thus contributing to explain lower growth of Portuguese goods exports this year (see "*Section 5 Expenditure*").[5] According to data available, the share of Portuguese goods exports in external markets increased slightly in the year a whole (0.6 per cent), after remaining virtually unchanged in 2006. In comparative terms, goods exports grew less in Portugal than in the euro area, in the group of advanced economies and worldwide (Chart 2.9). Portuguese exports evolved also at a slower pace than exports in emerging market and developing economies, particularly in Central and Eastern Europe and Asia. In spite of a slight moderation, exports of these economies maintained very high growth rates in 2007.

In 2007 growth of Portuguese exports of services was far stronger than exports of goods (12.2 and 5.7 per cent respectively). The share of Portuguese exports of both goods and services in external mar-

(5) The external demand indicator generally used is based on a limited number of countries, determined on the basis of their weight in national exports. The widening of the group of countries covered – which seems to be necessary due to the geographical distribution of Portuguese exports – has been constrained by statistical data limitations. The behaviour of exports in the recent period has been influenced by significant growth in some markets (see, for instance, Angola). The fact that these markets are not considered in the external demand indicator makes it more difficult to analyse the market share.

Table 2.2

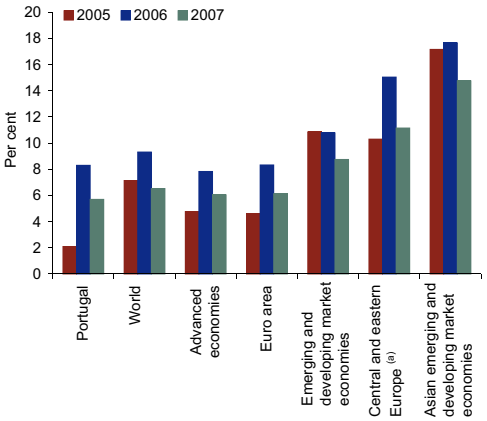
EXTERNAL DEMAND FOR PORTUGUESE GOODS
Rate of change in volume, per cent

	Weights 2006	2005	2006	2007
External demand [a]	100.0	6.0	8.1	5.1
Intra-euro area external demand	79.3	6.1	8.3	5.6
of which:				
Spain	31.8	7.1	8.0	6.2
France	16.1	5.4	7.9	4.7
Germany	14.3	7.3	12.9	6.4
Italy	5.2	-0.7	3.4	0.7
Extra-euro area external demand	20.7	5.5	7.1	3.1
of which:				
United Kingdom	10.1	3.9	8.0	2.2
United States	6.3	6.6	6.0	2.3

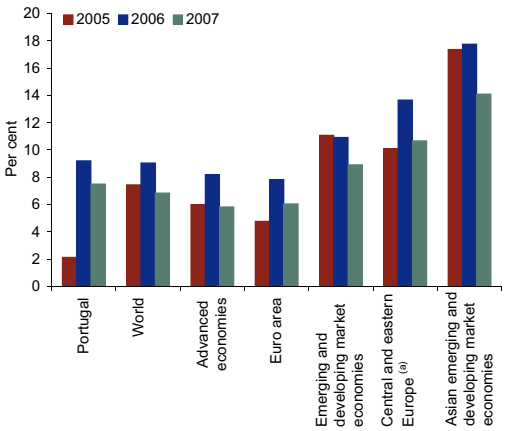
Sources: European Commission, UK Office for National Statistics and *INE*.
Note: (a) Calculated as a weighted average of the real growth in imports of goods from the 17 major trading partners. Each individual country was weighted according to its share in Portuguese exports in the previous year. The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

Chart 2.9

EXPORTS OF GOODS
Real rate of change



EXPORTS OF GOODS AND SERVICES
Real rate of change



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

kets increased by 1.9 per cent, compared with 0.6 per cent when considering only exports of goods. Comparing the behaviour of Portuguese exports of goods and services with that of other economies is also more favourable than comparing the development of exports of goods (Chart 2.9). Considering both goods and services, growth of Portuguese exports was higher than in the euro area, in the group of advanced economies and world total. Notice that, in the course of 2007, Portuguese exports of goods and services revealed a sharp deceleration trend. This did not result from the behaviour of external demand for Portuguese goods and services – which maintained relatively sustained growth over the year – and was reflected in a virtual stabilisation of the share of exports of goods and services in ex-

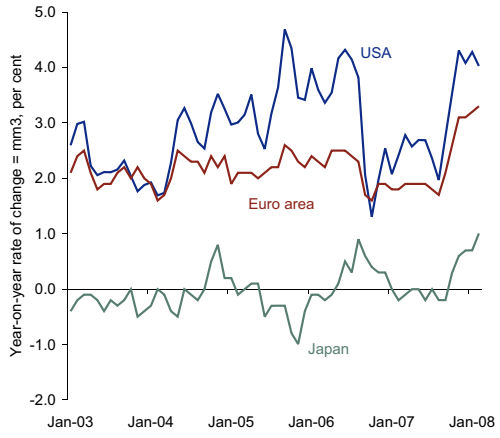
ternal markets in the second half of the year, after the significant gains obtained in the first half of the year.

Robust growth of the world activity and the rise in international commodity prices – albeit less than in 2006 in annual average terms – have contributed to the increase in inflationary pressures on a global scale. In advanced economies, inflation remained virtually unchanged in annual average terms, at levels slightly above 2 per cent (Table 2.1). Inflation in these economies, however, increased sharply in the last months of the year, largely reflecting the increase in energy and food prices (Chart 2.10). Inflation excluding these components remained relatively contained, but also rose in the last months of the year. In the euro area, the inflation rate stood at 2.1 per cent in 2007, *vis-à-vis* 2.2 per cent in the two previous years. The slight decline in inflation in 2007 as a whole was associated with the deceleration in energy prices, in line with lower growth of the international oil price, when valued in US dollars, and with the appreciation of the euro. The average change in the Harmonised Index of Consumer Prices (HICP) excluding energy rose by 0.5 p.p. in 2007 to 2.1 per cent, largely reflecting the VAT increase in Germany, against the background of low pressures on prices associated with the development of labour costs. Unprocessed food prices accelerated also significantly in 2007 as a whole in most euro area countries, to which contributed the acceleration in the international price of some food commodities. In terms of developments over the year, the year-on-year inflation in the euro area remained stable in the first eight months of 2007, but rose quite rapidly to 3.1 per cent at the end of 2007. This is explained by the acceleration in energy prices in that period – simultaneously reflecting an increase in international oil prices and an unfavourable base effect – combined with a significant increase in processed food prices. In emerging market and developing economies, inflation rose from 5.3 to 6.4 per cent, in annual average terms, reflecting more buoyant demand, and the higher share of food in consumer expenditure in these economies.

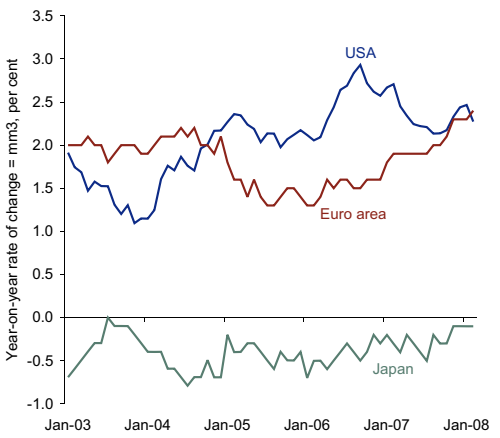
In the first half of 2007, monetary policy in main advanced economies continued to be oriented towards a less accommodating stance, in response to concerns about the emergence or increase of inflationary pressures in a context of robust growth of global activity and persistently high commodity prices (Chart 2.11). In the euro area, the Governing Council of the European Central Bank (ECB) decided to increase its official interest rate by 25 basis points (b.p.) twice, setting it at 4 per cent in early June (see

Chart 2.10

CONSUMER PRICES



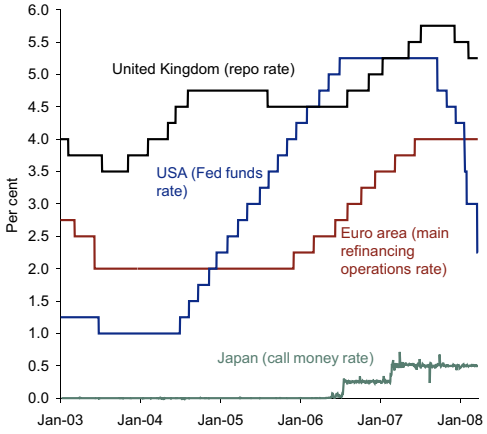
CONSUMER PRICES EXCLUDING ENERGY AND FOOD



Sources: Eurostat and Thomson Financial Datastream.

Chart 2.11

OFFICIAL INTEREST RATES



Source: Bloomberg.

Section 3). In the United Kingdom, the Monetary Policy Committee of the Bank of England raised its official interest rate by 25 b.p. in January, May and July, to 5.75 per cent, to ensure the maintenance of inflation below the 2 per cent medium-term objective. In turn, the US Federal Reserve maintained the reference rate unchanged, against the background of moderate growth of the economic activity, but signalling upward risks to inflation. In the second half of the year, financial market instability constrained the conduct of the monetary policy in main advanced economies. In that period, the US Federal Reserve started a cycle of official interest rate cuts, with a view to mitigating the adverse effects of tightened credit standards on overall economic growth. Hence, the target for the federal funds was lowered by 50 b.p. in the September meeting, and by 25 b.p. in the October and December meetings. In the first quarter of 2008, it was further reduced – 125 b.p. in January (75 b.p. on the 22nd and 50 b.p. in the regular meeting on the 30th) and 75 b.p in March – in the context of more acute downward risks to growth. The Monetary Policy Committee of the Bank of England decided to reduce its official interest rate in December 2007 and February 2008 (by 25 b.p. on both occasions). The Governing Council of the ECB, in turn, decided to maintain its official interest rate unchanged in the second half of the year and in the first months of 2008. A number of emerging and developing market economies, little affected by financial market instability, decided to increase further their reference interest rates during the second half of 2007 and in early 2008, in a context of upward pressures on prices related to the strength of activity and the rise in international commodity prices.

In the second half of 2007 interbank money markets of main advanced economies were significantly disrupted. In August, these markets were affected by a sharp decline in the number of transactions and by a widening of the spread between market interest rates and monetary policy benchmark rates, which led to central bank intervention, with successive liquidity injections. These measures have contributed to some easing of the financing conditions at shorter maturities in the money market, in spite of persisting disturbances in maturities similar or over one month, evinced by the persistently high levels of the interest rate spreads between operations with and without collateral (repo spreads)[6] at those maturities. After a calm spell at the end of September and in October, the announcement of higher-than-expected losses in financial sector companies (associated with the exposure to sub-prime credit) and the downward revision of economic growth prospects, particularly in the USA, led to a fur-

(6) Repo spread is the bank interest rate spread between lending without collateral and the corresponding interest rate of collateralised operations (repo rate).

ther increase in financial market instability in the last months of the year. In interbank money markets, this instability exacerbated the usual increase in demand for liquidity at year end,[7] implying a further increase in repo spreads – to higher levels than seen since the start of the turbulence period – that reflected the widening of credit and liquidity risk premia. In response, central banks conducted liquidity providing operations in amounts that exceeded those involved in previous tensions in this turbulence period, which contributed to some easing of the situation in those markets. The measures adopted by central banks to normalise the money market situation – often in a coordinated manner – included, in addition to a considerable increase in the amounts involved in liquidity-injection operations, a more flexible management of the liquidity-providing instruments. In the case of the ECB, the changes introduced in liquidity policy translated into an increase in the amounts and frequency of occasional operations and in the reinforcement of operations with a three-month maturity. In the case of the US Federal Reserve, changes in the operational framework for the implementation of monetary policy were substantially more relevant: in addition to an increase in amounts, they included an extension of maturities, eligible collateral and counterparties to liquidity-providing operations.[8] After a period of heightened tension at the end of 2007 and following the actions of monetary authorities, the money market stabilised in early 2008. After mid-January, however, the prospects of a more significant impact of market turbulence on the situation of financial sector companies, led to a new widening of repo spreads, especially in longer maturities. In March, tensions in the money markets of advanced economies strengthened, partly due to the approach of the end of the quarter. In this context, some central banks took additional measures intended to stabilize money market conditions.[9]

Main stock markets experienced new gains in the first half of 2007, extending the valuation trend observed over 2006, against a background of robust world economic growth, higher-than-expected corporate results and stronger merger and acquisition activity (Chart 2.12). In the second half of the year, however, developments in these markets were dominated by high volatility. In July and August, the flight from higher-risk assets translated into sharp falls in equity prices. Subsequent months saw some recovery, but at the end of December main stock market indices stood at lower levels than at the end of the first half of the year. Nonetheless, in terms of end-of-year comparisons, excluding Japan's Nikkei index, main stock market indices experienced gains in 2007 (Table 2.3). However, this development was not broadly based across all activity sectors, and the stock prices of financial sector corporations saw a significant devaluation. Stock market indices in emerging market economies were little affected by the instability in international financial markets, exhibiting significant valuations in 2007 as a whole. In early 2008 more negative prospects for economic activity, particularly in the USA, and newly announced significant losses in some large corporations of the financial sector determined a sharp and

(7) Usually, the Christmas and New Year period is associated with some money market tension, due to increased liquidity demand justified by two factors. On the one hand, the increase in demand for banknotes in circulation and their volatility, which raises the uncertainty associated to the forecasting of primary central bank liquidity needs. On the other hand, demand for those funds rose due to end-of-year balance-sheet adjustments.

(8) In particular, in December 2007, in response to increased tensions in interbank markets at the end of the year, the Federal Reserve created a Term Auction Facility, with a wider range of eligible counterparties and collateral than in regular operations. On this date, within the scope of concerted measures with other monetary authorities, the FED also announced the creation of two foreign exchange swaps with the ECB and the Swiss National Bank with a view to supplying US dollars in the respective money markets. In addition, the Bank of England and the Bank of Canada also participated in the concerted action.

(9) In March, the US Federal Reserve decided:

- on 7 March: to increase liquidity provided under the Term Auction Facility and in regular liquidity-providing operations;

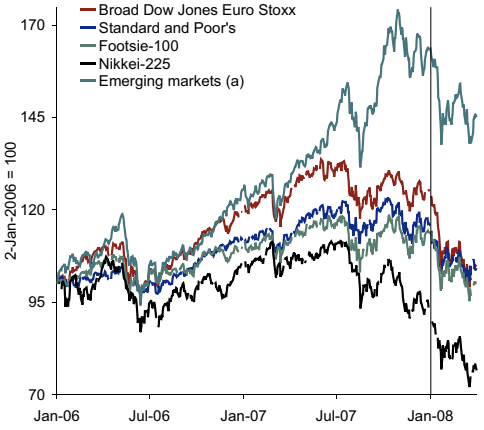
- on 11 March: to create a new Term Securities Lending Facility which is a lending programme of Treasury securities to primary dealers secured by a pledge of other securities, available through an auction procedure. In addition, the Fed has authorised increases in its existing temporary reciprocal currency arrangements (swap lines) with the ECB and the Swiss National Bank.

- on 16 March: to create the Primary Dealers Credit Facility, which extended the discount window credit facility to primary dealers, which were not eligible for not being depositing institutions and hence were not subject to tighter supervision regulations. The applicable interest rate is equivalent to the discount rate, whereas eligible collateral covers collateral eligible for regular operations plus securities of private companies deemed to be investment grade. The discount rate declined on this date from 3.5 to 3.25 per cent, and its maximum maturity was raised from 30 to 90 day operations.

On 27 March, the ECB decided to conduct supplementary six-month longer-term refinancing operations (in addition to the new supplementary three-month longer-term refinancing operations), aimed at supporting the normalisation of the functioning of the euro money market.

Chart 2.12

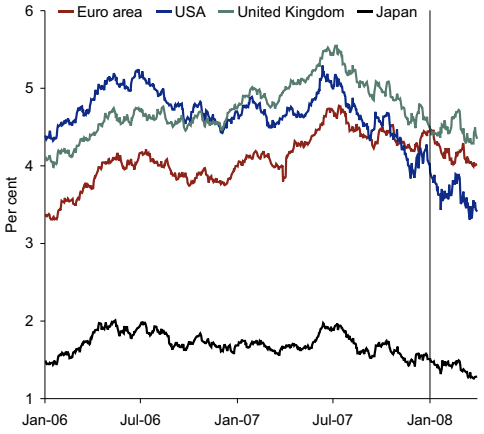
STOCK MARKETS



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

Chart 2.13

TEN-YEAR BOND YIELDS



Source: Bloomberg.

broadly based fall in stock prices. The largest stock market falls occurred in Japan and in the euro area (approximately 18 and 16 per cent respectively, from late 2007 to the end of March 2008) whereas the smallest fall was observed in the USA (around 10 per cent in the same period).

In the first half of 2007 developments in bond markets were characterised by a rise in long-term government interest rates in main advanced economies (Chart 2.13). At the end of the semester, government bond yields in the euro area and in the USA stood approximately 70 and 30 b.p. respectively above the level observed at the end of 2006. According to information from inflation-indexed bonds, this rise reflected chiefly the increase in long-term real interest rates (Chart 2.14). After mid July long-term government nominal interest rates in the euro area and in the USA reversed the trend observed in the previous half-year, and declined over the second semester, far more sharply in the second case (approximately 30 and 100 b.p. respectively). According to data from index-linked bonds, this decline seems to have chiefly reflected the decrease in real interest rates, which is consistent with a downward revision of prospects for economic growth in both economies, in particular in the USA. In the euro area, break-even inflation expectations of HICP-indexed bonds increased slightly in the second half of 2007. From the end of 2006 to the end of 2007 10-year nominal interest rates declined in the USA but rose in the euro area (Table 2.3). In the euro area, government yield spreads widened between euro area Member States and Germany, particularly in the second half of the year, which may have largely reflected increased demand for more liquid assets. In turn, the spreads between private and government debt yields in the USA and in the euro area, which had remained at low levels in the first half of 2007, widened significantly in the second half of the year, reflecting the sudden change in investors' risk perception (Chart 2.15). The widening of the spreads was comparatively sharper for corporations with worse rating, for financial corporations and for the USA (Table 2.3). In emerging markets, government bond spreads *vis-à-vis* US Treasury bonds widened slightly in 2007, but remained well below historical averages, contrary to private debt spreads in developed economies (Chart 2.16). This suggests that emerging markets in general were less affected by turbulence in international financial markets. In early 2008 bond markets continued to be volatile, with long-term interest rates declining again in the euro area and in the USA from late 2007 to the end of March, more markedly in the case of the US economy. According to data on index-linked bonds, this decline in long-term interest

Table 2.3

INTERNATIONAL FINANCIAL MARKETS
Daily data

	Averages			End-of-period		
	2005	2006	2007	2005	2006	2007
Stock price indices (percentage change)						
S&P 500	7	9	13	3	14	4
Nikkei 225	11	30	7	40	7	-11
FTSE 100	14	15	8	17	11	4
Dow Jones Euro Stoxx	17	22	17	23	20	5
MSCI - emerging market economies [a]	22	30	27	32	26	30
10-year interest rates - government debt (per cent)						
USA	4.3	4.8	4.7	4.4	4.7	4.0
Japan	1.4	1.7	1.7	1.5	1.7	1.5
United Kingdom	4.4	4.5	5.1	4.1	4.7	4.5
Euro area	3.4	3.9	4.3	3.4	4.1	4.4
Spreads between private and government bond yields (basis points)						
USA						
AA	52	55	89	54	51	171
Non-financial corporations	39	51	83	47	54	139
Financial corporations	54	56	90	56	51	176
BBB	132	114	152	115	113	262
Non-financial corporations	135	114	144	114	113	238
Financial corporations	150	139	220	140	130	458
Bancos	72	76	121	73	75	250
Euro area						
AA	17	23	46	21	26	88
Non-financial corporations	11	22	29	18	22	53
Financial corporations	18	23	50	22	27	96
BBB	66	74	85	71	73	145
Non-financial corporations	64	70	78	68	70	134
Financial corporations	77	100	138	95	98	240
Banks	22	33	56	29	35	105
Emerging market debt spreads						
EMBI+	316.7	199.5	190.2	245.0	169.0	239.0
Nominal effective exchange rates (percentage change)						
US dollar	-2.6	-2.0	-3.9	3.3	-4.3	-7.5
Japanese yen	-3.2	-7.2	-5.9	-10.4	-6.1	0.8
Pound sterling	-1.6	0.5	2.1	-2.3	6.0	-6.0
Euro	-1.0	0.3	3.9	-6.7	4.5	6.3
Memo:						
EUR/USD exchange rate [b]	0.0	0.9	9.1	-13.4	11.6	11.8

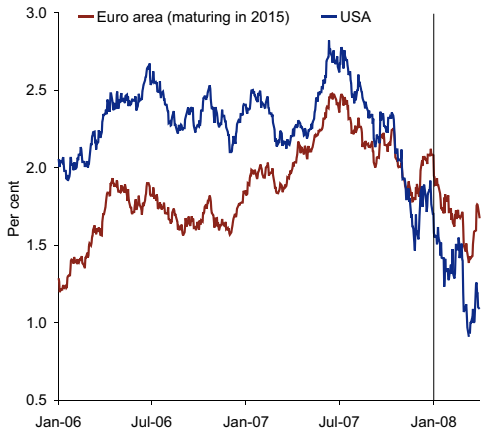
Sources: ECB, Bank for International Settlements, Bloomberg, JPMorgan and Federal Reserve Board.
Notes: (a) Morgan Stanley Capital International index for emerging market economies: Argentina, Brazil, Chile, China, Colombia, Czech Republic, Egypt, India, Indonesia, Israel, Jordan, Korea, Hungary, Malaysia, Mexico, Morocco, Pakistan and Peru. (b) A positive change corresponds to an appreciation of the euro.

rates is accounted for by the decrease in real interest rates, both in the euro area and in the USA. In both economies, long-term inflation expectations from index-linked bonds fluctuated significantly over the quarter. At the end of March inflation expectations in the euro area stood slightly above the levels observed at the end of 2007, while standing at a similar level in the USA. In the first months of 2008 the widening trend in government yield spreads between euro area Member States and Germany was considerably more marked. The spreads between private and government debt yields maintained the upward trend observed since mid-2007.

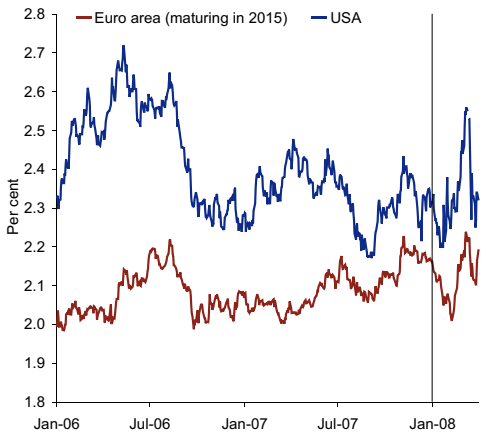
In 2007 foreign exchange markets maintained, in general, the trends observed in the previous year. The euro appreciated by approximately 6 per cent in nominal effective terms from the end of 2006 to

Chart 2.14

REAL GOVERNMENT BOND YIELDS [a]



INFLATION EXPECTATIONS [a]

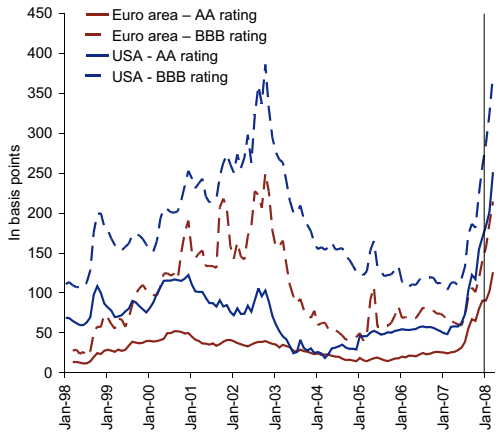


Source: Bloomberg.
Note: (a) French index-linked bonds linked to the euro area HICP (maturing in 2015) and US index-linked bonds linked to the CPI (10-year). In relation to the euro area, real interest rates and inflation expectations are seasonally adjusted.

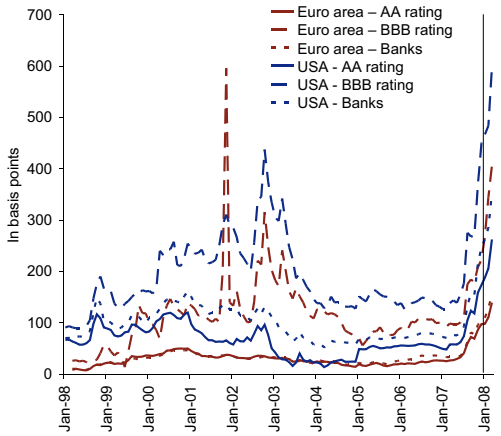
Chart 2.15

SPREADS BETWEEN PRIVATE AND GOVERNMENT BOND YIELDS [a]

Total number of companies



Financial corporations

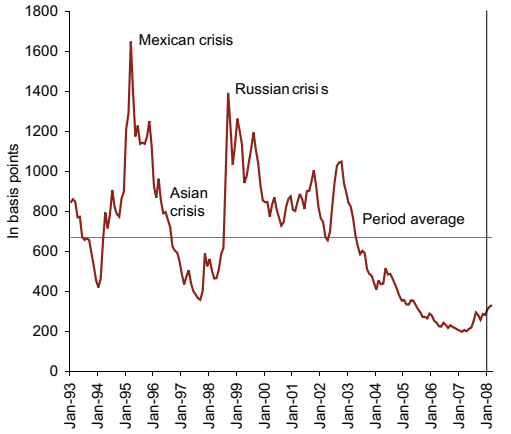


Source: Bloomberg.
Note: (a) Merrill Lynch Indices. Monthly averages.

the end of 2007 (Table 2.3). The appreciation was broadly based *vis-à-vis* all relevant currencies in the euro effective exchange rate index basket, and was particularly significant *vis-à-vis* the US dollar (Chart 2.17). The strengthening of the euro *vis-à-vis* the US dollar, which was more marked in the second half of the year, was associated with different expectations as to the development of monetary policy in both economies given the favourable prospects for the euro area as regards the economic growth differential. The persistently high current account deficit in the USA has also contributed to weaken the US dollar. The yen followed a downward trend in the first half of the year, associated with the maintenance of interest rates at low levels, which has continued to foster capital outflows from the

Chart 2.16

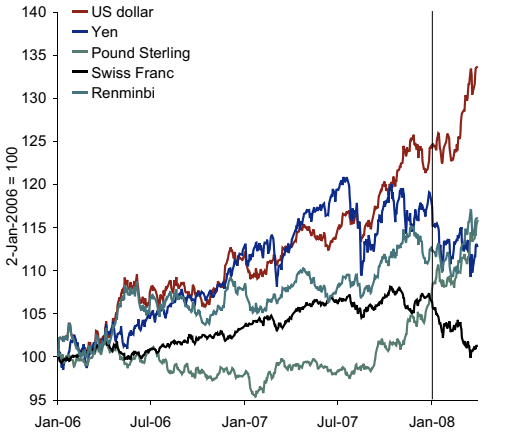
EMERGING MARKET DEBT SPREADS [a]



Source: JP Morgan.
Note: (a) Yield spread between emerging market sovereign issuers (EMBI/EMBI+) and US Treasury Securities. Monthly averages.

Chart 2.17

EXCHANGE RATE *VIS-À-VIS* THE EURO



Source: ECB.
Note: An increase (decrease) corresponds to a depreciation (appreciation).

Japanese economy (known as carry trades).[10] Financial market instability led to an annulment of carry trade positions and implied an appreciation *vis-à-vis* the euro in July and in early August, but after mid-August the yen depreciated again. The euro appreciated slightly *vis-à-vis* the currencies of other Asian trading partners, reflecting the peg of these currencies to the US dollar. In 2007 the Chinese authorities allowed for a faster appreciation of the renmimbi *vis-à-vis* the US dollar. It should be noticed that in the first three months of 2008 the euro appreciated further in nominal effective terms (3.6 per cent, in end-of-period terms), reflecting its strengthening *vis-à-vis* the US dollar – with the bilateral rate reaching historical peaks –, the pound sterling and, to a lesser extent, the renminbi. In contrast, the euro depreciated *vis-à-vis* the yen and the Swiss franc.

3. MACROECONOMIC POLICIES

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

Monetary policy of the ECB

During the first half of 2007 the ECB continued to gradually reduce the accommodative stance of the euro area monetary policy, raising its key interest rates by 25 b.p. in March and in June. These movements set the minimum bid rate on the main refinancing operations at 4 per cent, totalling an accumulated rise of 200 b.p. since December 2005 (Table 3.1.1). The decisions to raise interest rates reflected the assessment by the Governing Council of the ECB that there were upside risks to price stability in the euro area over the medium term and aimed at ensuring that inflation expectations were firmly anchored at levels consistent with price stability. The main upside risks stressed by the Governing Council were associated with higher than expected wage growth, given the high level of capacity utilisation

(10) Carry trade is a strategy where an investor borrows in a foreign country with low interest rates and invests the funds in another currency with higher interest rates. The almost nil level of the interest rates in Japan in recent years contributed to strengthen recourse to these investment strategies.

Table 3.1.1

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
6 Jun. 2007	3.00	4.00	5.00

Source: ECB.

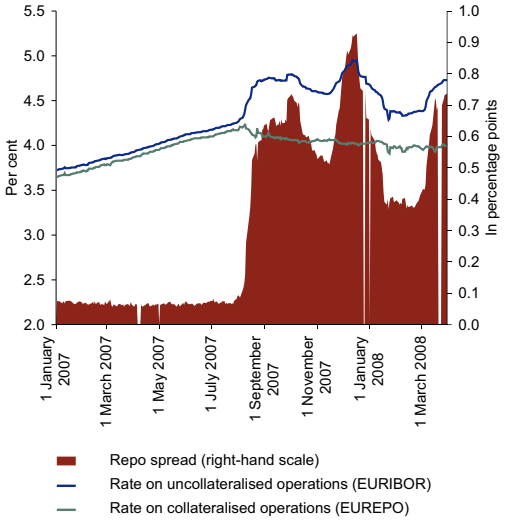
and the continued improvement in labour markets, with a higher than estimated contribution of administered prices and indirect taxes, as well as further rises in oil prices. According to the Governing Council, upside risks to price stability in the medium and long term were confirmed by the persistent strong pace of monetary and credit expansion in the euro area in 2007.

In the second half of 2007 the financial market turmoil introduced significant changes in the euro area monetary policy framework. The outlook for economic activity in the euro area in this period was subject to a higher than usual degree of uncertainty. According to the Council's assessment, although the euro area economic fundamentals remained sound, there was great uncertainty as to the potential spillover effect of the ongoing financial turmoil on economic activity. In turn, in the Council's opinion, the above-mentioned upside risks to price stability over the medium term persisted in this period. In particular, the inflation rate rose considerably from August onwards, reflecting sharp rises in oil and food prices, as well as unfavourable base effects on energy prices. The maintenance of the inflation rate at a high level increases the risks of second round effects on wages. Against this background of increased uncertainty, the Governing Council deemed it advisable to wait for further information before drawing any conclusions with regard to monetary policy conduct. Hence, key interest rates remained unchanged during the second half of the year, and the Governing Council reaffirmed its readiness to counter upside risks to medium-term price stability, in line with its mandate.

Money market interest rates for different maturities rose in 2007. In the first half of the year, this reflected developments and expectations of further rises in key ECB interest rates, while in the second half the rise in bank interest rates on uncollateralised operations was associated with the consequences of the financial market turmoil on the money market. Throughout the second half of the year and similarly to other central banks, the ECB increased considerably the supply of funds in the money market, in order to ensure the normalisation of liquidity conditions and prevent money market conditions from moving out of line with those targeted within the scope of monetary policy conduct. The

Chart 3.1.1

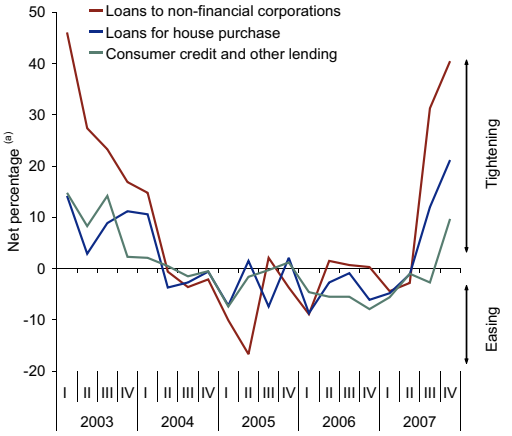
EURO AREA - THREE-MONTH MONEY MARKET INTEREST RATES



Sources: Reuters and Banco de Portugal calculations.

Chart 3.1.2

CREDIT STANDARDS



Source: *Bank Lending Survey*.
Note: (a) The net percentage refers to the difference between the sum of percentages for "tightened considerably" and "tightened somewhat" and the sum of percentages for "eased somewhat" and "eased considerably". A positive value means a tightening of standards in relation to the previous quarter.

measures adopted contributed to a certain stabilisation in financing conditions in the shorter money market maturities. This notwithstanding, disturbances in longer maturities persisted, worsened by the uncertainty associated with liquidity conditions at end-year. The increase of money market interest rates on uncollateralised operations for maturities of over one month in the second half of the year contrasted with the gradual decline in the corresponding interest rates on collateralised operations, in the context of a downward revision of the outlook for developments in key ECB interest rates (Chart 3.1.1). Following a period of heightened tension at the end of the year, the money market stabilised in early 2008, with a decline in money market interest rates on uncollateralised operations from the peaks ob-

Table 3.1.2

EURO AREA – MONETARY AND CREDIT AGGREGATES
Year-on-year rates of change, per cent, end-of-period

	2005	2006	2007			
			I	II	III	IV
Monetary aggregates [a]						
M1	11.3	7.5	7.0	6.1	6.1	3.7
M2	8.5	9.3	9.5	9.5	10.2	10.0
M3	7.3	9.9	11.0	11.0	11.3	11.4
Loans						
Loans to the private sector [a]	9.2	10.8	10.6	10.8	11.0	11.2
Non-financial corporations	8.3	13.1	12.6	13.3	14.0	14.5
Households [b]	9.4	8.2	7.9	7.2	6.8	6.2
Consumer credit	7.9	7.7	7.1	5.9	5.1	5.3
Loans for house purchase	11.5	9.6	8.9	8.4	7.9	7.1

Source: ECB.
Notes: (a) Seasonally adjusted. (b) Including loans to non-profit institutions serving households.

served. However, spreads between rates on collateralised and uncollateralised operations (repo spreads) for longer maturities remained at much higher levels than before the outbreak of financial market turmoil, reflecting the maintenance of a significant risk premium. As of early March, these spreads widened further, leading to new ECB interventions (see *Section 2*).

In 2007 loans to the private sector continued to grow at high levels, as a result of divergent developments in their main components (Table 3.1.2). On the one hand, loans to households moderated in the course of the year – extending the trend seen since early 2006 – due to the deceleration in lending for house purchase and consumer credit. The slowdown in loans for house purchase may be associated with the deceleration of prices and activity in the housing market in several euro area economies, against a background of a gradual rise in interest rates. On the other hand, loans to non-financial corporations accelerated further, maintaining a very high growth pace (a year-on-year change of 14.5 per cent in late 2007, from 13.1 per cent in late 2006). According to the January 2008 euro area bank lending survey, these developments seem to have been induced by continuing strong demand for credit for investment and inventory build-up and during the first half of the year, also by mergers and acquisitions and corporate restructuring activities, the results of this survey suggest a tightening of the credit standards in a significant share of euro area banks in the third and fourth quarters of 2007 (Chart 3.1.2).

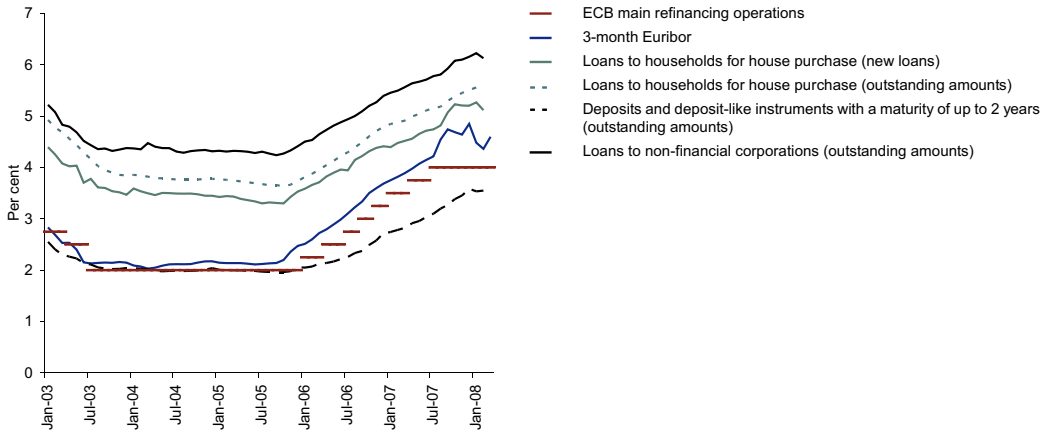
Monetary and financial conditions of the Portuguese economy

The monetary and financial conditions of the Portuguese economy deteriorated throughout 2007 and in early 2008, heightened by the instability outbreak in international financial markets. In fact, in addition to continued development trends in money market interest rates and in the effective exchange rate index for Portugal, conditions in the money and capital markets underwent a considerable comprehensive change, with implications for financial institutions. Given its degree of economic and financial openness, the Portuguese economy is exposed to the effects of the turmoil in international financial markets. The spillover of this situation to financing conditions for bank customers and to household and corporate spending decisions is likely to be gradual, reflecting lags in transmission mechanisms.

In 2007 euro money market interest rates and the effective exchange rate index for Portugal continued to follow the development trend started in the last quarter of 2005, albeit more sharply in the course of

Chart 3.1.3

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



Sources: ECB and Banco de Portugal.

Table 3.1.3

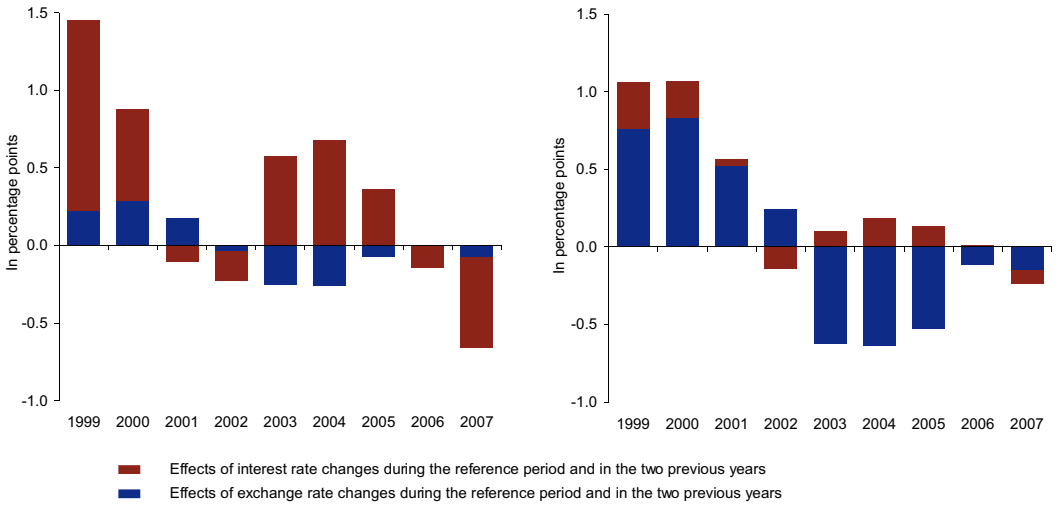
MONETARY AND FINANCIAL CONDITIONS OF THE PORTUGUESE ECONOMY

										Quarterly developments				Monthly developments		
	1999	2000	2001	2002	2003	2004	2005	2006	2007	2007.1	2007.2	2007.3	2007.4	Jan-08	Feb-08	Mar-08
Nominal interest rates - period averages (per cent)																
3-month Euribor	3.0	4.4	4.3	3.3	2.3	2.1	2.2	3.1	4.3	3.8	4.1	4.5	4.7	4.5	4.4	4.6
12-month Euribor	3.1	4.7	4.2	3.5	2.4	2.3	2.3	3.3	4.4	4.0	4.2	4.6	4.7	4.5	4.3	4.6
10-year fixed-rate Treasury bond yields	4.8	5.6	5.2	5.0	4.2	4.1	3.4	3.9	4.4	4.2	4.5	4.6	4.4	4.3	4.3	4.4
Bank interest rates																
On outstanding amounts of loans																
Non-financial corporations	5.8	6.0	6.4	5.4	4.6	4.4	4.3	4.9	5.8	5.5	5.7	5.8	6.1	6.2	6.1	
Households for house purchase	5.5	5.9	6.7	5.4	4.3	3.8	3.7	4.3	5.1	4.9	5.0	5.2	5.4	5.6	5.5	
Consumer credit and other lending	9.2	9.0	9.5	8.3	7.9	7.8	7.7	8.0	8.6	8.3	8.6	8.6	8.8	8.8	8.8	
On outstanding amounts of deposits with an agreed maturity																
Non-financial private sector - up to 2 years (excluding demand deposits, at notice)	2.5	3.0	3.6	3.0	2.2	2.0	2.0	2.3	3.1	2.8	3.0	3.2	3.5	3.5	3.5	
On new loans																
Households for house purchase	5.1	5.9	6.2	5.1	3.8	3.5	3.4	4.0	4.8	4.5	4.6	4.9	5.2	5.3	5.3	
Exchange rates - period averages																
Nominal effective exchange rate index [a], [b]	99.1	96.8	97.1	97.7	100.3	100.9	100.8	100.9	101.8	101.3	101.7	101.8	102.4	102.8	102.7	103.3
Nominal effective exchange rate index - percentage change from the previous corresponding period [a], [b]	-1.2	-2.3	0.3	0.6	2.6	0.6	-0.2	0.2	0.8	0.2	0.4	0.1	0.6	0.2	0.0	0.5
Stock market - percentage change from the previous corresponding period (end-of-period values)																
PSI Geral index	12.6	-8.2	-19.0	-20.7	17.4	18.0	17.2	33.3	18.3	5.2	17.8	-11.4	7.7	-14.9	-1.2	-3.5
Housing market prices - end-of-period annual rate of change																
Índice Confidencial Imobiliário [c]	9.0	7.8	5.4	0.6	1.1	0.6	2.3	2.1	1.3	1.4	1.0	1.1	1.3	1.3	1.4	
Assessment by banks (*INE*)					7.4	4.9	2.9	0.3	0.5	0.0	0.5	1.0	0.5			
Loans granted to the non-financial private sector																
End-of-period annual rate of change																
Loans granted by resident monetary financial institutions [d]																
Non-financial private sector	28.0	22.6	13.9	10.2	6.4	6.1	7.7	8.7	9.9	8.8	9.0	9.2	9.9	10.5	10.6	
Households - Total	29.2	21.2	11.7	11.6	9.6	9.2	9.8	9.9	9.0	9.6	9.4	9.2	9.0	8.9	8.9	
For house purchase	30.0	20.2	14.5	15.9	11.8	10.5	11.1	9.9	8.5	9.4	9.0	8.8	8.5	8.4	8.3	
Consumer credit and other lending	27.0	23.8	4.4	0.6	2.4	4.4	4.5	10.1	11.3	10.9	11.3	10.9	11.3	11.1	11.4	
Non-financial corporations	26.7	24.1	16.4	8.6	2.7	2.5	5.0	7.1	11.2	7.8	8.5	9.2	11.2	12.8	13.0	
Memo:																
HICP - End-of-period annual average rate of change																
Portugal	2.2	2.8	4.4	3.7	3.3	2.5	2.1	3.0	2.4	2.9	2.6	2.4	2.4	2.4	2.4	
Euro area	1.1	2.1	2.3	2.2	2.1	2.1	2.2	2.2	2.1	2.1	1.9	1.9	2.1	2.1	2.3	

Sources: Euronext Lisboa, Eurostat, *Imométrica*, *INE*, Reuters and Banco de Portugal.
Notes: (a) A positive change corresponds to an appreciation of the euro against the US dollar or of the effective exchange rate index. (b) Calculations against a group of 22 trading partners. For a detailed description of the methodology, see A. C. Gouveia and C. Coimbra, (2004) "*New effective exchange rate index for the Portuguese Economy*", Banco de Portugal, *Economic Bulletin-December*. (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 registers. For further details on the methodology used, see the article by I. Fonseca and R. Guimarães, in the October 2006 issue of the Newsletter *Imobiliária Portuguesa - Confidencial Imobiliário*, entitled: "*Índice Confidencial Imobiliário: procedimentos metodológicos*". (d) The annual growth rates are obtained from the relation between the outstanding amounts of bank loans, adjusted for securitisation operations, and the monthly transactions, which are calculated from the outstanding amounts corrected of reclassifications, write-offs/write-downs, exchange rate changes and price revaluations..

Chart 3.1.4

CONTRIBUTION OF MONETARY CONDITIONS



Note: For methodological information, see P. Esteves (2003), "*Monetary conditions index for Portugal*", Banco de Portugal, *Economic Bulletin-June*. The multipliers underlying the construction of this index (corresponding to impacts of exchange rate and interest rate changes) were updated taking into account the main model currently used in economic projections for the Portuguese economy.

the second half of the year (Chart 3.1.3 and Table 3.1.3). In annual average terms, the rise in the 3-month Euribor interest rate was 1.2 p.p. (0.1 p.p. in 2005 and 0.9 p.p. in 2006). The effective exchange rate index for Portugal appreciated by 0.8 p.p. (-0.2 and 0.2 per cent in 2005 and 2006 respectively). Based on the index of monetary conditions for the Portuguese economy, it may be concluded that the trend of these conditions seems to have had a restrictive impact on developments in economic activity and contributed – albeit moderately – to a decline in inflation (Chart 3.1.4).

However, it should be noted that this indicator does not take into account a series of relevant variables in the assessment of monetary and financial conditions, some of them having changed significantly in the second half of 2007, in a context of unstable international financial markets. In fact, within a framework of risk reassessment by market agents, risk premia increased largely in most financial market segments, from the very low levels seen in the course of recent years. In addition, contrary to previous episodes of international financial market disturbance, instability extended to the interbank money market, as financial institutions from advanced economies are at the core of this crisis. Thus, it becomes particularly relevant to analyse developments in the financial position of the banking system (and the respective spillover to counterpart sectors), in stock markets, debt spreads (both public and private, financial and non-financial) and real estate market prices.

The Portuguese banking system has been playing a key role in the financing of the Portuguese economy, namely through the intermediation of resources collected in international financial markets. Hence, there has been a sustained discrepancy between growth in credit to customers and in customer resources. In fact, in line with the growing financial integration of the Portuguese economy and with international trends, Portuguese banks have increasingly resorted to wholesale financing markets, namely to the issuance of medium to long-term debt securities and to securitisations. The role of financing (net of investments) in the money market with other credit institutions has continued to be negligible. This type of financing serves essentially as an instrument in a more conjunctural manage-

ment of bank liquidity, allowing for the accommodation, generally in the first half of each year and on a temporary basis, of imbalances associated with the seasonal behaviour of some balance-sheet items.

The collection of resources with non-resident entities has been facilitated, on the one hand, by the maintenance of a favourable position in terms of profitability, solvency and coverage of risks. On the other hand, it has also benefited from favourable financing conditions in international financial markets. In this context, due to having benefited from these conditions, banks recorded a historically high volume of debt securities issuance, mainly mortgage bonds, in the first half of 2007, with most major banking groups ensuring in this period a significant part of their financing programmes forecast for the whole year. In the second half of the year, against a background of deteriorating conditions in international financial markets, the net issuance of securities declined considerably compared with the first half of the year. Despite this change in financing conditions in wholesale markets, credit to the private sector continued to grow at high rates.

Bank loans to the non-financial private sector accelerated in 2007, with an increase of 1.2 p.p. in the 9.9 per cent rate seen at the end of the year, compared with the level in late 2006 (in February 2008 the rate of change stood at 10.6 per cent). However, this reflects distinct patterns in their components.

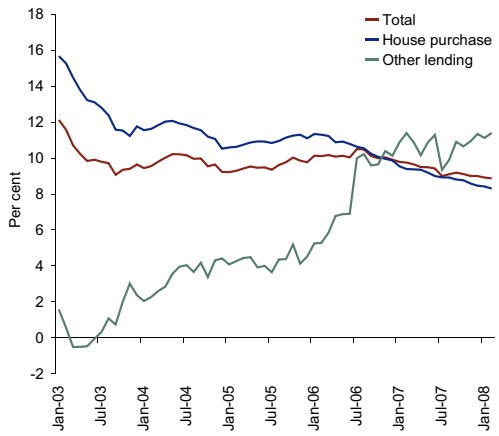
In 2007 bank loans to households for house purchase continued to slow down, in line with the rise in interest rates, within the scope of the relatively high indebtedness level of Portuguese households (the annual rate of change declined by 1.4 p.p. to 8.5 per cent – Chart 3.1.5). However, this slowdown was partly offset by a further acceleration in consumer credit and other lending (by 1.2 p.p. to 11.3 per cent), likely to have been associated with growth in consumer spending on durable goods. Up to February 2008 these development trends continued and the respective annual rates of change stood at 8.3 and 11.4 per cent.

In turn, bank loans to non-financial corporations accelerated from 7.1 per cent in late 2006 to 11.2 per cent in late 2007 (13 per cent in February 2008 – Chart 3.1.6). Banks participating in the Bank Lending

Chart 3.1.5

LOANS TO HOUSEHOLDS BY RESIDENT MONETARY INSTITUTIONS

Year-on-year rate of change

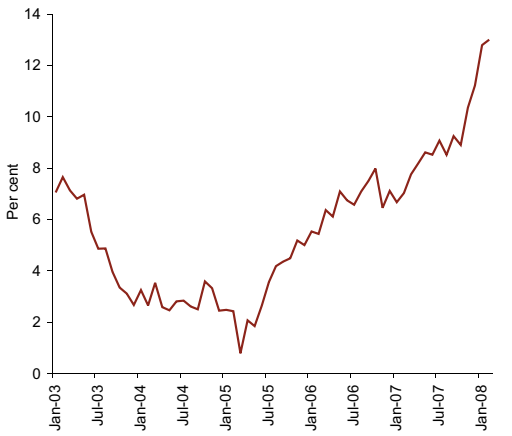


Source: Banco de Portugal.
Note: The annual growth rates are obtained from the relation between the outstanding amounts of bank loans, adjusted for securitisation operations, and the monthly transactions, which are calculated from the outstanding amounts corrected of reclassifications, write-offs/write-downs, exchange rate changes and price revaluations.

Chart 3.1.6

LOANS TO NON-FINANCIAL CORPORATIONS BY RESIDENT MONETARY INSTITUTIONS

Year-on-year rate of change

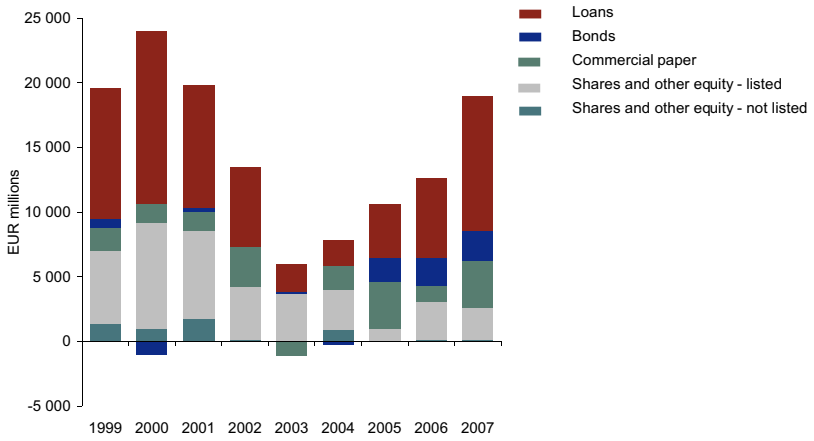


Source: Banco de Portugal.
Note: The annual growth rates are obtained from the relation between the outstanding amounts of bank loans, adjusted for securitisation operations, and the monthly transactions, which are calculated from the outstanding amounts corrected of reclassifications, write-offs/write-downs, exchange rate changes and price revaluations.

Chart 3.1.7

FINANCING OF PORTUGUESE NON-FINANCIAL CORPORATIONS

Net issues



Survey reported a demand for loans sustained by debt restructuring and the financing of inventories and working capital. To a lesser extent, investment financing seems to have also contributed to an increased demand for loans as of the middle of the year. Recourse to loans so as to replace debt securities financing appears to have been low.[11] In fact, the flow of non-financial corporate financing via the issuance of securities increased considerably in 2007 (Chart 3.1.7). Lower financing via shares and other equity (both quoted and unquoted) was more than offset by increased recourse to long-term and especially short-term securities (commercial paper). It should be noted that, in contrast to financial corporations (and banks in particular), there was no evident considerable change in the financing structure and amounts obtained after the outbreak of instability in international financial markets.

The increased difficulty in obtaining financing in the interbank money market, in securitised debt markets or through asset securitisations – translated in terms of lower volumes, shorter residual maturities or higher prices – is likely inducing a change in institutions' credit policy as of the third quarter of 2007, namely towards a worsening of conditions in the non-financial private sector financing. In addition, these developments were associated with downward revisions of expectations regarding general economic activity and housing market developments. In this context and according to the results of the survey to the five Portuguese banking groups included in the Bank Lending Survey sample, there was a clear tightening of credit standards for loans to enterprises and households since the third quarter of 2007. According to respondent banks, this seems to have translated into a widening of interest rate spreads, initially more relevant for riskier loans, but subsequently extending to average risk loans, in terms of the shortening of maturities, higher collateral requirements, as well as restrictions in amounts and non-price terms and conditions.[12] This tightening of credit standards is liable to give rise to moderate growth in this aggregate.

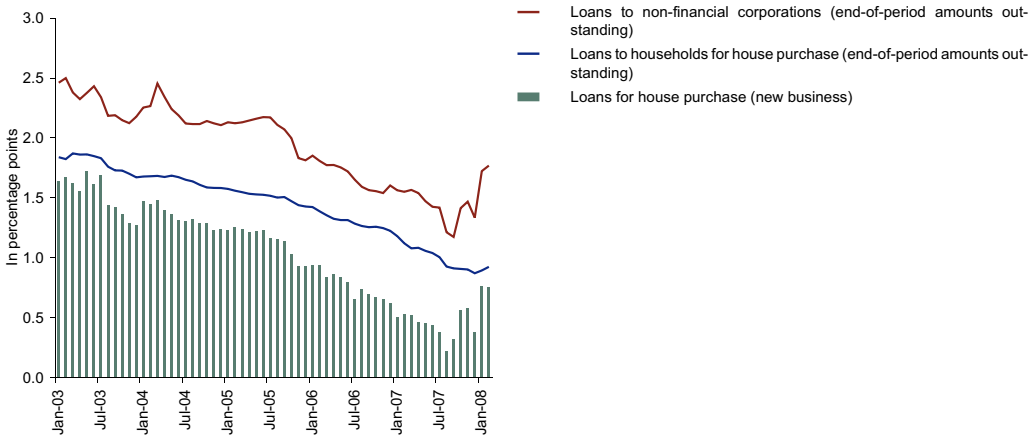
There are a few indications that bank lending interest rates on new business started incorporating higher interest rate spreads, particularly in early 2008. The spillover of this widening of spreads in interest rates on outstanding amounts (that include effects of former rates) shall be relatively heterogeneous across the different operation segments taken into account, reflecting a different ability of banks to introduce revisions in signed credit contract clauses. While in the case of the portfolio of consumer

(11) There is as yet no available information on a consolidated basis that allows for a stricter assessment of the sector's financing.

(12) In addition to reflecting the cost rise in their financing, banks will tend to incorporate in their pricing factors such as credit risk, interest rate risk (also associated with money market interest rate volatility), competition from other banks and use of alternative finance, liquidity risk and capital adequacy.

Chart 3.1.8

INTEREST RATE MARGINS IN LENDING OPERATIONS



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

credit and other lending to non-financial corporations and households this spillover may be relatively fast, in loans to households for house purchase, as a rule, banks will have difficulties in widening interest rate spreads in previously established contracts, which are in force for extended maturities.[13] However, interest rates on outstanding amounts will continue to follow the upward trend seen since late 2005, insofar as the levels prevailing at end-2007 and early 2008 may still not have totally incorporated changes in money market interest rates, given the usual time lag in transmission (Chart 3.1.8).

The adoption of other tighter clauses as far as credit standards are concerned may also play an important role, given that it will not enable bank counterparties to mitigate the negative impact of the rise in bank interest rates. In this vein, in the context of the interest rate rises started in 2005, banks allowed counterparties to accommodate this worsening in financing costs with the adoption of other more favourable conditions (namely through increased maturities and a cut in interest rate margins in lending operations *vis-à-vis* money market rates, commissions and other charges). This seems not only to have favoured a sustained flow of loans but also to have restrained the emergence of new loan portfolio defaults.

Given the situation in wholesale financing markets, more competitive strategies are being implemented for the collection of customer deposits by banking institutions, which will include, *inter alia*, a compression of interest rate margins in deposit operations *vis-à-vis* money market rates. In this context, the collection of resources with customers (namely households) was facilitated in the past few months by declines in the profitability of alternative financial products, such as mutual funds and, more recently, savings certificates, resulting in considerable redemptions. The improved (absolute and relative) remuneration of deposits contributed to sustain the acceleration in the deposits of households and emigrants in Portugal. At end-2007 the rate of change in this aggregate stood at 8.1 per cent, compared with 3.5 and 5.2 per cent respectively in December 2006 and June 2007. The acceleration in customer resources assumed special relevance in the course of the second half of 2007 for being the main counterpart of the change in bank loans. This seems to have sustained the expansion of banks'

(13) In the case of loans to non-financial corporations, the review of the conditions applicable to loans is viable in the context of the reassessment of counterparties at the economic and financial level which occurs at most on an annual basis. In the case of consumer credit and other lending to households the widening of the interest rate spread in the banks' portfolio is eventually made possible by the relatively shorter maturity of operations.

business, stress being laid on loans to the non-financial private sector, at a similar rate than before the outbreak of instability in international financial markets, as already mentioned.

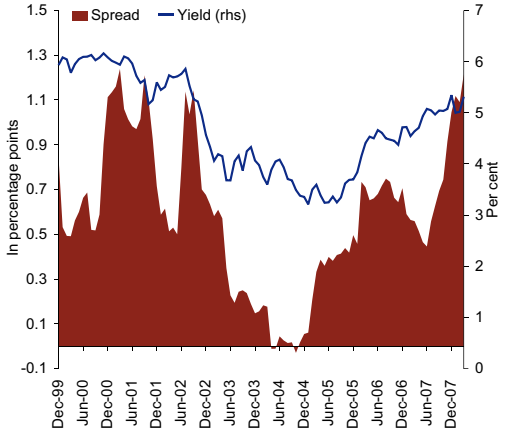
Financial institutions in advanced economies have been the hardest hit by the turmoil in international financial markets. In parallel with the increase in risk premia in debt issues, their actual and prospective yield was revised downwards. Joined with the deterioration of the macroeconomic framework in these economies, this had a rather negative effect on stock market prices in general and the financial sector in particular. Following a 24 per cent valuation during the first seven months of 2007, the Portuguese stock market (as measured by the PSI Geral index) declined by around 5 per cent until the end of the year. Developments up to end-March 2008 were particularly adverse, and the index accumulated losses of close to 20 per cent. In sectoral terms the financial services index was the most jeopardised in the first three months of the year, declining by 30 per cent.[14]

In addition to affecting income generation, the resilience of these developments is exerting a significant negative impact on banks' capital adequacy ratios, simultaneously hampering the reinforcement of their capital via the issuance of shares. This may be a further restraint to the expansion of banks' business at a pace similar to that of the most recent years. Despite these constraints, some of the major Portuguese private banking groups announced equity capital increases in the course of 2008. In late 2007 *Caixa Geral de Depósitos* raised its equity capital by €150 million.

As referred to, since the mid-2007 there has been a large increase in risk premia in most financial market segments, from the very low levels seen in the course of recent years, in a context of reassessment of risks by market agents. This should have contributed to raise the costs of financing through debt securities with longer maturities of Portuguese non-financial issuers (that, it should be noted, account for a small share of total non-financial corporate financing) (Chart 3.1.9). In fact, in line with the situation at euro area level, there as a clear widening of interest rate spreads in Portuguese non-financial corporate bonds (*vis-à-vis* public debt securities of a comparable maturity). Nonetheless, the yields on these notes remain at lower levels than early in the decade.

Chart 3.1.9

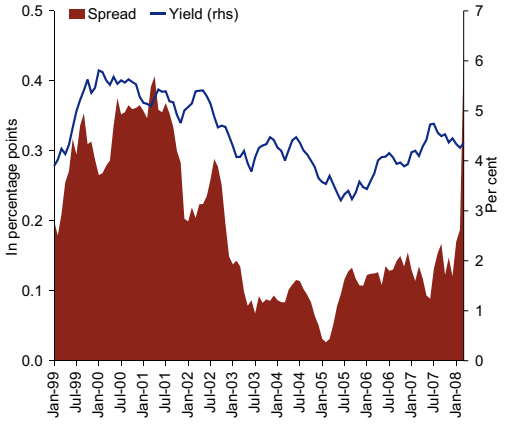
PORTUGUESE NON-FINANCIAL CORPORATE BOND YIELDS AND SPREAD *VIS-À-VIS* PUBLIC DEBT SECURITIES OF A COMPARABLE MATURITY



Source: Lehman Brothers.

Chart 3.1.10

PORTUGUESE PUBLIC DEBT YIELDS AND SPREAD VIS-À-VIS GERMAN GOVERNMENT DEBT (10-YEAR)



Sources: Reuters and Banco de Portugal.

(14) PSI Financials is comprised by companies listed on Euronext-Lisbon whose activity is linked to the financial sector, *i.e.* essentially banks.

Likewise, and despite the increase by around 0.5 p.p. in 2007 (both in annual average terms and in terms of end-of-period values), long-term Portuguese Treasury bond yields remained at a historically low level, below that seen in the 2000-2003 period (Chart 3.1.10). In intra-annual terms, there was an increase of around 0.8 p.p. during the first half of 2007 and a subsequent reversal of this trend, with a contribution of the turmoil in international financial markets. This may have induced, to a certain extent, a flight-to-quality phenomenon, likely to have also contributed to an increase in the risk premia underlying public debt in some euro area countries in the second half of the year. This worsened considerably in February and March 2008, and these premia reached significant levels, in the context of renewed financial market instability. The consequent increase in risk aversion led investors to seek safe haven in public debt securities with higher liquidity, inducing for these a sharp yield decline.

Since real estate valuation is liable, on the one hand, to induce a wealth effect on owners' spending decisions and, on the other, to influence credit market developments (since real estate assets are used as collateral in credit operations), it is also important to assess its pattern. Portuguese residential market prices, as measured by the *índice Confidencial Imobiliário*, recorded a nominal annual rate of change of 1.3 per cent at end-2007, compared with 2.1 per cent at end-2006 (in terms of change deflated by the inflation rate, it maintained a negative rate of change of close to 1 per cent). Against this background, it is important to note that evidence in the Portuguese case does not suggest the existence of overvalued prices in real estate assets liable to give rise to substantial negative adjustments to the value of these assets.[15] The stable moderate change in the prices of the housing market's residential segment in Portugal contrasts with that seen in the United States, the United Kingdom and in a few euro countries that have been experiencing a pronounced slowdown in prices, after considerable valuations in recent years.

As already mentioned, the Portuguese economy is exposed to the effects of unstable international financial markets, namely due to its degree of economic and financial openness. The ongoing turmoil brought about important changes to the framework where (financial and non-financial) agents obtain a significant part of their financing. The reassessment of risk premia and the deterioration of the financing conditions of banks in international financial wholesale markets are contributing to a rise in the economy's financing costs and to the implementation of tighter credit standards on new loans, which will tend to be mirrored in a slowdown in credit to the private sector. In turn, the heightened uncertainty and the decline in financial asset prices are expected to have adverse effects in the confidence of economic agents and to induce negative wealth effects. Hence, the international financial turmoil will tend to have a negative impact on the outlook for economic activity in Portugal. Nonetheless, great uncertainty prevails with regard to the severity and resilience of the market situation and consequently, to the magnitude of the impact on the Portuguese economy.

3.2. Fiscal policy[16]

In 2007 the general government deficit, on a national accounts basis, stood at 2.6 per cent of GDP, declining by 1.3 p.p. compared with 2006 (Table 3.2.1). This figure is clearly more favourable than the initial target (3.7 per cent of GDP) and its successive revisions (3.3 and 3.0 per cent of GDP, in March and October 2007, respectively). Within the framework of the Stability and Growth Pact, the confirmation of a deficit below the reference value will lead to the abrogation of the excessive deficit procedure to which Portugal has been subject since September 2005. This means that all commitments undertaken

(15) See "Box 6.1 *Housing Prices in Portugal and Macroeconomic Fundamentals: Evidence of Quantile Regression*", Banco de Portugal, *Financial Stability Report 2005* .

(16) This section, including GDP figures used in the calculation of ratios, is based on the excessive deficit procedure notification and on the provisional general government accounts, on a national accounts basis, sent by *INE* to Eurostat at the end of March.

Table 3.2.1

MAIN FISCAL INDICATORS
As a percentage of GDP

	2005	2006	2007
Overall balance	-6.1	-3.9	-2.6
Primary balance	-3.5	-1.1	0.2
Temporary measures	0.0	0.0	0.1
Overall structural balance [(a)]	-5.6	-3.4	-2.4
Primary structural balance [(a)]	-3.0	-0.6	0.4
Total structural revenue [(a)]	41.8	42.8	43.4
Primary structural expenditure [(a)]	44.8	43.4	43.0
Public debt	63.6	64.7	63.6

Sources: *INE* and Banco de Portugal.
Note: (a) Structural values are adjusted for the effects of the cycle and temporary measures. Cyclical components are calculated by Banco de Portugal according to the methodology used in the Eurosystem.

have been fulfilled one year earlier than established in the European Council recommendation. The public debt ratio interrupted the upward trend recorded in the past few years, declining by 1.1 p.p. from 2006, standing at 63.6 per cent at the end of 2007.

According to Banco de Portugal estimates, the fiscal policy pursued in 2007 had a restrictive nature, apparent in the reduction by 1.0 p.p. of GDP of the primary structural deficit (*i.e.* the primary deficit adjusted for the effects of the cycle and temporary measures). Macroeconomic developments made a slightly positive contribution to the fiscal balance. In addition, the figure for 2007 was favourably affected by the *Alqueva* dam concession, classified as a temporary measure, which amounted to 0.1 per cent of GDP. The estimated decrease of the overall structural deficit will enable the fulfilment of the Council recommendation, *i.e.* that its reduction should amount at least to 0.75 p.p. of GDP. However, according to the estimates of Banco de Portugal, to achieve the medium term objective of an overall structural deficit of 0.5 per cent of GDP in 2010, a reduction of around 2.0 p.p. of GDP is still required,[17] which will only be possible with the pursuance of the fiscal consolidation effort (see " *Box 1 Fiscal prospects*").

The improvement of the fiscal situation in 2007 reflects the contributions of total revenue and primary expenditure, which adjusted for the effects of the cycle and temporary measures, corresponded to 0.6 and 0.4 p.p. of GDP respectively.[18] In line with developments in the past few years, the cyclically adjusted tax revenue (including social contributions) recorded a further significant rise. Contrasting with 2006 and according to the disaggregation methodology used by Banco de Portugal, this result is not predominantly explained by tax policy measures, nor does it result from the behaviour of the different macroeconomic bases and their elasticities.[19] Thus, it seems to be associated with other factors of a permanent or transitory nature, notably additional gains resulting from the improved efficiency of the

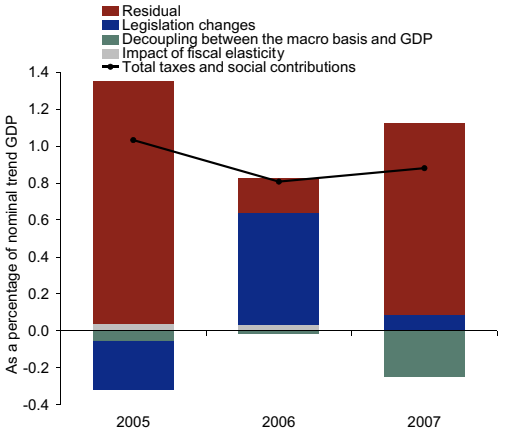
(17) It should be noted that the figure for the overall structural deficit may differ from that obtained according to the European Commission methodology, in particular due to differences in the degree of smoothness in the calculation of the relevant macroeconomic variables.

(18) These figures have been affected by the redefinition of the general government sector, following the privatisation of notary offices. The correction of this effect would lead to an upward revision of revenue and expenditure by around 0.1 per cent of GDP.

(19) For further details on the methodology underlying the preparation of these contributions, see "Box 2.2 *Structural tax revenue in Portugal*", Banco de Portugal, *Annual Report 2006* ; J. Kremer *et al.* (2006), "A disaggregated framework for the analysis of structural developments in public finances", ECB *Working Paper* no. 579; Braz, C. (2006) "*The calculation of cyclically adjusted balances at Banco de Portugal: an update*", Banco de Portugal, *Economic Bulletin-Winter*.

Chart 3.2.1

CONTRIBUTIONS TO THE STRUCTURAL CHANGE IN TOTAL TAXES AND SOCIAL CONTRIBUTIONS [(a)]



Sources: *INE* and Banco de Portugal.
Note: (a) For further details on the methodology used to calculate these contributions, see "Box 2.2 entitled *Structural tax revenue in Portugal*", Banco de Portugal, *Annual Report 2006*; J. Kremer *et al.* (2006), "*A disaggregated framework for the analysis of structural developments in public finances*", ECB *Working Paper* no 579; C. Braz (2006), "*The calculation of cyclically adjusted balances at Banco de Portugal: an update*", Banco de Portugal, *Economic Bulletin-Winter* .

tax administration, whose effects were particularly felt in the collection of taxes on income and wealth (Chart 3.2.1). On the expenditure side, the reduction of primary current expenditure as a percentage of GDP, for the second consecutive year after a protracted period of strong increases, was mainly accounted for by developments in compensation of employees.[20]

Taxes on income and wealth reflected the favourable performances of both the personal income tax and, in particular of the corporate income tax (Table 3.2.2). The marked rise in revenue from the corporate income tax is largely explained by the broadening of the tax base, the recovery of arrears, and the good results of large taxpayers. In turn, revenue from the personal income tax, albeit influenced by the lagged effects of fiscal policy measures that partially cancelled each other out (in particular the gradual increase in pension income taxation and the reintroduction of some tax benefits), was chiefly conditioned by the impact of improved collection procedures and debt recovery.

The ratio of taxes on production and imports to GDP decreased, largely due to the performance of revenue from the tax on tobacco. It should be noted that the collection of this tax was affected by the fact that in the last months of 2007, contrary to 2006, there was no significant anticipation of the introduction of tobacco in distribution circuits. In turn, the value-added tax (VAT) made a close-to-zero contribution to fiscal consolidation. Its evolution, albeit benefiting from the increased effectiveness of the tax administration, was adversely affected by the moderate growth of private consumption and by an effect resulting from a change in reimbursement procedures. Regarding the other indirect taxes, revenue from the tax on oil products, the car tax and the stamp tax remained unchanged as a percentage of GDP, while the share of the municipal tax on real estate transactions (*Imposto Municipal Sobre as Transmissões Onerosas de Imóveis*) and the municipal property tax (*Imposto Municipal sobre Imóveis*) increased sharply.

(20) This result is obtained after correcting for the effects of the transformation of some public hospitals into corporations in 2007, mentioned below.

Table 3.2.2

GENERAL GOVERNMENT ACCOUNTS[a]

	As a percentage of GDP			Rate of change	
	2005	2006	2007	2006	2007
Total revenue	41.6	42.4	43.1	6.3	6.5
Current revenue	40.1	41.3	42.2	7.2	7.2
Taxes on income and wealth	8.4	8.8	9.8	8.7	16.3
Taxes on production and imports	15.0	15.5	15.1	7.2	2.3
Social contributions	12.5	12.5	12.7	3.5	6.9
Actual	11.4	11.4	11.7	4.5	7.8
Imputed	1.2	1.1	1.0	-5.4	-1.9
Sales [b]	2.4	2.5	2.5	8.4	5.9
Other current revenue	1.8	2.1	2.2	25.4	7.4
Capital revenue	1.4	1.1	0.9	-18.5	-16.6
Total expenditure	47.7	46.3	45.7	1.2	3.5
Current expenditure	43.4	42.9	42.3	3.1	3.2
Compensation of employees [b]	14.4	13.6	12.9	-1.7	-0.7
Intermediate consumption [b]	4.2	4.1	4.1	1.8	3.8
Social benefits	18.5	18.8	19.2	6.2	7.1
in cash	14.9	15.1	15.2	5.3	5.4
in kind [b]	3.5	3.7	4.1	9.9	14.2
Subsidies	1.6	1.4	1.2	-7.9	-11.7
Other current expenditure	2.1	2.2	2.1	10.5	-1.4
Interest	2.6	2.8	2.8	10.6	6.9
Capital expenditure	4.3	3.4	3.5	-17.7	6.9
Gross fixed capital formation	2.9	2.3	2.4	-17.4	8.6
Other capital expenditure	1.4	1.1	1.0	-18.3	3.3
Overall balance	-6.1	-3.9	-2.6		
Overall balance (excluding temporary measures)	-6.1	-3.9	-2.7		

Sources: *INE* and Banco de Portugal.
Notes: (a) According to national accounts. (b)Items affected by the redefinition of the general government sector, following the transformation of public hospitals into corporate entities and the privatisation of notary offices. Values shown in this table are not adjusted for the impact of these changes.

In turn, there was an increase in revenue from social contributions as a percentage of GDP, due to the considerable growth of actual social contributions to Social Security and *Caixa Geral de Aposentações* (civil servants pension system) only partially offset by the decrease in imputed contributions. In the case of actual contributions, those of the general system benefited from the recovery of debts and the fact that new general government employees are registered in Social Security. On the other hand, contributions of the civil servants pension sub-system moved broadly in line with the still sharp growth of pension expenditure. Finally, it should be noted that the performance of imputed contributions resulted largely from the decrease in State expenditure with the civil servants healthcare system, in the wake of changes in its financing introduced in the 2007 State budget.

The ratio of non-tax revenue as a whole to GDP increased only slightly. Concerning this outcome it should be mentioned the sharp growth of interest and dividends received by the general government, as well as a marked fall in transfers from the European Social Fund.

The composition of current expenditure in 2007 was strongly affected by the corporatisation of some public hospitals in February and August 2007, which implied a decline in compensation of employees, intermediate consumption and co-financing of medicines and medical services (included in social benefits in kind), and an increase in payments of services provided by corporate hospitals (also included in social benefits in kind). The analysis below is based on estimated figures adjusted for these effects.

In 2007 compensation of employees decreased by 0.4 p.p. of GDP, in line with developments in the wage bill, which similarly to 2006 resulted from a moderate update of the wage scale, a fall in the number of public employees (following the rule of one hiring for each two outgoings), the freeze of automatic progressions in public administration careers and a decline in the average wage due to retirements/hirings.

In turn, social benefits in cash increased slightly as a percentage of GDP. In fact, pension expenditure, despite continuing to decelerate, increased as a percentage of GDP, both in the Social Security and in the civil servants pension sub-systems, as a result of the rise in the number of pensioners and in the average pension (due to the pensions update and a composition effect resulting from the fact that the new pensions are, on average, far higher than pensions already paid). It should also be noted that expenditure with unemployment benefits fell by 0.1 p.p. of GDP, largely due to the new legislation introduced at the end of 2006.

Transfers in kind to households remained broadly unchanged as a percentage of GDP. The National Health Service expenditure benefited from savings in the co-finacing of medicines and medical services, following the measures introduced in the 2007 State budget. This effect was offset by payments to corporate hospitals (excluding those transformed into corporate entities during the year), which recorded a further significant rise.

Intermediate consumption expenditure increased significantly, largely influenced by the rise in payments to concessionaries of *SCUTs* (toll-free motorways). By contrast, subsidies and other current expenditure recorded negative rates of change. Developments in the former reflect a fall in expenditure on subsidised interest on housing loans and the decline in the transfers from the European Social Fund.

Interest expenditure, albeit decelerating, remained virtually unchanged as a percentage of GDP, mirroring the smaller growth of the stock of government debt (in line with the reduction in financing needs), while the implicit interest rate recorded a very slight increase.

Capital expenditure, excluding capital injections reclassified as non-financial transactions and the impact of temporary measures[21], rose to a minor extent as a percentage of GDP. The 8.6 per cent nominal growth of public investment was largely due to the strong deceleration of revenue resulting from the sale of real estate compared with 2006. Excluding this effect, the rate of change would only be slightly positive.

In 2007 the public debt ratio declined by 1.1 p.p., standing at 63.6 per cent of GDP at the end of the year. Contrary to 2006, these developments reflect, to a large extent, the debt-deficit adjustments, as the primary deficit and the effect of the differential between the implicit interest rate of government debt and the growth rate of nominal GDP had a minor contribution to the debt dynamics.

(21) The temporary measure relating to the *Alqueva* dam concession had a negative impact on the item "other capital expenditure".

Table 4.1

GROSS VALUE ADDED BY SECTOR OF ACTIVITY [a]

Real percentage rate of change

	Weights 2003 [b]	2003	2004	2005	2006	2007
Agriculture, forestry and fishing	3.2	-2.2	5.9	-5.6	6.8	-4.2
Industry	16.0	-1.0	0.2	-1.0	2.2	3.5
Electricity, gas and water	2.7	8.3	3.1	-3.1	4.1	3.3
Construction	7.1	-8.7	-0.3	-3.1	-6.1	0.1
Services	70.9	0.3	2.0	2.0	1.5	1.9
GVA	100.0	-0.5	1.7	0.8	1.3	1.9
Memo:						
GDP [c]	-	-0.8	1.5	0.9	1.3	1.9

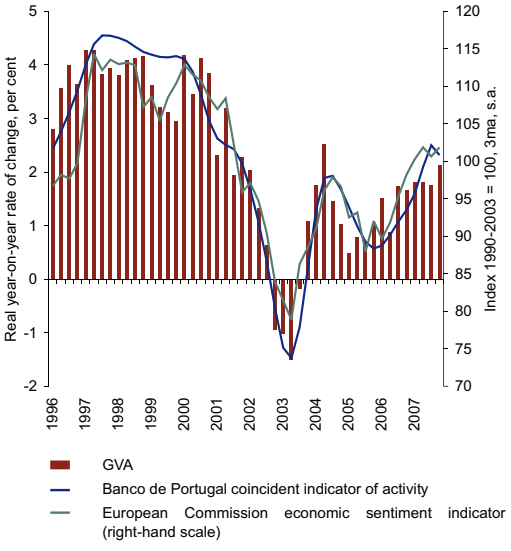
Sources: *INE* and Banco de Portugal.
Notes: (a) Values for 2004-2007 correspond to estimates of Banco de Portugal derived from *INE*'s National Accounts from 1999 to 2003. (b) As a percentage of total GVA at current prices. (c) GDP at market prices. The nominal value of GDP includes, in addition to sectoral GVAs, taxes and subsidies on products and import taxes.

4. SUPPLY

According to Banco de Portugal estimates, the gross value added (GVA) of the total economy accelerated from 1.3 per cent in 2006 to 1.9 per cent in 2007 (Table 4.1). Compared with the corresponding period a year earlier, this was due to a virtually stable growth pattern in the first three quarters, together with some acceleration at the end of the year, chiefly driven by developments in the construction sec-

Chart 4.1

GVA, COINCIDENT INDICATOR OF ACTIVITY AND ECONOMIC SENTIMENT INDICATOR

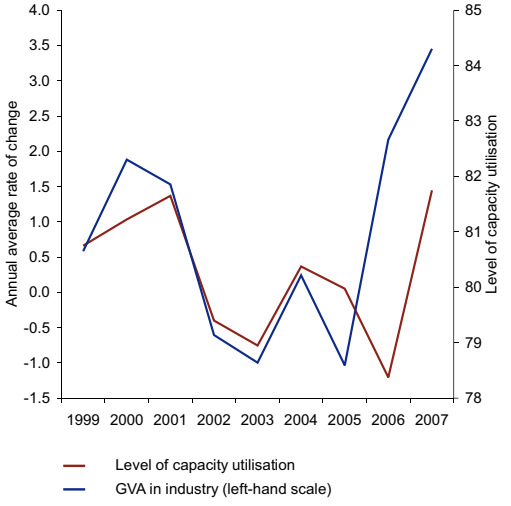


Sources: European Commission, *INE* (Quarterly Accounts) and Banco de Portugal.

Chart 4.2

GVA IN INDUSTRY AND LEVEL OF CAPACITY UTILISATION IN MANUFACTURING INDUSTRY

Per cent



Sources: European Commission and Banco de Portugal.

tor. The acceleration of activity in the year as a whole is confirmed by the coincident indicator of Banco de Portugal, as well as by an improvement in the European Commission economic sentiment indicator, in particular in the manufacturing industry and services subcomponents (Chart 4.1).

Developments in the manufacturing industry confidence indicator, as well as an increase in this sector's capacity utilisation, mirror an acceleration in the industrial sector GVA from 2.2 per cent in 2006 to 3.5 per cent in 2007. This performance was broadly based across most of the manufacturing industry subsectors (Chart 4.2). However, this buoyancy seems to be associated with developments in domestic demand, as exports of goods decelerated compared with the previous year (see "*Section 5 Expenditure*"). This is apparent in the largely different behaviour of turnover in industry in the domestic and external markets (Chart 4.3). In fact, while the turnover index of the domestic market accelerated 3 p.p. in 2007 to 5.7 per cent, the corresponding index for the external market recorded a sharp deceleration of 8 p.p. to 5.2 per cent.

Although GVA in industry evolved favourably in annual average terms , in the first three quarters of the year it showed a decelerating profile, in line with developments in the industrial production index in the manufacturing industry and with the intra-annual behaviour of exports of goods. At the end of the year these variables recovered somewhat, with the exception of merchandise exports, which recorded a further deceleration in year-on-year terms.

The services sector made a significant contribution to the GVA acceleration in 2007, with an annual average growth of 1.9 per cent (accelerating 0.4 p.p. from 2006). The acceleration of activity in services was broadly based across its subsectors, with the exception of financial activities, which however continued to be the most dynamic services subsector. The major contribution to the acceleration of GVA in this sector was made by the transport, storage and communication subsectors, partly reflecting the buoyancy of exports of transport and communications services (see "*Section 5 Expenditure*").

The growth rate of activity in the wholesale and retail trade subsectors also increased in line with the acceleration of private consumption, in particular of its durable goods component (see "*Section 5 Expenditure*"). This buoyancy was confirmed by the durable goods segment of the retail trade turnover index, which rebounded in 2007.[22] The confidence indicator in this subsector recovered slightly, remaining however below the average of the past ten years. Finally, activity in accommodation and food service activities also accelerated, presumably benefiting from buoyant tourism exports.

Activity in the construction sector in 2007 picked up, after falling by approximately 20 per cent in cumulative terms in the past five years. These developments, that contrast with the maintenance of this sector's confidence indicator at low levels, despite a slight improvement in 2007, reflect a rebound in all subcomponents of GFCF in construction, in particular public construction work, after a sharp drop in 2006. The evolution of the public works subsector in 2007 in part seems to be associated with the start of the National Strategic Reference Framework 2007-2013, in parallel with the implementation of projects still financed by the 2000-2006 Community Support Framework. However, the housing construction component recorded a further negative change in 2007 (see "*Section 5 Expenditure*").

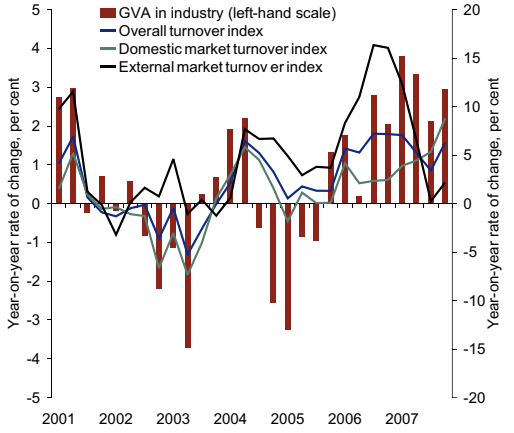
The agriculture, forestry and fishing sector was the only one to record a contraction in 2007, of 4.2 per cent, against an increase of 6.8 per cent in 2006. These developments result from the agriculture subsector behaviour, influenced by adverse weather conditions.

Data available for 2008, albeit still scarce, show some signs of a supply-side deceleration. In particular, at the beginning of the year the coincident indicator of Banco de Portugal on economic activity declined as well as most confidence indicators of the European Commission.

(22) However, it should be noted that the durable goods component of the retail trade turnover index does not include motor cars, motorcycles and fuel for vehicles and therefore does not reflect the sharp growth of consumption of this type of goods in 2007 (see "*Section 5 Expenditure*").

Chart 4.3

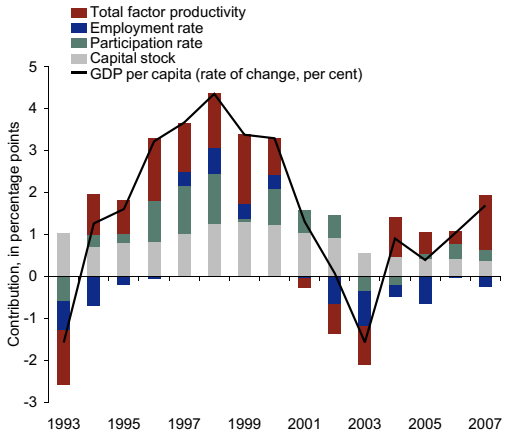
GVA AND TURNOVER INDEX IN INDUSTRY



Sources: *INE* and Banco de Portugal.

Chart 4.4

BREAKDOWN OF THE REAL CHANGE OF GDP *PER CAPITA*



Sources: *INE* and Banco de Portugal.

Developments in the growth factors behind the acceleration of activity in 2007 can be analysed through a growth accounting exercise. This analysis shows that the acceleration of output was due to developments in total factor productivity, whose contribution to GDP growth per capita increased from around 0.3 p.p. in 2006 to 1.3 p.p. in 2007 (Chart 4.4). However, this increase should be analysed bearing in mind the caveats underlying the growth accounting methodology, as total factor productivity corresponds to a residual item of the decomposition.[23] Therefore, it reflects the buoyancy of output that is not explained by the productive factors taken into account, *i.e.* in this case, labour supply and capital stock. In particular, the change in the degree of capacity utilisation, as well as the quality of factor inputs, are reflected in total factor productivity. This is particularly relevant given the reduced contribution of investment to economic growth compared with the same stage of the previous business cycle, which suggests higher utilisation by companies of their intensive margin.[24] In particular, capacity utilisation in the manufacturing industry in 2007 recorded its highest growth in the past few years (Chart 4.2). Likewise, the ongoing corporate restructuring process of the Portuguese economy will translate into both improved input quality and an effective increase of total factor productivity, which cannot be distinguished in a growth accounting exercise.

With regard to other growth factors, the contribution of capital stock remained at 0.4 p.p., despite some recovery in GFCF (see "*Section 5 Expenditure*"). In turn, the contribution of labour to GDP per capita growth was virtually nill in 2007, reflecting subdued employment growth in that year.

According to the latest estimates available for the potential output level, based on different statistical methods, developments in activity in 2007 implied a slight reduction in the output gap (Chart 4.5).[25] However, it still remains negative and close to the figure estimated for 2003. This is a reflection of the

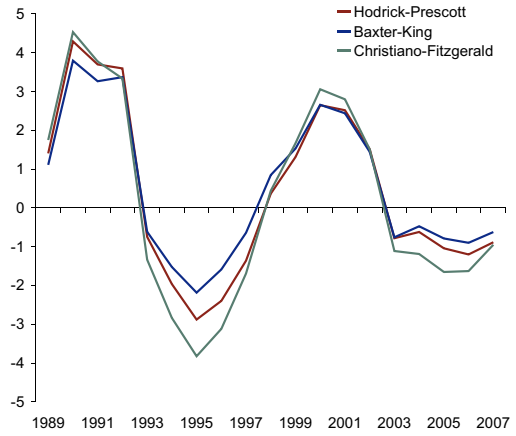
(23) For a detailed description of this method, as well as of its caveats, see V. Almeida and R. Félix, (2006), "*Computing potential output and the output gap for the Portuguese economy*", Banco de Portugal, *Economic Bulletin-Autumn*.

(24) Intensive margin refers to the degree to which a resource is utilised or applied. For example, in the case of a variable such as employment measured in hours worked, the intensive margin corresponds to the average number of hours per worker as apposed to the extensive margin, which corresponds to the number of workers employed.

(25) For further information on the output gap computation methods, see V. Almeida and R. Félix, (2006), "*Computing potential output and the output gap for the Portuguese economy*", Banco de Portugal, *Economic Bulletin-Autumn*.

Chart 4.5

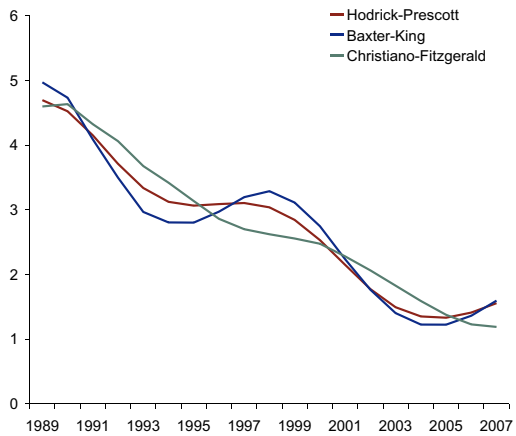
OUTPUT GAP
In percentage points



Sources: *INE* and Banco de Portugal.
Note: For further details on the output gap computation methods, see V. Almeida and R. Félix (2006), "*Computing potential output and the output gap for the Portuguese economy*", Banco de Portugal, *Economic Bulletin-Autumn.*

Chart 4.6

POTENTIAL GDP GROWTH
Per cent



Sources: *INE* and Banco de Portugal.
Note: For further details on the output gap computation methods, see V. Almeida and R. Félix (2006), "*Computing potential output and the output gap for the Portuguese economy*", Banco de Portugal, *Economic Bulletin-Autumn.*

fact that the Portuguese economy does not show a clear cyclical recovery towards a trend output growth which is lower than observed in previous business cycles (Chart 4.6).

The historically high level of the unemployment rate, which reached 8.0 per cent, marked labour market in 2007. In addition, employment growth was weak, standing at 0.2 per cent. Labour market polarisation persisted with fixed-term contracts increasing by 8.0 per cent and permanent contracts decreasing by 2.2 per cent.

According to the Employment Survey of *INE* (Statistics Portugal), the participation rate in 2007 stood at 74.1 per cent (Table 4.2). Despite the 0.2 p.p. rise in the participation rate from 2006, there was a slowdown compared with developments in the past two years. Demographic projections for the age structure of the Portuguese population can be used to isolate demographic factors in the evolution of the participation rate. In 2007 assuming that for each age level the participation rates remained unchanged at the 2006 level, the evolution of the aggregate participation rate would be close to zero.[26] This projection is the result of the combination of factors with oppositing impacts. On the one hand, the rising share of the older population (aged 55-64), also with lower participation rates, leads to the smaller growth of this rate. On the other hand, the declining share of the young population (aged 15-29), with lower participation rates, and the rising share of the age group with the highest employment rate (aged 30-54) offset that negative effect. In addition, in 2007 the impact of other structural factors besides the age component was more mitigated than in previous years. In particular, the slow down in the growth of the female participation rate is confirmed, one of the factors that used to contribute most to the rise in participation (0.9 p.p in 2005, 0.5 p.p in 2006, and 0.4 p.p. in 2007).

Developments in the labour force resulted from a rise in both employment and unemployment in the course of 2007. Total employment went up by 0.2 per cent (Table 4.2), mainly due to the rise in self-employment, with a slight contribution of salaried employment. Reversing the trend of the past few years, with losses in self-employment, there was an increase of 1.3 per cent in 2007. Thus, self-employment

(26) These projections for the participation rate foresee a slight increase until 2010, followed by strong decline until 2040 (up to 3 p.p.) merely due to demographic factors. For a detailed analysis of the impact of demographic developments on the participation rates, see "Box II.4.1 entitled *Implications of developments in the age structure of the Portuguese population for the participation and unemployment rates*", Banco de Portugal, *Annual Report 2001*.

Table 4.2

POPULATION, EMPLOYMENT AND UNEMPLOYMENT
Rate of change, per cent (unless otherwise indicated)

	2002	2003	2004	2005	2006	2007
Population	0.7	0.8	0.6	0.5	0.2	0.2
Labour force	1.6	1.0	0.5	1.0	0.8	0.6
Participation rate 15-64 years (% of population)	72.6	72.8	72.9	73.4	73.9	74.1
Total employment	0.5	-0.4	0.1	0.0	0.7	0.2
Private sector employment [(a)]	0.2	-1.2	0.0	-0.2	1.3	0.5
Dependent employment	1.0	-0.3	1.2	0.8	2.2	0.1
Permanent contract	-0.5	0.9	2.2	1.3	0.9	-2.2
Fixed-term contract	7.3	-2.6	-1.9	1.7	9.3	8.0
Self-employment	1.0	0.5	-3.1	-2.8	-2.7	1.3
Total unemployment	26.7	26.5	6.6	15.7	1.3	4.9
Total unemployment rate (% of labour force)	5.0	6.3	6.7	7.6	7.7	8.0
Long-term unemployment (% of total unemployment) [(b)]	37.3	37.7	46.2	49.9	51.7	48.9

Sources: *INE* (Employment Survey) and Banco de Portugal.
Notes: (a) Private sector employment is defined as total employment excluding Banco de Portugal estimates for public sector employment. (b) A long-term unemployed is an individual seeking work for 12 months or more.

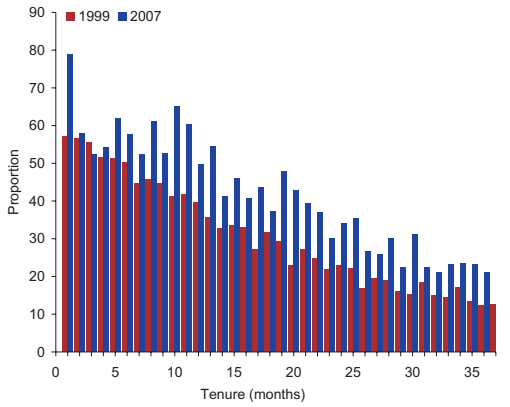
returned to its typical pro-cyclical behaviour, which may have been interrupted at the start of the current economic recovery phase, due to the significant rise in the minimum value of the compulsory social contributions of these workers. In fact, this rise made this type of employment less competitive, in particular when compared with low-wage earners.[27] Contrasting with the better performance of self-employment, salaried employment increased only by 0.1 per cent, after particularly strong growth in 2006.

The composition of salaried employment indicates that the polarisation process of the Portuguese labour market has intensified. Fixed-term contracts increased by 8.0 per cent, while permanent contracts decreased by 2.2 per cent. In terms of their share in total salaried employment, permanent contracts account for 77.6 per cent (79.5 per cent in 2006) and fixed-term contracts for 17.6 per cent (16.3 per cent in 2006). Although the use of fixed-term contracts is typical of phases of economic recovery, the share of these contracts in the composition of employment has been rising since 1995, reaching a peak in 2007. Based on data from the 1999 and 2007 Employment Surveys, Chart 4.7 shows that the use of fixed-term contracts increased for all levels of tenure up to 36 months. Thus, from 1999 to 2007 the probability of new contracts being fixed-term contracts increased for all levels of tenure reported. This phenomenon has primarily affected the younger age group (Chart 4.8). Employment rotation is important for promoting the creation of the best (most efficient) worker-firm pair. In sum, fixed-term contracts can be used to select workers, but the recent trend and the high number of fixed-term contracts seems to be due to other reasons in the current labour market context. Structural factors, such as the labour market legislation, induce an excessive and therefore inefficient rotation of a significant share of workers. Ultimately, the polarisation of the labour market affects negatively investment decisions regarding education and training by companies and the workers involved in employment rotation. This situation is all the more serious as it affects the younger workers, *i.e.* those more willing to invest in education and training.

(27) The relationship between self-employment, the rigidity of labour legislation and compulsory social contributions is evidenced for a sample of 18 developed countries in M. Centeno, (2000), "*Is self-employment a response to labour market rigidity?*", Banco de Portugal, *Economic Bulletin-December*, pp. 37-44.

Chart 4.7

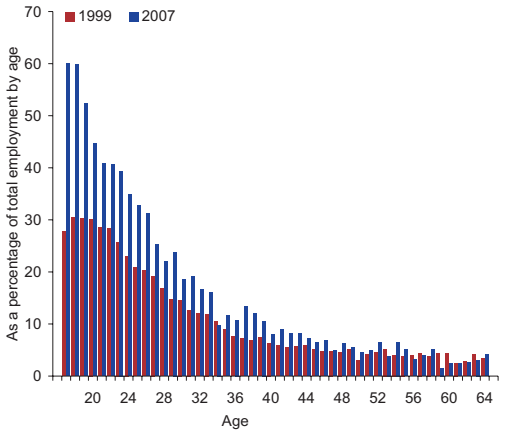
PROPORTION OF FIXED-TERM CONTRACTS BY TENURE (MONTHS)



Source: *INE* (Employment Survey).

Chart 4.8

PROPORTION OF FIXED-TERM CONTRACTS BY AGE



Source: *INE* (Employment Survey).

In sectoral terms, employment in manufacturing dropped by 2.7 per cent, after a 1.2 per cent rise in 2006. Thus, the downward trend seen in the last decade was resumed. On the other hand, employment in the services sector increased by 0.4 per cent, its slowest pace since 2003. The main determinants of employment developments in the services sector were a reduction of employment in the general government, education and health sectors, and a rise in activity in the real estate, renting and business services sector.

The most striking feature of the labour market in 2007 was the high level of the unemployment rate, which reached 8.0 per cent. In the context of the Portuguese economy this is a historically high level and translates in a 0.3 p.p. increase from 2006 (Table 4.2).[28] This increase was associated with a 4.9 per cent rise in the number of the unemployed compared with 2006. This development was due not only to cyclical, but also to structural factors – such as the gradual restructuring of the productive fabric and the high entitlement and financial coverage of unemployment benefits –, which reinforce each other contributing to the current labour market situation. In the past few years, the traditional relationship between the output gap and the unemployment rate seems to have been broken, a fact clearly confirmed by the statistics (Chart 4.9). Although the economic recovery may contribute to a gradual decline of the unemployment rate, the absence of an appropriate structural response will hamper (or at least postpone) the sustained reduction of unemployment to the levels observed in the past.

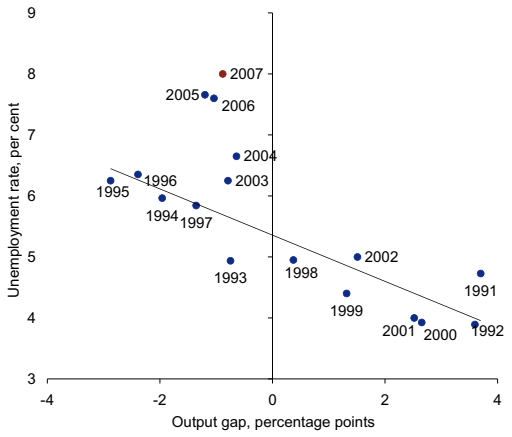
In terms of the breakdown of unemployment into duration levels, in the course of 2007 the share of long-term unemployment in total unemployment (12 months or more) declined from 51.7 per cent in 2006 to 48.9 per cent. However, these developments in long-term unemployment are mitigated by the fact that the number of the unemployed fell only in the group of the unemployed for more than 24 months. Reversing the trend seen in the past few years, the number of the short-term unemployed (individuals who have been unemployed for under 1 year) increased by 10.8 per cent from 2006. The rise was more marked in the shorter unemployment duration (up to 3 months).

The decline in the average duration of unemployment from 22.4 months in 2006 to 22 months in 2007 is in line with the fall in the share of long-term unemployment. The persistence of long unemployment

(28) It should be noted that the current definition of unemployment is stricter than that used in 1996, when the last peak had been recorded. Thus, using the former definition the figure for the unemployment rate in 2007 would have been even higher.

Chart 4.9

OUTPUT GAP AND UNEMPLOYMENT RATE [a]



Sources: *INE* and Banco de Portugal.
Note: (a) The unemployment rate series was constructed according to the methodology described in G. L. Castro and P. S. Esteves (2004), "*Quarterly series for the Portuguese economy: 1977-2003*", Banco de Portugal, *Economic Bulletin-June. The output gap was calculated with the private sector GDP series, which is defined as total GDP less compensation of public employees and general government fixed capital consumption.*

Chart 4.10

QUARTERLY AVERAGE FLOWS IN THE LABOUR MARKET

Volume in thousands and, in brackets, percentage of labour force [a]

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 the four quarters of 2007.

periods in Portugal is partly explained by the generosity of unemployment benefits, as well as by their significant potential duration.[29] However, it should be noted that in the course of 2007 the number of unemployment benefit recipients decreased, partly due to the introduction of legislative changes in November 2006. These led to the shortening of the potential duration of benefits for specific groups of unemployed individuals and to increased control as regards both the allocation of unemployment benefits and the compliance by recipients with the commitment to actively seek work.

Chart 4.10 shows an alternative perspective of labour market dynamics. It represents quarterly average flows between the different labour market status – employment, unemployment and inactivity. In 2007, 43.8 thousand individuals moved from employment into inactivity and 42.9 thousand in the opposite direction. Total movements from inactivity into unemployment are higher (around 10 thousand more transitions) than from inactivity into employment. Finally, transitions from unemployment into employment affected on average 58.6 thousand individuals, while in the opposite direction they affected 47.3 thousand. During the past four quarters, these transitions corresponded to 6.8 per cent of the labour force.[30] In comparative terms, only the flows from inactivity into unemployment changed significantly from the past two years, declining by around 10 per cent.

5. EXPENDITURE

In 2007, the Portuguese economy grew by 1.9 per cent, accounting for a 0.6 p.p. acceleration of economic activity from the previous year (Table 5.1). This growth rate of GDP, however, albeit close to that

(29) See A. Pereira (2006) "*Assessment of the changes in the Portuguese unemployment insurance system*", Banco de Portugal, *Economic Bulletin-Spring* ; M. Centeno and Á. Novo, (2007) "*The regressivity of unemployment insurance: identification of the income effect through the July 1999 legislation*", Banco de Portugal, *Economic Bulletin-Autumn* ; and "Box 2.5 *Work incentives and the generosity of unemployment benefits*", Banco de Portugal, *Annual Report 2005*.

(30) The Employment Survey underestimates labour market movements because of the sampling criteria. In addition, due to the 1/6 rotation of the sample in each quarter, the calculation is only made with the common component of the samples of consecutive quarters.

Table 5.1

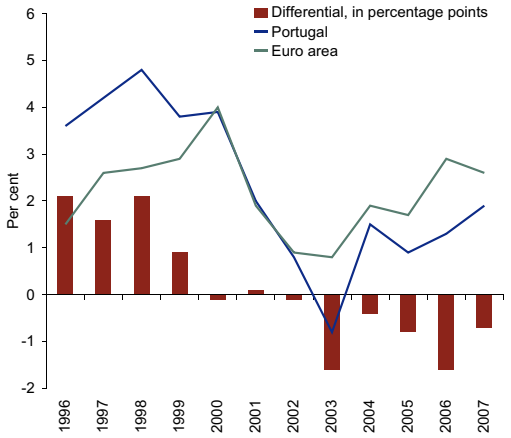
GDP AND MAIN EXPENDITURE COMPONENTS [a]
Real rate of change, per cent

	2002	2003	2004	2005	2006	2007
GDP	0.8	-0.8	1.5	0.9	1.3	1.9
Private consumption	1.3	-0.2	2.5	1.9	1.2	1.5
Public consumption	2.6	0.2	2.6	3.2	-1.2	-0.1
Investment	-4.7	-8.3	2.5	-1.5	-1.4	3.6
GFCF	-3.5	-7.4	0.2	-0.9	-1.6	3.2
Change in inventories [b]	-0.4	-0.3	0.5	-0.1	0.0	0.1
Domestic demand	0.1	-2.0	2.5	1.5	0.2	1.7
Exports	1.4	3.9	4.0	2.1	9.2	7.5
Imports	-0.7	-0.9	6.7	3.5	4.3	5.7
Contribution of domestic demand to GDP [b]	0.1	-2.2	2.7	1.6	0.2	1.8
Contribution of net external demand to GDP [b]	0.7	1.4	-1.2	-0.7	1.0	0.1

Sources: *INE* and Banco de Portugal.
Notes: (a) Banco de Portugal estimates derived from the *INE*'s National Accounts between 1995 and 2005 (ESA95). (b) Contribution to the rate of change in GDP in percentage points.

Chart 5.1

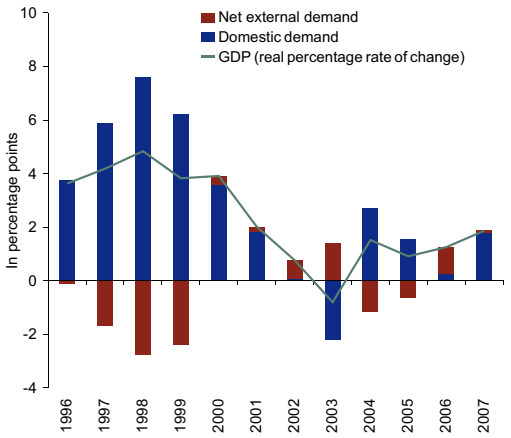
GROSS DOMESTIC PRODUCT
Real rate of change



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

Chart 5.2

BREAKDOWN OF REAL CHANGE IN GDP
Contribution, in percentage points



Sources: *INE* and Banco de Portugal.

observed in the euro area, continued to be insufficient to ensure that real convergence with the euro area as a whole is resumed (Chart 5.1). Indeed, Portugal will probably be again among the countries with lowest growth in the euro area and in the European Union.

The acceleration of economic activity in 2007 was accompanied by a significant change in the composition of growth *vis-à-vis* 2006, as a result of the strong increase in the contribution of domestic demand and of the fall in the contribution of net external demand to values close to zero (Chart 5.2). This development largely reflected the momentum gained by GFCF which, contrary to recent years, had a positive change. In turn, the behaviour of net external demand in 2007 was the result of the deceler-

ation in exports, particularly goods, and of higher import growth. Notwithstanding the slower pace of growth in 2007, exports of goods and services continued to be the most buoyant component of global demand, with the market share posting higher gains than in 2006, in annual average terms, in spite of a virtual stabilisation in the second half of the year, according to available data (Chart 5.3).

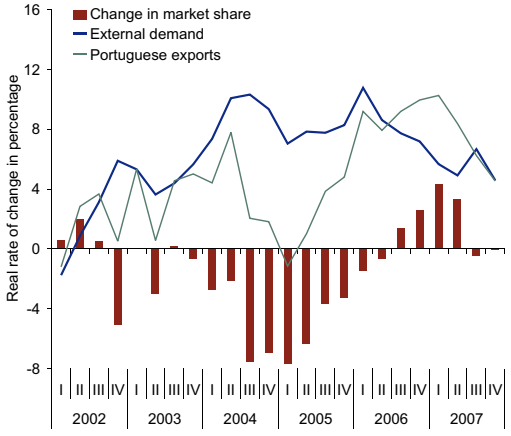
Although growth in 2007 exceeded the value projected by Banco de Portugal at the start of the year by only 0.1 p.p., the composition of expenditure diverged significantly from expectations.[31] Hence, growth of GFCF in 2007 stood well above projections (by 3.2 p.p.). This revision was essentially determined by significantly stronger growth of business GFCF, namely due to the renewed acceleration of investment in construction and to strong growth of imports of air transport equipment. Private consumption, in turn, despite more buoyant consumption of durable goods, had a change identical to that projected in early 2007. By contrast, despite stronger-than-expected growth of services exports (by 5.2 p.p.), the contribution of net external demand to GDP declined significantly, reflecting the less buoyant behaviour of goods exports and higher growth of imports (5.7 per cent, compared with a projection of 3.5 per cent in early 2007), in line with developments in import-content-weighted global demand.

In 2007 private consumption maintained moderate growth, with a slight annual change above that observed in the previous year and in line with the euro area as a whole, but below GDP's growth. Several factors were behind the greater moderation of the pace of growth of private consumption in recent years, particularly the increase in the unemployment rate, the higher fiscal burden, namely at the level of indirect taxation, the deceleration of transfers to households, a component of disposable income that is typically associated with a higher propensity to consume, and the gradual increase of interest rates.

Recent developments point to less favourable financing conditions than those prevailing in 2004 and 2005. Indeed, as of late 2005 ECB interest rates rose gradually, with an impact that was particularly felt in the Portuguese economy, considering not only the relatively high household indebtedness, but also

Chart 5.3

MARKET SHARE OF PORTUGUESE GOODS AND SERVICES EXPORTS

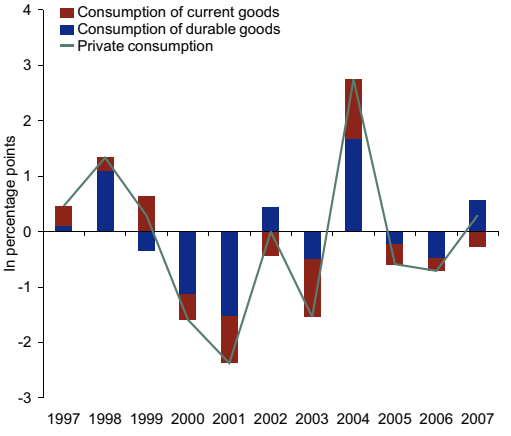


Sources: ECB, UK Office for National Statistics and Banco de Portugal calculations.
Note: External demand adjusted for the effects of tax fraud in the United Kingdom.

Chart 5.4

CHANGE IN PRIVATE CONSUMPTION AND CONTRIBUTIONS OF MAIN COMPONENTS

Contributions to change, in percentage points



Sources: *INE* and Banco de Portugal.

(31) See Banco de Portugal, *Economic Bulletin-Winter 2006*.

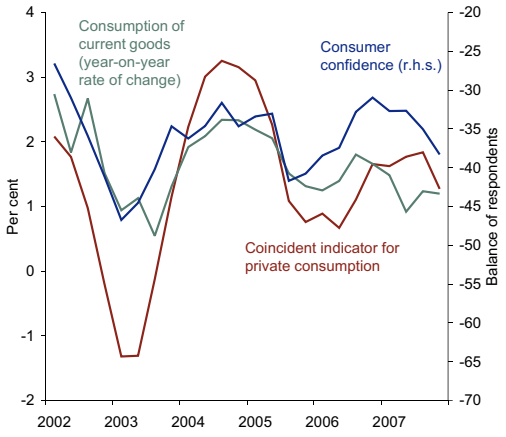
the fact that interest rates in general were indexed to money market rates.[32] However, shrinking bank margins, as well as the supply of new financial products and contractual arrangements, made it possible to contain growth of payments associated with the household debt service, namely through the extension of deadlines for the repayment of loans.

The acceleration of private consumption in 2007 reflected the behaviour of consumption of durable goods, in a context of a decline, for the third year in a row, in the pace of growth of consumption of current goods (Chart 5.4). Available information points to the maintenance of the strong dynamics of consumption of durable goods over the first months of 2008. In 2007 as a whole consumption of durable goods grew by 4.3 per cent, after a fall of 1.0 per cent in the previous year, in contrast to consumption of current goods, which decelerated again, translating into a fall in its contribution to the change in private consumption from 1.4 p.p. in 2006 to 1.1 p.p. in 2007. The developments in consumption of current goods, which include, for instance, household expenditure in services and food, and accounts for approximately 90 per cent of total consumption expenditure, was consistent with the behaviour of consumer confidence and with the profile of the private consumption coincident indicator (Chart 5.5).

Consumption of durable goods, in turn, evolved in line with its usual pro-cyclical behaviour. The strong dynamics of this consumption component in 2007 led to a narrowing of the gap *vis-à-vis* the respective trend, which is common in a phase of economic recovery. Nonetheless, this narrowing has been characterised by a slower and irregular process, when compared with that observed in previous cycles, which may reflect the presence of more active intertemporal budget restrictions in the most recent period (Chart 5.6). However, the behaviour of consumption of durable goods, in particular motor vehicles,

Chart 5.5

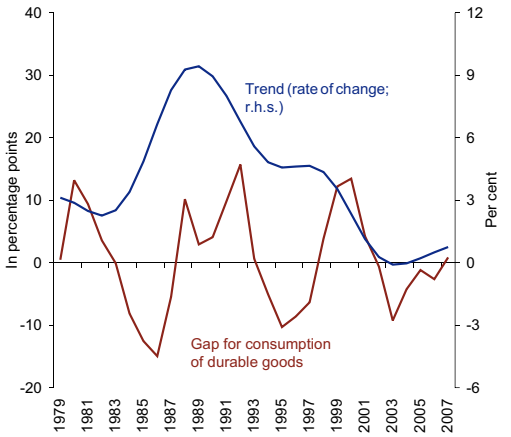
CONSUMPTION OF CURRENT GOODS AND COINCIDENT AND CONFIDENCE INDICATORS FOR PRIVATE CONSUMPTION



Sources: *INE* and Banco de Portugal.

Chart 5.6

CYCLICAL DEVELOPMENTS IN CONSUMPTION OF DURABLE GOODS



Sources: *INE* and Banco de Portugal.
Note: Trend obtained by applying a Hodrick-Prescott (HP) filter to quarterly estimates of Banco de Portugal through a smoothness parameter set to 7680, which corresponds to a smoothing parameter of 30 for annual data, usually used to calculate the cyclically-adjusted budget balance (see Raven, Morten O. and Harald Uhlig: "On adjusting the Hodrick-Prescott filter for the frequency of observations", in the May 2002 issue of *Review of Economics and Statistics*, 84(2), 371-376). The gap for consumption of durable goods was calculated as the difference between the actual level and its trend, in percentage points.

(32) At the end of 2007, ECB key interest rates were 2 p.p. above their level in early December 2005. The minimum bid rate on the main refinancing operations stood at 4 per cent.

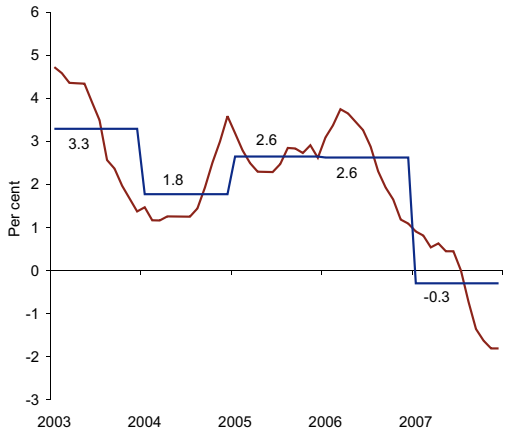
was also significantly affected by a number of changes with a view to simplifying the tax incentive programme for the retirement of end-of-life vehicles, as well as by the changes in the vehicle taxes, which entered into force on 1 July 2007 and contributed to the decline in prices of motor vehicles in the year as a whole (Chart 5.7).[33] Sales of motor vehicles within the scope of the tax incentive programme for the retirement of end-of-life vehicles contributed significantly to the increase in sales in 2007, accounting for 12.2 per cent of total sales of passenger cars in December 2007, compared with 2.6 per cent in January and 6.4 per cent in the year as a whole. It should be noted that after the 3.0 per cent fall in 2006, sales of passenger cars grew by 6.1 per cent in 2007 (2.0 per cent, excluding sales within the scope of the tax incentive programme for the retirement of end-of-life vehicles).[34] In turn, as a result of the new tax framework implemented in July 2007, decisions on purchases of motor vehicles were brought forward in higher-end segments, and postponed in lower-end segments, thereby determining a particularly irregular intra-annual profile in sales of passenger cars, adjusted for the quality effect (Chart 5.8).

According to the January 2008 bank lending survey, which covers the five major banking groups, most reporting institutions tightened further their credit standards applied to the approval of loans to households for consumer credit and other lending in the fourth quarter of 2007, although less markedly than in other segments. These standards were expected to be more tight in the first quarter of 2008. Nonetheless, loans for consumer credit and other lending seem to be the single segment with a slight increase in demand in late 2007. In this context, it is important to stress that the buoyancy of consumer durables was followed by persistently high growth of bank loans for consumption. This rate of change revealed an upward profile in the course of the year, notwithstanding the turbulence in international fi-

Chart 5.7

MOTOR VEHICLE PRICE DEVELOPMENTS

Year-on-year rate of change, per cent

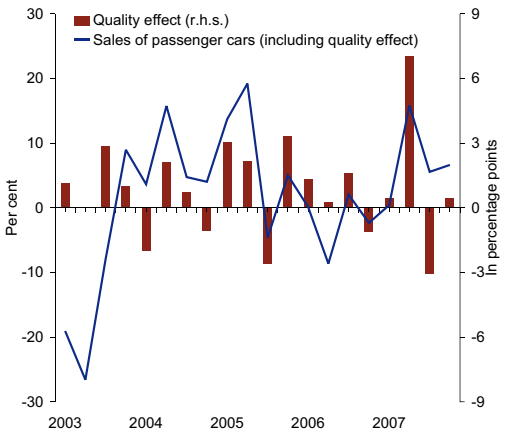


Source: *INE*.

Chart 5.8

SALES OF PASSENGER CARS AND QUALITY EFFECT

Growth rate, quarterly figures



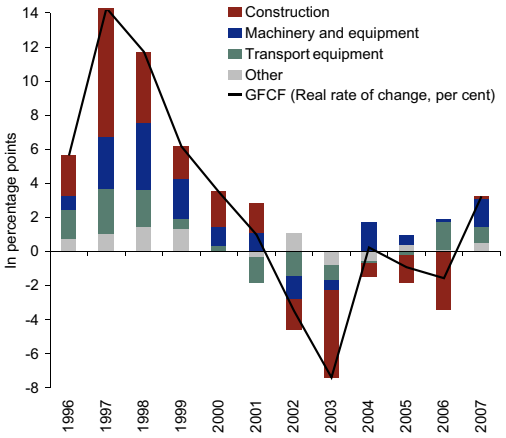
Sources: *ACAP* and Banco de Portugal calculations.
Note: The quality effect aims to adjust the volume of sales of passenger cars according to their segments. If the quality effect is nil, it represents a uniform distribution of sales of passenger cars across the different segments, while a positive (negative) quality effect implies a bias of that distribution towards greater sales of passenger cars in the higher-end (lower-end) segments.

(33) At the level of the changes introduced at the start of the year with respect to the tax incentive programme for the retirement of end-of-life vehicles, it is worth stressing the elimination of the obligation that vehicles to be retired should circulate, the cut in the minimum period for ownership of the vehicle, and the reduction of document requirements for access to the programme. The new tax framework that entered into force on 1 July 2007 privileges environmentally-competitive vehicles, in particular lower segment gasoline vehicles.

(34) These figures do not include the purchase of passenger cars by rental companies, which is considered to be corporate investment.

Chart 5.9

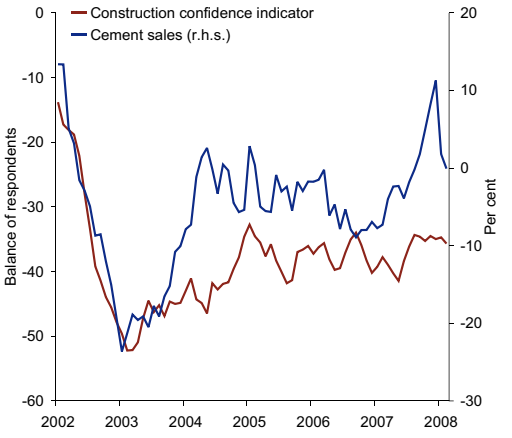
BREAKDOWN OF REAL CHANGE IN GFCF
Contributions, in percentage points



Sources: *INE* and Banco de Portugal.

Chart 5.10

CONSTRUCTION CONFIDENCE INDICATOR AND CEMENT SALES TO THE DOMESTIC MARKET



Sources: European Commission, *Cimpor* and *Secil*.
Note: Confidence indicator calculated on the basis of the quarterly moving average of the balance of respondents; cement sales calculated on the basis of the quarterly year-on-year change in Portuguese companies' cement sales to the domestic market.

nancial markets. In the year as a whole this type of loans grew by 13.7 per cent (9.7 per cent in 2006), and this acceleration was chiefly due to the increase in the contribution of smaller credit institutions, in particular institutions focused in loans for car purchase.

In 2007 public consumption growth, in real terms, is estimated to have been virtually nil. Underlying this estimate is a decline in the number of civil servants, reflecting the effect of current regulations regarding the hiring policy in the general government. Goods and services expenditure, in turn, had a positive change, largely as a result of the behaviour of intermediate consumption and social benefits in kind, in particular the components related to payments to corporate hospitals and to pharmaceutical subsidies and conventions.

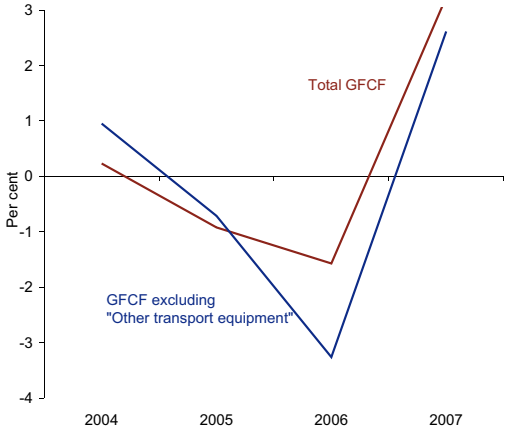
After having declined in the most recent years, GFCF recorded a further positive rate of change in 2007, albeit lower than in the euro area. The rebound in GFCF in 2007 largely reflected the strong acceleration in the "machinery and equipment" component, which grew by 7.0 per cent (0.6 per cent in 2006), although it is also supported by the behaviour of GFCF in "construction", which made a marginally positive contribution, following the consecutively negative values seen since 2001 (Chart 5.9). In fact, cement sales to the domestic market increased in the second half of the year and confidence in this sector improved slightly (Chart 5.10). The available information, however, points to a somewhat less buoyant construction sector in the early months of 2008. It is important to note that, notwithstanding the more favourable behaviour of GFCF in "construction" in 2007, house purchase by households fell further (by -2.5 per cent), albeit less sharply than in 2006. In turn, growth in GFCF in "transport equipment" was much lower than in 2006, despite the strong acceleration in the second half-year. The profile of intra-annual developments in this component in 2007 was irregular, reflecting the impact on decisions to purchase commercial vehicles of the entry into force of sundry legislation both in 2006 and in 2007, and of the behaviour of GFCF in "other transport equipment", associated in particular with the purchase of aircraft.[35] As seen in the second quarter of 2006 and in the second half of 2007, purchases

(35) Strong growth in heavy commercial vehicle sales in April and September 2006 mirrored the anticipated purchase of this type of vehicles, following the entry into force of Community legislation on the use of mandatory standard equipment (May) and a series of environmental protection standards (October). In turn, significant growth in light commercial vehicle sales in the second quarter of 2007 was associated with changes in taxes on vehicles that entered into force in July.

Chart 5.11

DEVELOPMENTS IN GFCF EXCLUDING TRANSPORT EQUIPMENT'

Real rate of change

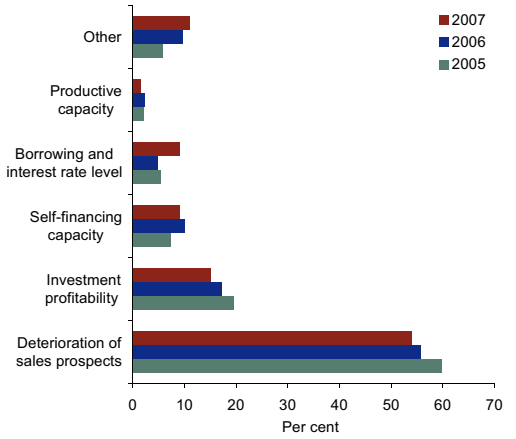


Sources: *INE* and Banco de Portugal estimates.

Chart 5.12

MAIN FACTOR LIMITING INVESTMENT

Per cent of total number of companies with investment restrictions



Source: *INE* (Investment Survey). Results shown for each year are based on the first Investment Survey published the following year.

of aircraft may significantly affect GFCF developments due to the size of the amounts involved and the discrete nature of related decisions.[36] According to Banco de Portugal estimates, in 2007 GFCF excluding "other transport equipment" accelerated more markedly than the overall aggregate (Chart 5.11).

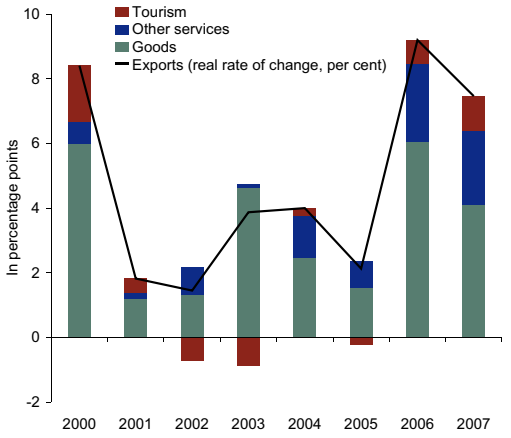
Stronger GFCF growth, in particular the corporate component, is essential to ensure a more solid and sustained recovery of economic activity. Estimates for developments in corporate GFCF point to a volume expansion of 4.1 per cent in 2007 (0.5 and 2.2 per cent respectively in 2005 and 2006), *i.e.* consistent with the maintenance of the improved confidence trend in services and manufacturing. However, after the downward trend observed in the recent past, the more favourable performance of this component in the past few years still does not lead to the conclusion that it represents the start of a sustained recovery, especially when taking into account the current environment of uncertainty about the outlook for developments in the international economic and financial situation. The Investment Survey of Statistics Portugal released in February 2008 shows that the share of companies in the various sectors claiming to have faced investment restrictions during 2007 remained stable compared with the survey conducted in early 2007 (45.7 per cent). This notwithstanding, the value calculated was lower than in 2006. From among the above-mentioned companies, the deterioration of sales prospects and, to a lesser extent, the profitability of the respective investments, continued to be seen as the main limiting factors, although both seem to have lost some importance in the past two years (Chart 5.12). Conversely, the difficulty in obtaining credit and the interest rate level have become increasingly important, although to a limited extent. However, these factors are particularly relevant in the current context of turbulence in international financial markets. According to the bank lending survey released in early 2008, the five largest banking institutions reported a tightening of credit standards applied to the approval of loans to enterprises in the fourth quarter of 2007. This essentially resulted from increased difficulties in access to financing in wholesale international markets. Respondent banks also referred that the tightening of credit standards applied to the approval of loans or credit lines to enterprises con-

(36) It should be noted that purchases of aircraft, for being exclusively imports, do not have an impact on GDP value when it is entered in accounts, but only on its composition.

Chart 5.13

BREAKDOWN OF REAL CHANGE IN EXPORTS OF GOODS AND SERVICES

Contribution, in percentage points



Sources: *INE* and Banco de Portugal.

tinued to increase in the first quarter of 2008. However, it should be noted that the increased tightening was less significant in loans for investment financing, which as of late 2007 was pointed as a factor contributing to increased demand for bank loans to enterprises.

In 2007 exports of goods and services in Portugal decelerated, although less markedly than in the euro area as a whole, with the respective real growth rate standing at 7.5 per cent (9.2 per cent in 2006).[37] In spite of the weaker dynamics in 2007, exports of goods and services remained the most buoyant component of global demand, with a higher gain in market share than in 2006.[38] Export behaviour reflects less buoyant goods exports, which decelerated considerably in 2007 (from 8.3 per cent in 2006 to 5.7 per cent). Conversely, the contribution of exports of tourism and other services to export growth increased slightly from 2006, reflecting a continuing high growth pace (Chart 5.13). In 2007 exports of tourism and other services grew by 12.2 per cent in real terms, compared with 11.7 per cent in 2006. This confirms the upward trend of the relative importance of services exports in total exports, stress being laid in 2007 not only on the acceleration in tourism exports, but also on the maintenance of strong growth in other services, such as those related to transport and the provision of technical professional services (Table 5.2).

In parallel with the growing importance of services exports, export behaviour in 2007 seems to confirm other structural movements seen in the recent past. In particular, the degree of openness of the Portuguese economy, measured on the basis of the ratio of exports and imports, as a whole, to GDP, saw a further considerable increase in 2007 (Chart 5.14).[39] In addition, the structure by geographical areas of goods exports in nominal terms continued to mirror the increasingly higher weight of extra-EU markets, particularly the Angolan market (Chart 5.15).[40]

(37) Exports of goods and services in the euro area grew by 6.0 per cent in 2007, following an 8.1 per cent change in 2006.

(38) See *footnote 5* in "Section 2 *Major international economic developments*".

(39) In 2007 the ratio of nominal goods and services exports and imports, as a whole, to GDP stood at 73 per cent, which represents an increase of 10 p.p. from 2003.

(40) In 2007 exports of goods to Angola grew by 39 per cent in nominal terms, reinforcing the position of the Angolan market as the second main destination of Portuguese exports to extra-EU markets, immediately following the United States. In 2007 the weight of Angola in extra-EU Portuguese exports stood at 19.3 per cent (15.5 per cent in 2006), *i.e.* close to the value recorded for the United States (20.4 per cent) and clearly above that of Singapore (8.1 per cent) and Malaysia (4.6 per cent), the countries occupying the immediately following positions.

Table 5.2

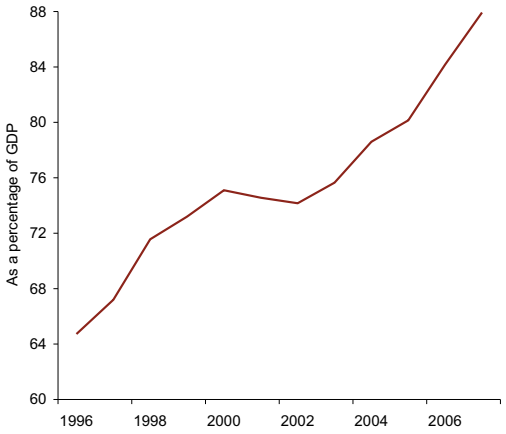
PORTUGUESE EXPORTS OF SERVICES
Year-on-year rate of change and contributions; nominal values

	Weights 2006	Year-on-year rate of change (per cent)			Contribution to the year-on-year rate of change (in percentage points)		
		2005	2006	2007	2005	2006	2007
Total	100.0	3.4	15.6	15.2	3.4	15.6	15.2
Tourism	45.3	0.1	7.6	10.8	0.0	3.9	5.1
Transportation services	22.3	11.2	23.1	14.3	2.2	4.9	3.2
Other business services	18.2	8.6	24.8	19.5	1.3	4.0	3.4
Communication services	4.4	19.0	16.7	34.2	0.6	0.6	1.3
Construction services	3.7	-15.7	41.1	43.6	-0.5	1.0	1.3
Financial services	1.5	-8.7	14.5	25.2	-0.1	0.2	0.3
Computer and information services	1.2	4.5	28.8	25.0	0.0	0.3	0.3
Personal, cultural and recreational services	1.2	6.6	22.2	-5.7	0.1	0.3	-0.1
Government operations	1.1	-15.4	17.7	16.9	-0.2	0.2	0.2
Insurance services	0.6	-26.5	14.1	5.8	-0.2	0.1	0.0
Royalties and license fees	0.5	47.1	34.1	18.3	0.1	0.1	0.1

Source: Banco de Portugal (Balance of Payments).

Chart 5.14

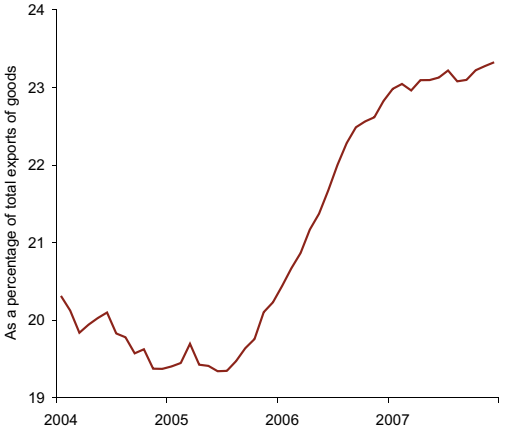
DEGREE OF OPENNESS OF THE ECONOMY
Sum of exports and imports as a percentage of GDP, values in real terms



Sources: *INE* and Banco de Portugal.

Chart 5.15

WEIGHT OF EXTRA-EU EXPORTS OF GOODS
Nominal values; twelve-month moving average



Sources: *INE* (International Trade Statistics) and Banco de Portugal calculations.

The deceleration in goods exports in nominal terms was particularly sharp as of the second quarter of the year and, according to the available information, exports should remain sluggish during the first quarter of 2008. The deceleration in goods exports in 2007 was particularly evident in specific markets, which expanded strongly in 2006. Concretely, fuel exports, namely to the United States and Spain, fell markedly since early in the year, after having grown strongly in 2006 (Table 5.3). In turn, exports of motor vehicles and other transport equipment, in particular to Germany, decelerated considerably as of

Table 5.3

PORTUGUESE EXPORTS OF GOODS BY GROUPS OF PRODUCTS

Year-on-year rate of change and contributions; nominal values

	Weights 2006	Year-on-year rate of change (per cent)									Contribution to the year-on-year rate of change (p.p.)									
		2006	2006				2007	2007				2006	2006				2007	2007			
			Q1	Q2	Q3	Q4		Q1	Q2	Q3	Q4		Q1	Q2	Q3	Q4		Q1	Q2	Q3	Q4
Total	100.0	12.4	11.5	12.3	13.1	12.7	8.4	13.5	9.8	6.2	4.3	12.4	11.5	12.3	13.1	12.7	8.4	13.5	9.8	6.2	4.3
Classification by groups of products																					
Agriculture	3.7	8.6	7.7	8.5	9.9	8.2	15.2	12.6	8.2	17.9	21.5	0.3	0.3	0.3	0.4	0.3	0.6	0.5	0.3	0.6	0.8
Food	4.2	11.5	13.1	9.4	9.4	13.8	18.5	18.7	19.7	18.8	17.1	0.5	0.5	0.4	0.4	0.7	0.8	0.7	0.8	0.8	0.8
Mineral fuels	5.5	44.1	69.0	131.2	6.5	16.9	-13.2	-21.5	-24.1	1.1	-6.7	1.9	2.3	4.0	0.4	0.8	-0.7	-1.1	-1.5	0.1	-0.3
Chemicals	5.0	7.9	22.8	7.7	9.9	-7.3	9.6	0.6	10.7	7.7	21.7	0.4	1.2	0.4	0.5	-0.4	0.5	0.0	0.5	0.4	0.9
Plastic, rubber products	5.3	13.4	14.5	15.8	11.4	12.0	16.7	16.2	11.9	15.8	23.4	0.7	0.7	0.8	0.6	0.6	0.9	0.9	0.6	0.9	1.2
Leather, leather products	0.3	17.3	32.2	26.8	6.8	7.2	1.5	7.3	3.7	-1.7	-3.1	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Wood, cork	4.2	5.6	8.6	3.8	2.0	8.1	9.7	11.3	12.5	11.7	3.4	0.3	0.4	0.2	0.1	0.3	0.4	0.5	0.5	0.5	0.1
Cellulose pulp, paper	4.5	10.4	8.8	15.8	12.4	5.1	8.4	11.6	3.8	5.0	13.5	0.5	0.4	0.7	0.6	0.2	0.4	0.5	0.2	0.2	0.6
Textile products	4.7	4.6	2.7	0.7	9.0	6.8	3.4	7.5	3.0	4.4	-0.9	0.2	0.1	0.0	0.4	0.3	0.2	0.4	0.2	0.2	0.0
Clothing	7.2	-3.1	-1.2	-1.9	-5.8	-3.4	4.8	4.5	3.8	1.4	9.7	-0.3	-0.1	-0.2	-0.5	-0.3	0.3	0.4	0.3	0.1	0.6
Footwear	3.7	-1.2	-1.4	-9.7	4.4	1.2	3.8	2.3	5.8	3.1	4.7	-0.1	-0.1	-0.4	0.2	0.0	0.1	0.1	0.2	0.1	0.1
Minerals, ores	5.4	20.9	16.9	21.0	20.7	24.5	14.5	17.9	17.0	14.9	8.8	1.0	0.8	1.1	1.0	1.2	0.8	0.9	0.9	0.8	0.5
Common metals	8.4	26.6	30.8	24.7	29.3	22.2	14.1	20.0	18.8	10.1	7.4	2.0	2.3	1.9	2.1	1.7	1.2	1.7	1.6	0.8	0.6
Machinery, appliances	19.8	19.0	15.2	9.9	26.3	24.7	8.2	22.2	18.9	-1.0	-4.3	3.6	2.8	1.9	4.8	4.7	1.6	4.2	3.5	-0.2	-0.9
Motor vehicles, other transport equipment	13.2	6.2	-6.2	4.3	14.2	13.5	4.9	25.7	6.2	1.2	-10.3	0.9	-0.9	0.6	1.8	1.9	0.6	3.1	0.9	0.2	-1.4
Optical and precision instruments	0.9	10.7	16.7	5.0	5.7	15.6	6.1	6.8	12.3	3.8	2.1	0.1	0.1	0.0	0.1	0.1	0.1	0.1	0.1	0.0	0.0
Other products	4.1	7.6	12.2	8.4	3.8	5.9	16.7	14.3	16.4	19.1	17.1	0.3	0.5	0.4	0.2	0.2	0.7	0.6	0.7	0.7	0.7
Classification by broad economic categories																					
Intermediate goods	33.6	15.5	17.6	15.3	17.2	12.2	12.6	15.0	13.6	9.8	12.0	5.1	5.7	5.2	5.5	3.9	4.2	5.1	4.7	3.2	3.9
Capital goods	33.7	13.1	5.9	7.7	19.8	19.2	6.4	21.6	12.8	0.6	-6.8	4.4	2.0	2.7	6.3	6.5	2.1	6.9	4.2	0.2	-2.4
Consumer goods	26.6	3.8	4.8	2.2	3.7	4.6	10.8	9.3	9.7	10.6	13.5	1.1	1.4	0.6	1.1	1.3	2.9	2.6	2.5	2.9	3.5
Fuels	5.1	48.0	75.6	145.7	5.0	22.6	-16.8	-24.0	-29.2	0.7	-12.8	1.9	2.3	3.9	0.3	1.0	-0.9	-1.1	-1.7	0.0	-0.6
Other	1.1	-1.5	7.1	-3.0	-3.7	-5.8	-2.6	-1.4	5.3	-11.6	-1.4	0.0	0.1	0.0	-0.1	-0.1	0.0	0.0	0.1	-0.1	0.0
Memo: Total excluding fuels	94.9	10.9	9.5	8.7	13.5	12.2	9.7	15.3	12.2	6.5	5.2	10.5	9.2	8.4	12.8	11.7	9.2	14.6	11.5	6.2	4.9

Sources: *INE* (International Trade Statistics) and Banco de Portugal.

Table 5.4

PORTUGUESE EXPORTS OF GOODS BY GEOGRAPHICAL AREAS

Year-on-year rate of change and contributions; nominal values

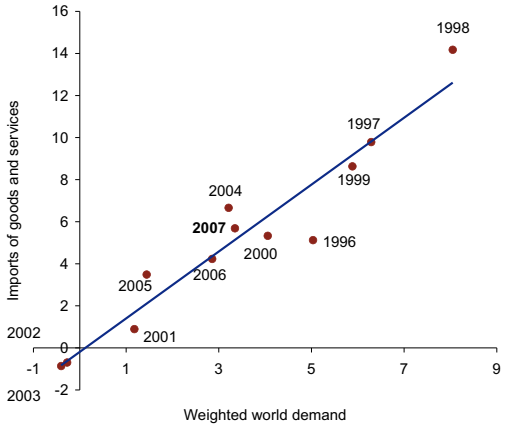
	Weights	Year-on-year rate of change (per cent)										Contribution to the year-on-year rate of change (p.p.)									
	2006	2006	2006				2007	2007				2006	2006				2007	2007			
			Q1	Q2	Q3	Q4		Q1	Q2	Q3	Q4		Q1	Q2	Q3	Q4		Q1	Q2	Q3	Q4
TOTAL	100.0	12.4	11.5	12.3	13.1	12.7	8.4	13.5	9.8	6.2	4.3	12.4	11.5	12.3	13.1	12.7	8.4	13.5	9.8	6.2	4.3
Intra-EU	77.4	8.7	7.9	7.8	8.4	10.7	7.3	12.1	8.4	6.1	2.8	6.9	6.5	6.3	6.6	8.3	5.7	9.6	6.5	4.6	2.1
of which:																					
Spain	27.4	14.0	17.2	15.6	11.1	12.3	11.7	14.8	9.8	13.0	9.5	3.8	4.6	4.3	3.0	3.3	3.2	4.2	2.8	3.4	2.6
Germany	13.1	21.6	4.9	22.0	26.1	34.4	8.0	28.9	9.7	2.6	-5.6	2.6	0.6	2.6	3.1	4.0	1.1	3.5	1.3	0.3	-0.8
France	12.4	1.8	1.4	-3.2	1.8	8.0	10.8	14.6	11.4	9.6	7.4	0.2	0.2	-0.5	0.2	1.0	1.3	2.0	1.4	1.1	0.9
United Kingdom	7.1	-7.9	-4.4	-11.8	-8.9	-6.2	-7.4	-7.4	-0.3	-8.8	-13.1	-0.7	-0.4	-1.0	-0.8	-0.5	-0.5	-0.5	0.0	-0.6	-0.9
Italy	4.1	5.3	9.9	9.0	11.4	-7.6	8.0	10.7	6.7	3.7	11.2	0.2	0.4	0.4	0.5	-0.3	0.3	0.5	0.3	0.1	0.4
Extra-EU	22.6	26.9	27.7	31.5	30.3	19.5	12.0	18.96	14.9	6.3	9.4	5.4	5.0	5.9	6.5	4.4	2.7	3.9	3.2	1.5	2.2
of which:																					
USA	6.1	27.4	17.5	43.1	24.6	24.2	-15.3	8.1	-17.4	-29.1	-17.1	1.5	0.9	2.2	1.5	1.3	-0.9	0.4	-1.1	-2.0	-1.0
PALOP	4.4	43.8	41.7	53.1	48.9	34.9	34.9	40.8	35.8	34.2	30.5	1.5	1.3	1.6	1.7	1.5	1.5	1.6	1.5	1.6	1.5

Sources: *INE* (International Trade Statistics) and Banco de Portugal.

Chart 5.16

IMPORTS OF GOODS AND SERVICES AND WEIGHTED WORLD DEMAND

Real rate of change, per cent



Sources: *INE* and Banco de Portugal.

the second quarter, following strong growth in 2006 especially associated to the start of production of a new model in a major company of the sector. Finally, exports of minerals grew less, which was more evident at the end of the year, following the strong dynamics recorded in 2006, in the wake of price increases in these commodities in international markets. Less buoyant exports as of the second quarter are also observed in other markets, in particular machinery and metallic and mineral products. In the case of machinery exports, which accounted for roughly 20 per cent of total exports in 2006, there is an almost broadly based deceleration by markets of destination, in particular to the United States.[41] By contrast, exports in traditional sectors such as clothing and footwear accelerated after the declines in 2006. An analysis by countries of destination also shows the continuing downward trend of exports to the United Kingdom (Table 5.4).

In 2007 imports grew above the 2006 level, as regards both goods and services. The acceleration in imports was observed against a background of strong growth in some domestic demand components with high import content, such as the consumption of durable goods and investment in machinery and transport equipment (Chart 5.16). According to the current estimates, imports of goods and services grew by 5.7 per cent (4.3 per cent in 2006), *i.e.* above estimates for domestic demand growth (and also for import-content weighted global demand growth), giving rise to a further increase in the import penetration rate in the Portuguese economy. The greater buoyancy of imports in real terms was accompanied by a strong deceleration in the respective deflator, largely reflecting a fall in the import prices of non-food durable goods and fuels in the year as a whole, although the latter grew considerably in the last quarter of the year.

Nominal imports decelerated from 8.1 to 6.9 per cent in 2007, largely reflecting developments in fuel imports, which fell by 2.9 per cent in the year as a whole (Table 5.5). Excluding fuels, nominal import growth stood at 8.6 per cent (7.2 per cent in 2006). The analysis by markets of origin makes it possible to prove the reinforcement of the Spanish market's weight in the structure of Portuguese imports,

(41) Following strong growth in 2006, machinery exports to Singapore decelerated markedly, largely offset by a considerable increase in this type of exports to Malaysia. This suggests a possible replacement phenomenon between these two markets in 2007.

Table 5.5

PORTUGUESE IMPORTS OF GOODS BY GROUPS OF PRODUCTS
Year-on-year rate of change and contributions; nominal values

	Weights 2006	Year-on-year rate of change (per cent)			Contribution to the year-on-year rate of change (p.p.)		
		2005	2006	2007	2005	2006	2007
Total	100.0	5.5	8.1	6.9	5.5	8.1	6.9
Classification by groups of products							
Agriculture	8.4	3.0	9.2	14.7	0.3	0.8	1.2
Food	3.4	-2.3	5.5	13.1	-0.1	0.2	0.4
Mineral fuels	15.3	43.3	12.0	-2.2	4.7	1.8	-0.3
Chemicals	9.1	3.3	10.7	2.2	0.3	1.0	0.2
Plastic, rubber products	4.6	4.6	6.1	14.3	0.2	0.3	0.7
Leather, leather products	0.9	-4.7	2.5	16.3	-0.1	0.0	0.2
Wood, cork	1.2	3.7	-1.8	18.1	0.1	0.0	0.2
Cellulose pulp, paper	2.4	0.3	5.0	6.3	0.0	0.1	0.2
Textile products	3.3	-9.5	3.1	0.3	-0.4	0.1	0.0
Clothing	2.5	2.7	3.6	15.9	0.1	0.1	0.4
Footwear	0.8	2.1	7.0	14.2	0.0	0.1	0.1
Minerals, ores	1.7	11.9	-2.0	4.1	0.2	0.0	0.1
Common metals	9.6	3.1	23.7	10.1	0.3	2.0	1.0
Machinery, appliances	19.9	0.9	7.9	6.4	0.2	1.6	1.3
Motor vehicles, other transport equipment	11.7	-4.3	1.0	9.4	-0.6	0.1	1.1
Optical and precision instruments	2.1	5.0	3.8	4.4	0.1	0.1	0.1
Other products	3.1	5.3	-0.4	4.1	0.2	0.0	0.1
Classification by broad economic categories							
Intermediate goods	29.9	1.1	9.6	10.6	0.3	2.8	3.2
Capital goods	31.7	-0.2	4.6	6.6	-0.1	1.5	2.1
Consumer goods	23.1	1.0	8.5	8.6	0.2	1.9	2.0
Fuels	14.9	40.8	13.2	-2.9	4.3	1.9	-0.4
Other	0.4	3021.4	-20.5	14.7	0.6	-0.1	0.1
Memo: Total excluding fuels	85.1	1.2	7.2	8.6	1.1	6.2	7.3

Sources: *INE* (International Trade Statistics) and Banco de Portugal.

stress being also laid on the very significant increase in imports from France and Sweden. By contrast, imports of goods from the United Kingdom, Germany and Italy decelerated markedly.

6. PRICES

Inflation, measured by the annual average rate of change in the HICP, dropped from 3.0 per cent in 2006, to 2.4 per cent in 2007 (Table 6.1). However, in the last months of the year, prices showed a marked upward trend, driven by the acceleration in the prices of energy and processed food excluding tobacco (Chart 6.1). The average rate of change of euro area HICP also declined, albeit less markedly. This led to the narrowing of the inflation differential to 0.3 p.p. in 2007 (Chart 6.2). The decrease of the inflation differential was common to all major aggregates, with the exception of energy (Chart 6.3). The price increase in 2007 was similar to that projected by Banco de Portugal at the beginning of the year.[42] However, developments in food prices fell short of the projection, in particular in the case of tobacco, while the rate of change in industrial goods prices was higher than projected, namely in the case of energy.

(42) See Banco de Portugal, *Economic Bulletin-Winter 2006*.

Table 6.1

HICP – MAIN CATEGORIES AND AGGREGATES
Rate of change, per cent

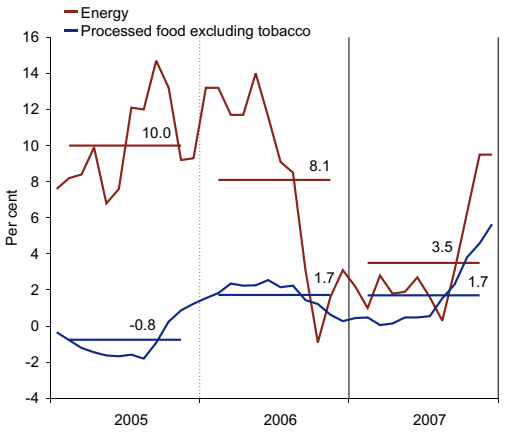
	Weights 2006	2002	2003	2004	2005	2006	2007
Total	100.0	3.7	3.3	2.5	2.1	3.0	2.4
Total excluding energy	90.8	3.9	3.1	2.3	1.4	2.5	2.3
Total excluding unprocessed food and energy	79.4	4.5	3.3	2.6	1.7	2.4	2.2
Goods	62.3	2.4	2.4	1.6	1.9	3.2	2.2
Food	21.9	1.9	2.6	1.4	0.1	3.6	2.8
Unprocessed	11.3	0.2	2.1	0.0	-0.5	3.2	3.0
Processed	10.6	3.8	3.1	2.8	0.8	4.1	2.6
Industrial	40.4	2.7	2.4	1.8	2.8	3.0	1.9
Non-energy	31.1	3.1	1.8	0.8	1.0	1.5	1.4
Energy	9.2	1.2	4.9	5.4	10.0	8.1	3.5
Services	37.7	5.9	4.6	3.9	2.5	2.7	2.8
Memo:							
CPI [a]	-	3.6	3.3	2.4	2.3	3.1	2.5
Euro area HICP	-	2.2	2.1	2.1	2.2	2.2	2.1

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

The reduction of the annual average inflation rate reflects, to a large extent, the strong deceleration in energy prices, due to the decline in the annual growth rate of oil prices in international markets, mirroring a base effect associated with the significant rise in oil prices in 2006 (Table 6.2). In addition, there was a broadly-based deceleration, in annual average terms, in the international prices of non-energy commodities, with the exception of food commodities, as well as in import prices of non-energy goods.

Chart 6.1

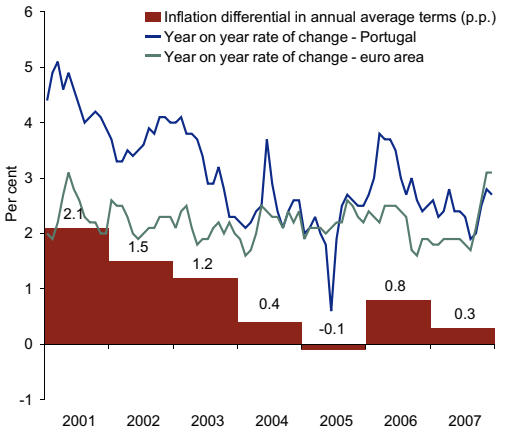
HICP - ENERGY AND PROCESSED FOOD EXCLUDING TOBACCO
Year-on-year and average rates of change



Sources: Eurostat and Banco de Portugal calculations.

Chart 6.2

INFLATION RATE: PORTUGAL AND THE EURO AREA
Year-on year rate of change and differential

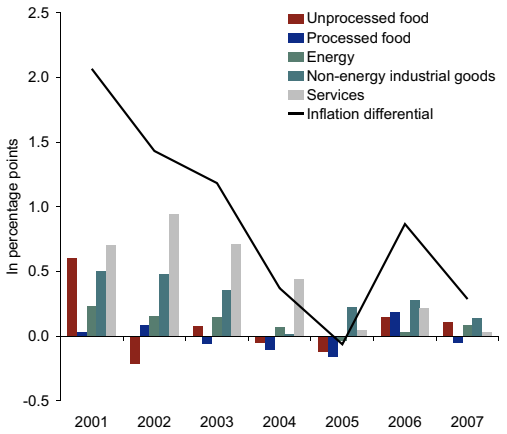


Source: Eurostat.

Chart 6.3

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.

Estimates by Banco de Portugal, on the basis of data provided by *INE*, point to an increase of 1.5 per cent in the deflator of imports excluding energy, accounting for a 0.7 p.p. decline vis-à-vis 2006. Developments in import prices benefited from the euro appreciation, which after slowing down in the middle of the year, accelerated again in the last months of 2007.

Lower unit labour costs (ULC) growth in 2007, namely in the private sector, seems to have also contributed to the reduction of inflation (Table 6.3). Banco de Portugal estimates point to a decline in the

Table 6.2

PORTUGAL – MAIN INTERNATIONAL PRICE INDICATORS

Rate of change, per cent

	2002	2003	2004	2005	2006	2007
Goods Import prices [a]						
Total	-2.4	-2.2	2.2	3.1	4.8	1.2
Total excluding fuels	-1.8	-2.9	0.8	-0.6	2.2	1.5
Consumer goods	-0.6	-2.9	-1.6	-2.7	1.6	0.3
International commodity prices						
Oil prices (Brent Blend), EUR	-4.9	-5.0	21.4	45.0	19.0	0.4
Non-energy commodity prices, EUR	-0.9	-4.5	10.8	9.4	24.8	9.2
Memo:						
Nominal effective exchange rate index for Portugal [b]	0.6	2.6	0.6	-0.2	0.2	0.8

Sources: Eurostat, HWWI, *INE*, Thomson Financial Datastream and Banco de Portugal.
Notes: (a) Banco de Portugal calculations 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 A. C. Gouveia and C. Coimbra, (2004) "*New effective exchange rate index for the Portuguese economy*", Banco de Portugal, *Economic Bulletin-December*.

Table 6.3

WAGES AND PRODUCTIVITY IN PORTUGAL AND IN THE EURO AREA
Annual average rate of change, per cent

	2002	2003	2004	2005	2006	2007
Portugal [a]						
Total economy						
Compensation per employee	3.0	2.8	2.4	3.9	2.8	3.4
Productivity	0.3	0.3	1.7	1.2	0.5	1.7
Unit labour costs	2.7	2.5	0.7	2.7	2.3	1.7
Private sector						
Compensation per employee	2.7	3.1	3.0	4.3	3.3	3.8
Productivity	0.3	0.2	2.0	1.4	0.4	1.9
Unit labour costs	2.4	2.9	1.0	2.8	2.9	1.9
Euro area [b]						
Total economy						
Compensation per employee	2.6	2.3	2.1	1.8	2.2	2.0
Productivity	0.2	0.3	1.0	0.8	1.4	0.8
Unit labour costs	2.3	1.9	1.1	0.9	0.9	1.2

Sources: ECB, *INE* and Banco de Portugal.
Notes: (a) Compensation per employee excludes government transfers to *Caixa Geral de Aposentações* (civil servants' pension scheme). (b) Figures for 2007 are estimates up to the third quarter.

growth rate of ULC in the private sector by 1.0 p.p., determined by an increase in productivity, as wages remained highly resilient to the deceleration, despite less favourable labour market conditions (see "*Section 4 Supply*"). By contrast, the deceleration of productivity in the euro area was higher than that of wages, leading to a rise in ULC growth. Thus, and like in the previous year, the positive differential between ULC growth in Portugal and in the euro area narrowed in line with the reduction of the inflation differential (Charts 6.4 and 6.5).

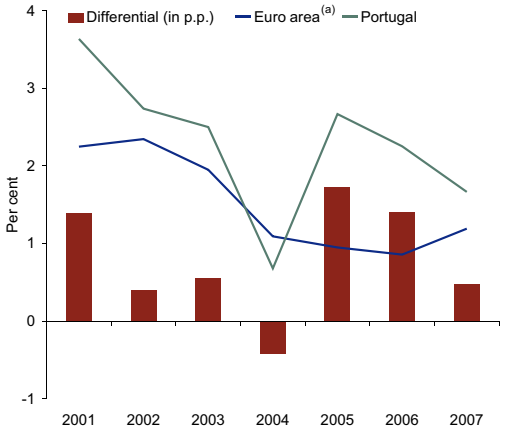
In the last months of 2007, the year-on-year rates of change in the HICP recorded an upward trend, which continued in the first months of 2008, contrasting with the declining trend previously seen. This pattern is related to an acceleration in the prices of energy and processed food excluding tobacco and emerged on the back of significant rises in the prices of food and energy commodities in international markets since the end of 2007 (see "*Section 2 Major international economic developments*"). Although developments in processed food in intra-annual terms were similar to those of the aggregate excluding tobacco, they were decisively conditioned by developments in the price of this good, which decelerated from 14.1 per cent in 2006 to 6.3 per cent in 2007. The deceleration in the price of tobacco, which contributed to the evolution of the inflation differential of processed food, is associated with a rise in the tobacco tax in 2007 lower than in 2006 and with the anticipation of the introduction of this good in the distribution circuits at the end of 2006. Thus, the impact of this tax rise on tobacco prices was postponed until April 2007.

Regarding other fiscal policy measures with an impact on inflation, car prices fell by 0.3 per cent in 2007 (2.7 per cent in 2006), which may be associated with the enforcement on July 1st 2007 of changes in vehicle taxation. It should also be noted that the increase in fees already charged (and the introduction of new fees) on services provided by the national health service led to an increase in the prices of services provided by hospitals by 59.3 per cent, accounting for about 0,2 p.p. of the annual change in total HICP.

Chart 6.4

UNIT LABOUR COSTS IN PORTUGAL AND IN THE EURO AREA

Rates of change and differential

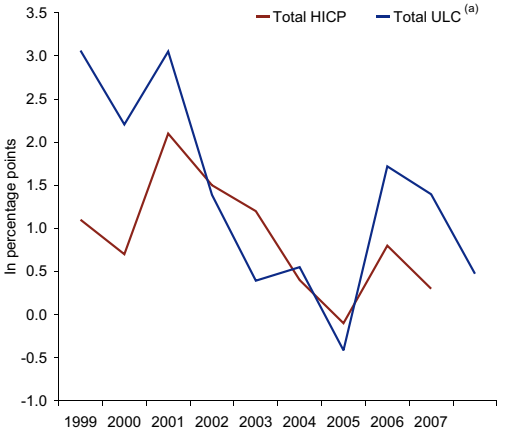


Sources: ECB, *INE* and Banco de Portugal.
Note: (a) The figure for 2007 is an estimate up to the third quarter.

Chart 6.5

HICP AND ULC DIFFERENTIALS BETWEEN PORTUGAL AND THE EURO AREA

Differentials between annual rates of change



Sources: ECB, *INE* and Banco de Portugal.
Note: (a) The unit labour costs series is lagged one period.

7. BALANCE OF PAYMENTS

Net external borrowing requirements of the Portuguese economy, as a percentage of GDP, declined in 2007. This reflected the stabilisation of investment and domestic saving rates and the increase in capital transfers from abroad, which was mainly determined by greater transfers from the European Union, namely associated with the implementation of projects approved under the third Community Support Framework. In the same vein, the combined current and capital account deficit declined from 9.3 per cent of GDP in 2006 to 8.5 per cent of GDP in 2007 (Table 7.1 and Chart 7.1). The current account deficit fell slightly from 10.1 to 9.8 per cent of GDP, while the capital account surplus increased from 0.8 to 1.3 per cent of GDP (Chart 7.2).

The slight decline in the current account deficit, as a percentage of GDP, reflected favourable developments in the goods and services balance, which more than offset the deterioration of the income deficit. The goods and services deficit decreased, reflecting the stabilisation of the goods deficit and the increase in the services surplus, which illustrates growth of net exports of tourism, transportation services and other corporate services (namely technical and professional services). In turn, the income deficit widened further from 4.1 to 4.5 per cent of GDP, largely reflecting the deterioration of the credit and loan income balance, which is in line with the continued deterioration of the Portuguese international investment position and the increase in financing costs.

The breakdown of changes in the goods and services account balance indicates that the smaller deficit in 2007 was the result of the combination of a positive volume effect, given that the volume of exports continued to grow at a faster pace than imports, and an also positive effect in terms of trade, more than offsetting the negative impact associated with the price effect (Chart 7.3). Although declining significantly from the previous year, the volume effect continued to be positive. This resulted, on the one hand, from the higher positive volume effect of the services account. On the other hand, the volume effect of the goods account declined to a negative value in 2007, reflecting a deceleration in exports, which was particularly sharp in the case of energy goods (Chart 7.4).

Table 7.1

CURRENT AND CAPITAL ACCOUNTS
Balance as a percentage of GDP

	2002	2003	2004	2005	2006	2007
Current account	-8.1	-6.1	-7.6	-9.5	-10.1	-9.8
Goods and services	-7.9	-6.5	-7.5	-8.4	-7.6	-6.9
Goods	-10.4	-9.1	-10.3	-11.0	-10.7	-10.7
Services	2.5	2.6	2.8	2.6	3.1	3.8
of which:						
Travel and tourism	2.8	2.7	2.8	2.5	2.6	2.8
Income	-2.3	-1.7	-2.1	-2.6	-4.1	-4.5
Current transfers	2.2	2.1	2.0	1.5	1.6	1.6
of which:						
Emigrants/immigrants remittances	1.8	1.4	1.4	1.2	1.2	1.2
Capital account	1.5	1.9	1.5	1.2	0.8	1.3
Memo:						
Current transfers account + capital account	3.7	4.0	3.5	2.7	2.4	2.9
Current account + capital account	-6.6	-4.2	-6.1	-8.3	-9.3	-8.5

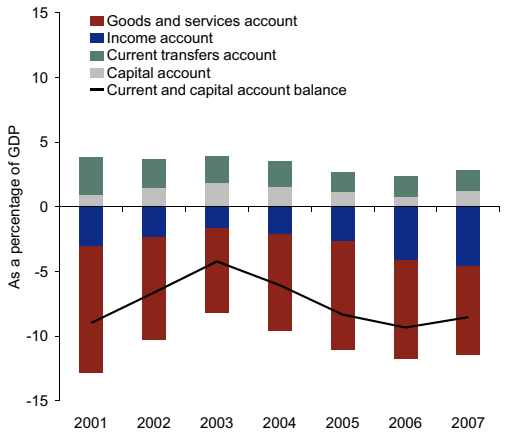
Sources: *INE* and Banco de Portugal.

Export and import prices also decelerated, giving rise to a negative price effect. However, the marked deceleration in import prices in annual average terms, namely fuel prices, led to gains in terms of trade, which was common to the energy and non-energy components of the account. In nominal terms, net transactions of energy goods between Portugal and abroad were relatively stable, and their deficit continued to be higher than the non-energy component of the goods and services account (Chart 7.5).

In 2007 the financial account continued to reflect a persistently high deficit between domestic savings and investment. In fact, over the year, net inflows stood at 9.7 per cent of GDP (Table 7.2). The significant recourse to external savings to meet resident sector borrowing requirements was behind the

Chart 7.1

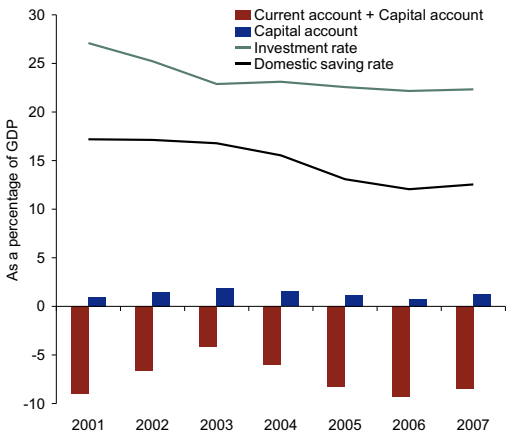
CURRENT AND CAPITAL ACCOUNT



Sources: *INE* and Banco de Portugal.

Chart 7.2

FINANCING CAPACITY OF THE ECONOMY

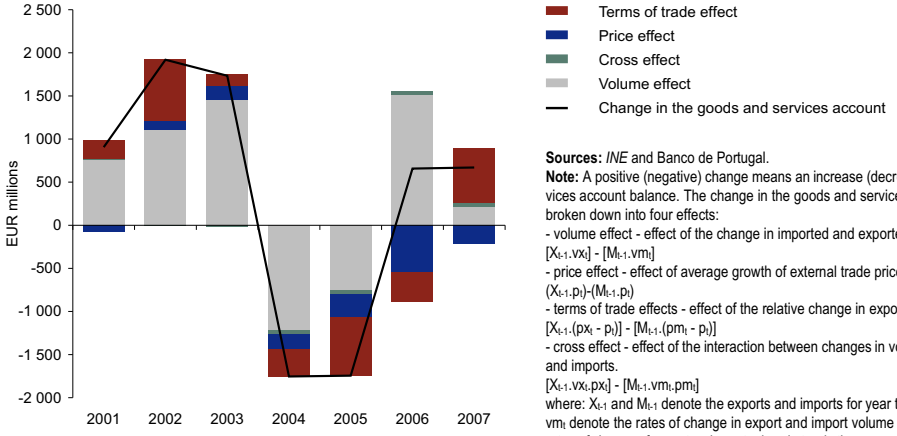


Sources: *INE* and Banco de Portugal.

Chart 7.3

BREAKDOWN OF THE GOODS AND SERVICES ACCOUNT BALANCE

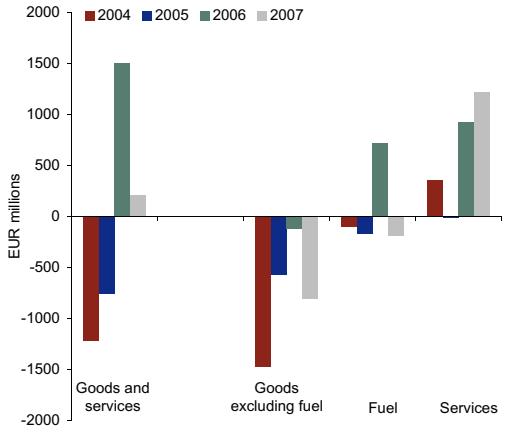
Breakdown into volume, price and terms of trade effects



Sources: *INE* and Banco de Portugal.
Note: A positive (negative) change means an increase (decrease) in the goods and services account balance. The change in the goods and services account balance may be broken down into four effects:
- volume effect - effect of the change in imported and exported volumes;
$[X_{t-1}.vx_t] - [M_{t-1}.vm_t]$
- price effect - effect of average growth of external trade prices;
$(X_{t-1}.p_t)-(M_{t-1}.p_t)$
- terms of trade effects - effect of the relative change in export and import prices;
$[X_{t-1}.(px_t - p_t)] - [M_{t-1}.(pm_t - p_t)]$
- cross effect - effect of the interaction between changes in volume and prices of exports and imports.
$[X_{t-1}.vx_t.px_t] - [M_{t-1}.vm_t.pm_t]$
where: X_{t-1} and M_{t-1} denote the exports and imports for year t-1 at current prices; vx_t and vm_t denote the rates of change in export and import volume in t; px_t and pm_t denote the rates of change of export an import prices in t; p_t is the average rate of change of external trade prices in year t $((px_t + pm_t)/2)$.

Chart 7.4

BREAKDOWN OF THE VOLUME EFFECT OF THE CHANGE IN THE GOODS AND SERVICES BALANCE ACCOUNT

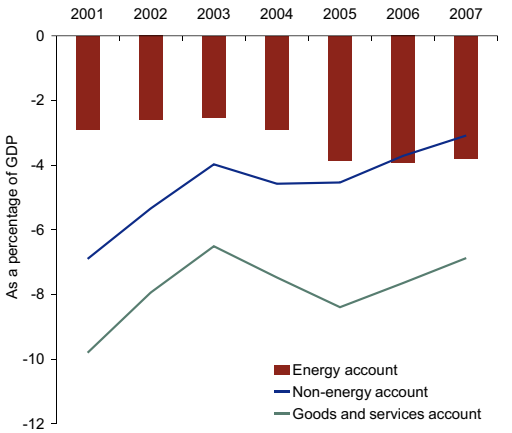


Sources: *INE* and Banco de Portugal.
Note: A positive (negative) change means an increase (decrease) in the goods and services account balance. For a description of the methodology used, see note to chart 7.3.

Chart 7.5

GOODS AND SERVICES ACCOUNT

Breakdown into energy and non-energy accounts



Sources: *INE* and Banco de Portugal.

gradual movement of the international investment position of Portuguese goods and services to debt territory. This resulted in successive increases in income paid to foreign investors, which were reflected in higher income deficit.

In 2007 external financing of the economy continued to be mostly intermediated by the resident banking system. However, this type of financing diverged from previous years. In fact, over the past few years, these funds were largely obtained through the issuance of medium and long-term securities by subsidiaries and branches abroad, which subsequently channelled funds to their parent companies in Portugal. These operations were reflected in the financial account under “other investment”. In 2007 securities were directly issued by parent companies, and were mostly purchased by non-residents.

Table 7.2

FINANCIAL ACCOUNT
As a percentage of GDP

	Jan-Dec 2006			Jan-Dec 2007		
	Change in liabilities	Change in assets	Net change	Change in liabilities	Change in assets	Net change
Current and capital accounts			-9.3			-8.5
Financial account	21.3	-12.3	9.0	18.8	-9.1	9.7
Direct investment	5.8	-3.6	2.2	2.5	-2.8	-0.3
excluding Madeira and Santa Maria (Azores) off-shores	*4.2*	*-2.7*	*1.5*	*2.5*	*-2.6*	*-0.1*
Portfolio investment	6.7	-5.1	1.7	11.2	-5.4	5.8
Financial derivatives	-3.6	3.5	-0.1	-4.7	5.1	0.4
Other investment	12.4	-8.4	4.0	9.8	-6.4	3.3
Reserve assets		1.2	1.2		0.4	0.4
By institutional sector of resident investor:						
Monetary authorities	-3.9	0.6	-3.3	-0.3	0.0	-0.3
Portfolio investment	0.0	0.1	0.1	0.0	0.6	0.6
Financial derivatives	0.0	0.0	0.0	0.0	0.0	0.0
Other investment	-3.9	-0.7	-4.6	-0.3	-1.1	-1.4
Reserve assets		1.2	1.2		0.4	0.4
General government	1.5	0.6	2.1	1.9	0.8	2.7
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	2.2	-0.2	2.0	1.8	-0.2	1.7
Financial derivatives	-0.8	0.7	-0.1	-0.5	0.6	0.1
Other investment	0.0	0.1	0.1	0.6	0.3	0.9
Other monetary financial institutions	15.4	-2.9	12.5	13.9	-3.9	10.0
Direct investment	0.2	-0.2	0.0	0.3	-0.3	0.0
excluding Madeira and Santa Maria (Azores) off-shores	*0.2*	*-0.2*	*0.0*	*0.3*	*-0.3*	*0.0*
Portfolio investment	0.9	2.1	3.0	7.5	-2.8	4.7
Financial derivatives	-2.0	1.8	-0.2	-3.1	3.3	0.2
Other investment	16.2	-6.5	9.6	9.2	-4.2	5.1
Non-monetary financial institutions	3.1	-6.1	-3.0	2.9	-1.7	1.2
Direct investment	1.1	-0.9	0.2	0.9	-0.1	0.8
excluding Madeira and Santa Maria (Azores) off-shores	*0.8*	*-0.9*	*-0.1*	*0.9*	*-0.1*	*0.8*
Portfolio investment	2.4	-6.5	-4.1	2.5	-2.0	0.5
Financial derivatives	-0.7	0.7	0.0	-0.8	0.8	0.0
Other investment	0.3	0.6	0.8	0.3	-0.4	-0.1
Non-financial corporations and households	5.3	-4.6	0.7	0.4	-4.3	-3.9
Direct investment	4.5	-2.5	2.0	1.3	-2.4	-1.1
excluding Madeira and Santa Maria (Azores) off-shores	*3.2*	*-1.6*	*1.6*	*1.3*	*-2.3*	*-1.0*
Portfolio investment	1.2	-0.6	0.6	-0.6	-1.2	-1.8
Non-financial corporations	1.2	0.4	1.6	-0.6	-0.3	-0.9
Households	0.0	-0.9	-0.9	0.0	-0.9	-0.9
Financial derivatives	-0.2	0.2	0.0	-0.3	0.3	0.1
Other investment	-0.2	-1.8	-2.0	-0.1	-1.0	-1.1
Errors and omissions			0.3			-1.2

Sources: *INE* and Banco de Portugal.
Note: 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.

These operations are recorded in the financial account under "portfolio investment" (as changes in liabilities).[43]

In view of the favourable financing conditions in the first half of the year, banks recorded historically high issuance volumes during this period, possibly financing in the first half of the year a significant share of borrowing requirements expected for 2007. In the second half of the year, net issues declined, although remaining at relatively high levels, in an environment of unfavourable international financial market conditions. In this context, the Portuguese banking system, in particular domestic banks, intensified recourse to financing through deposits and loans by non-resident monetary institutions (recorded under "other investment" as changes in liabilities). Moreover, of total net investment flows by non-residents in securities issued by banks, around half corresponds to mortgage bonds.

With regard to portfolio investment, net financing flows of non-monetary financial institutions were reversed (net inflows of 1.2 per cent of GDP in 2007, compared with net outflows of 3.0 per cent of GDP in 2006). This was mainly due to lower net purchases of securities issued by non-residents. As in previous years, purchases, mainly of bonds and other long-term debt securities, continued to be largely made by insurance companies and pension funds. In turn, investment funds saw net flows of disinvestment abroad in 2007, mainly following the onset of international market instability.

In 2007 net direct inflows to general government were higher than in the previous year, despite lower general government borrowing requirements. This increase reflected greater recourse to short-term loans abroad and disinvestment in long-term deposits abroad, given that net purchases of government debt securities by non-residents were lower.

Direct investment in 2007 corresponded to net outflows of 0.3 per cent of GDP, compared with net inflows of 2.2 per cent of GDP in the previous year. This mainly reflected a strong decrease in foreign direct investment in Portugal as a percentage of GDP, while Portuguese direct investment abroad was virtually stable as a percentage of GDP. As in previous years, most direct investment in the financial account was mainly associated with holding investments. In contrast to previous years, the use of Portuguese offshores by non-residents to invest in third countries was very low.

8. CONCLUSION

The economic and financial integration of the Portuguese economy, in the context of an intensified globalisation process and of the participation in the euro area, led to greater economy efficiency, due to a wide choice set available to economic agents, an overall increase in competition and a greater sharing and diversification of external risk. This process represented a true regime change, characterised by a close link between domestic monetary conditions and external macroeconomic variables, a permanent decline in financing costs, an access to external financing by a wider group of households and companies and a lower volatility in the main financial variables. This structural dynamics strengthened the ability of the Portuguese economy to smoothen the impact of idiosyncratic and temporary shocks on income and wealth, and made it possible to sustain a significant disparity between domestic demand and supply.

For a small open economy such as the Portuguese economy, with a strong integration with the rest of the world, international economic developments have direct repercussions on economic activity. The

(43) This was associated, on the one hand, with the amendment of the Portuguese legislation on the issuance of mortgage bonds in 2006. This amendment facilitated the issue of mortgage-backed securities that constitute autonomous property, although they remain on the bank's balance sheet, allowing banks to obtain financing at lower cost, compared with other types of debt securities, such as the issue of bonds through EMTN (Euro-Medium Term Notes) programmes. On the other hand, the Eurosystem ceased to accept as collateral in monetary policy operations securities of banks issued off-shore after 1 January 2007.

impact of these external shocks naturally depends on the resilience and adjustment capacity of the economy, in particular the macroeconomic policies pursued and the structural functioning of markets. In this context a stability-oriented macroeconomic framework plays a central role and, within the euro area, the Stability and Growth Pact is fundamental to ensure macroeconomic stability. The progress achieved over the past two years in fulfilling the fiscal consolidation commitments is particularly relevant, with a deficit below 3 per cent of GDP being attained earlier than expected. The efforts towards reducing the structural fiscal deficit must proceed, in order to fully comply with the commitments in the context of the Stability and Growth Pact. In particular, the fulfilment of the medium-term objective of a 0.5 per cent structural deficit in 2010 is fundamental to foster a balanced and sustainable fiscal position. This would decrease economic agent uncertainty and allow the full operation of automatic stabilisers. With regard to the functioning of markets, it should be highlighted that rigidity features persist in employment and unemployment developments, contributing to the lack of resource mobility and the creation of polarization in the labour market. These elements imply, on the one hand, a lower capacity to efficiently reallocate human resources between firms and economic sectors and, on the other hand, fewer incentives to agents in terms of training and education. Finally, incentives to quality investment in human capital must be strengthened, namely regarding the beginning of each individual life-cycle. This investment is essential to foster greater economic growth over medium and long-term horizons, also contributing to a better income distribution in the economy.

In 2007 the Portuguese economy continued to recover, with a significant acceleration in GDP to levels above those recorded in the past few years. However, in the second half of 2007 and early 2008 several interlinked adverse external shocks occurred simultaneously, with important macroeconomic implications at a global level: the turbulence in international financial markets, which led to an increase in the perception and risk aversion by investors, in the financing costs of the private sector and in the money, bond and equity market volatility; the strong increases in oil prices and the significant acceleration in food commodity prices in international markets, which gave rise to significant inflationary pressures at a global level; and, the marked deceleration in the US economy, in the context of a strong correction in the real estate market and the occurrence of the abovementioned shocks, which was coupled with a more subdued deceleration in most other advanced economies and with less buoyant global trade flows. The combination of these shocks will have an unfavourable impact on the recovery path of the Portuguese economy, affecting the external demand for Portuguese goods and services, the intertemporal consumption and investment decisions of economic agents and the evolution of their solvability conditions. There persists, however, a particularly high level of uncertainty regarding the degree of deterioration of the global macroeconomic framework - namely given the accelerator effect stemming from the interaction between economic activity and financial markets - as well as the corresponding impact on the Portuguese economy.

The cut-off date for data was late March 2008, except the IMF World Economic Outlook and Monetary and Financial Statistics.

Box 1: Fiscal prospects

The December 2007 Stability Programme updated the Portuguese medium-term fiscal policy guidelines, in the context of the Stability and Growth Pact. The 2008 State Budget establishes the fiscal programme for the current year. Both documents are based on data published last autumn. The recent release of the general government deficit in 2007, in the framework of the excessive deficit procedure, points to 2.6 per cent of GDP, clearly below the official target, i.e. 3 per cent. This was followed by the revision of the target for the deficit in 2008 from 2.4 to 2.2 per cent of GDP, and the announcement of the cut of the standard rate of VAT from 21 to 20 per cent, effective as of 1 July 2008. The new data on the 2007 fiscal outcome, compiled on a national accounts basis, and the above-mentioned policy decisions warrant a reassessment of the 2008 State Budget and the Stability Programme, with a view to ensuring a continued fiscal consolidation process and the fulfilment of the medium-term objective by 2010.[1]

The Stability Programme sent to the European Commission in December 2007 appears as a natural development of the previous updates, since June 2005. Essentially, the document maintains the medium-term fiscal objectives, and their pursuit is based on the same range of policies. The main news are the confirmation that the general government deficit was equal to or below 3 per cent of GDP in 2007, 1 year prior to the deadline established in the excessive deficit procedure, and the revised assessment of Portuguese public finance sustainability, in the wake of the public pension systems reform.

The main fiscal indicators considered in this Programme update are presented in Table 1. It is worth mentioning the prospect of fulfilment of the medium-term objective for the structural balance and debt developments leading to a ratio to GDP below 60 per cent, as from 2010. The lower deficit will mainly result from smaller expenditure as a percentage of GDP (-2.1 p.p.), with a major contribution from staff costs. The document also envisages a higher total revenue-to-GDP ratio (+0.7 p.p.), but not as a result of developments in tax receipts, which as a whole are expected to remain stable as a percentage of GDP. These general features are shared by the 2008 State Budget. In their analysis of the Stability Programme, the Commission and the Council assessed favourably the general stance, although pointing out that the pursuit of its objectives requires effective implementation of the announced measures and may entail additional efforts, in particular if the risk of economic growth falling short of projections materialises.

The analysis of sustainability of Portuguese public finances presented in the 2007 December Stability Programme mirrors the new projections for ageing-related expenditure, prepared after the reform of public pension systems. These projections and the indicators resulting resulting from them were examined and approved by the Ageing Working Group (AWG) and the Economic Policy Committee in October 2007. As shown in Table 2, the new rules concerning the pension systems have significantly reduced changes in the pension expenditure-to-GDP ratio projected for Portugal, according to the base scenario of the AWG, from 9.3 to 5.0 p.p. between 2005 and 2050.[2] *Accordingly, sustainability indicators S1 and S2, which are used by the European Commission, have improved considerably, allowing the reclassification of Portugal from the group of high-risk countries, to the medium-risk group.*

In 2007, as in 2006, deficit reduction plans were largely exceeded and, as a result, the credibility of the 2008 State Budget and the Stability Programme were enhanced. However, the macroeconomic scenario is particularly favourable when compared with those disclosed by other national or international institutions. In turn, risks are higher than usual given the great uncertainty surrounding global economic developments in the near future.

On the other hand, in 2007 a significant part of the rates of change in the main expenditure items may have been due to factors that over the next few years will cease to dampen expenditure growth, at least to the same extent. The freezing of automatic progressions in careers, the limitation of early retirements, changes in unemployment benefits procedures and the reduction in the cofinancing of medicines are some of the measures that permanently affect the expenditure level, but only transitorily have an impact on its rate of change. Moreover, although the de-

(1) *In the framework of the Stability and Growth Pact reform, Member States shall define a medium-term objective for the balance adjusted for the cycle and temporary measures (structural balance) in Stability/Convergence Programme updates. This country-specific medium-term objective shall take into account the current government debt ratio and potential output growth, also ensuring a safety margin so that the deficit does not exceed the benchmark under adverse cyclical conditions.*

(2) *The latter figure is based on the assumption that the retirement age will be maintained, in a context marked by the introduction of the sustainability factor, which is a less favourable hypothesis in terms of pension expenditure. This compares with the ceiling for the increase in this item according to Pinheiro and Cunha, "MISS: A model for assessing the sustainability of public social security in Portugal", Banco de Portugal, Occasional Paper No 2, 2007.*

Table 1

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

	2007	2008	2009	2010	2011
Overall general government balance	-3.0	-2.4	-1.5	-0.4	-0.2
Total revenue	42.4	42.7	42.8	43.1	43.1
Total expenditure	45.4	45.1	44.4	43.5	43.3
Primary balance	-0.1	0.5	1.3	2.2	2.5
Overall structural balance	-2.1	-1.6	-1.1	-0.4	-0.4
Change	*0.7*	*0.5*	*0.5*	*0.7*	*0.0*
Primary structural balance	0.8	1.3	1.7	2.3	2.2
Change	*0.8*	*0.5*	*0.4*	*0.6*	*-0.1*
Public debt	64.4	64.1	62.5	59.7	56.7
Memo:					
Real GDP rate of change	1.8	2.2	2.8	3.0	3.0

Source: December 2007 update of the Stability Programme.

Table 2

PROJECTIONS FOR PUBLIC PENSION EXPENDITURE

Changes in pension expenditure in the period 2005-2050 (% of GDP)	
2006 AWG Report [(a)]	9.3
2006 AWG update = Dec. 2007 SGP [(b)]	5.0
Pinheiro and Cunha (2007)	
i) Postponement of the retirement age	1.0
ii) Maintenance of the retirement age	4.4
Sustainability indicators ('medium-term objective scenario[(c)])	
S1 (permanent change in the primary balance required to ensure a 60 per cent debt ratio in 2050)	
Prior to reform [(d)]	2.5
After reform (Dec. 2007 SGP) [(b)]	0.8
S2 (permanent change in the primary balance required to ensure the intertemporal budget constraint)	
Prior to reform [(d)]	5.2
After reform (Dec. 2007 SGP) [(b)]	2.7

Notes: (a) Economic Policy Committee and European Commission, "The impact of ageing on public expenditure: projections for the EU25 Member States on pensions, health care, long-term care, education and unemployment transfers (2004-2050)", European Economy Special Report No 1, 2006. (b) December 2007 update of the Stability Programme. (c) This scenario is based on the assumption that the medium-term objective will be fulfilled by 2010. (d) European Commission, "The long-term sustainability of public finances in the European Union", European Economy No 4, 2006.

cline in the number of civil servants resulting from the retirement and hiring policy continued to help containing expenditure expansion, some uncertainty persists regarding the effects of the remaining measures of the reform of public administration. Turning to revenue, additional gains concerning the collection of taxes and contributions due in each year are likely to have a more moderate evolution, and the recovery of tax arrears may decrease, mitigating

the favourable impact of efficiency gains in tax collection over the past few years. As a whole, the quantitative relevance of these factors is surrounded by some uncertainty, warranting a careful monitoring of developments in public finances throughout the year and the possible adoption of measures aimed at ensuring the convergence towards the medium-term objective of a 0.5 per cent structural deficit in 2010.

ARTICLES

Economic Effects of Globalisation: Lessons From Trade Models

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Corporations: an Application of Data Envelopment Analysis

ECONOMIC EFFECTS OF GLOBALISATION: LESSONS FROM TRADE MODELS*

*Cristina Manteu***[1]

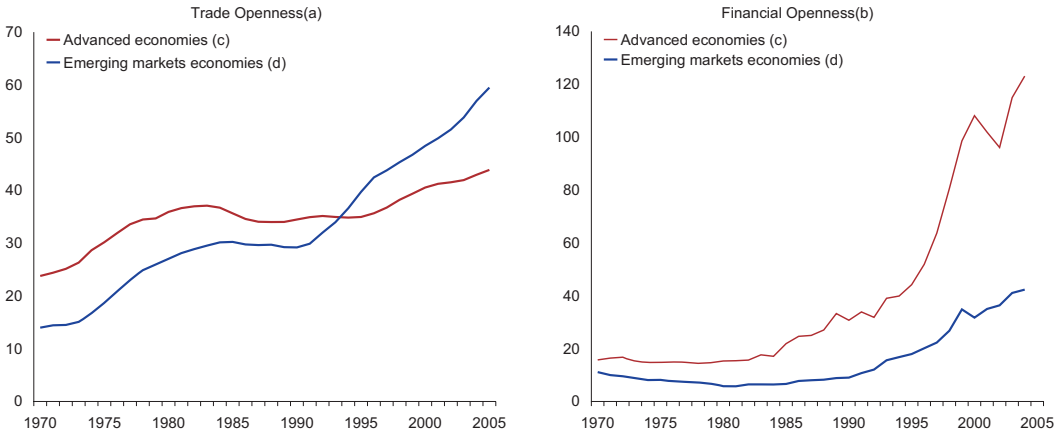
1. INTRODUCTION

Globalisation is a general term used to designate the growing process of international economic integration, covering the significant rise in trade of goods and services and increasing cross-border factor mobility. Globalisation is not a recent phenomenon but intensified as of the early 1990s. In 1990-2005, the average growth of world trade of goods and services increased and continued to exceed world output growth. Trade openness has thus increased significantly both in advanced economies and in major emerging market economies (Chart 1). Financial openness also gained ground in these two groups of countries as of the early 1990s reflecting, to a large extent, the strong increase in world flows of foreign direct investment.

The increased pace of the globalisation process reflects a number of factors. First, it is the result of further advances in the liberalisation of world trade and capital movements and was made possible by technological progress that implied a significant decrease in transport, communication and co-ordination costs. Second, the acceleration in globalisation reflects the growing openness of developing and emerging market economies – in many cases in the wake of political and economic reforms – with special emphasis on large economies such as China and India and countries of Central and Eastern Euro-

Chart 1

TRADE AND FINANCIAL OPENNESS



Source: IMF World Economic Outlook (Apr.2006).
Notes: (a) Measured as the sum of exports and imports in percent of GDP (five-year moving average).(b) Measured as the sum of the stocks of external assets and liabilities of foreign direct investment and portfolio investment in percent of GDP. (c) Australia, Austria, Belgium, Canada, Denmark, Finland, France, Germany, Greece,Iceland, Ireland, Italy, Japan, Luxembourg, the Netherlands, Norway, Portugal, Spain, Sweden, Switzerland, the United Kingdom, and the United States. (d) Argentina, Brazil, Chile, China, Colombia, Czech Republic, Dominican Republic, Ecuador,Egypt, Hungary, India, Indonesia, Korea, Malaysia, Mexico, Peru, the Philippines, Poland,Romania, Russia, South Africa, Thailand, Turkey, and Venezuela.

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

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pe. The group of developing and emerging market economies has been experiencing strong increases in both activity and international trade flows, which is mirrored in its rising economic relevance at global level. Finally, the emergence of these new economies with abundant labour supplies and the decrease in transport, communication and co-ordination costs has reinforced the trend towards the reorganisation of productive processes on a global basis with a view to reducing costs. In particular, the most recent period has seen an increase in transfers of industrial activities and business services from most advanced economies to countries with lower production costs. This transfer consists in contracting part of the productive process with foreign suppliers, covering the production of parts, components or semi-finished products, as well as services. Evidence of this growing geographical fragmentation of productive processes is given by the rising volume of trade of intermediate goods and business services as well as in the increase in foreign direct investment flows.

The rapid change of the global environment implied by these forces is expected to have a broad impact on both advanced and emerging market economies. Some of the questions that are frequently raised and which are at the basis of the policy debate include whether globalisation is welfare improving for the economies involved, how will potential benefits and costs materialize (and through which channels), how specialization patterns might be affected, how it might impact on the distribution of income within an economy and what can be done to facilitate adjustment.

The debate on the impact of globalisation is not always guided by sound economic theory (or based on systematic empirical evidence). However, international trade theory in particular should be able to provide well-informed answers to many of the questions raised. In this context, the aim of this article is to present a selective and non-analytical survey of the effects of globalisation for advanced economies that emerge from trade models. It can be seen mainly as a contribution to improve the quality of the globalisation debate. In reviewing the considerable research that trade economists have undertaken, we overlook some issues (e.g. imbalanced trade, as the models reviewed typically assume trade balance equilibrium[2]). Short term adjustment costs associated to the trade induced changes in specialization are also not a feature of the models surveyed. Changes in specialization require restructuring, i.e., economies must be able to move resources to alternative uses, which the models assume to take place instantaneously[3]. As the title of the article suggests, we also leave aside the issues raised by financial globalisation. Our main focus is on assessing the impact of the globalisation of trade, giving special emphasis to the consequences of integrating large labour abundant economies in the world trade system and of the growing international fragmentation of production. We are particularly interested on the effects of these developments on the welfare and income distribution of advanced economies.

The remainder of the article is organised as follows. In section 2, the expected impact of globalisation is analysed in the framework of textbook trade models, which include the Ricardian single factor model, the Hechscher-Ohlin-Samuelson two-factor model and the new trade models incorporating scale economies and monopolistic competition developed in the 80's. The focus of section 3 is on the findings of the more recent trade literature, namely the so-called "new new" trade models incorporating firm heterogeneity. Section 4 reviews the implications of models developed to account for a distinguished feature of the present globalisation process: the growing international fragmentation of production. Section 5 discusses some issues raised by globalization regarding economic policy, in particular, for a small open economy. Section 6 summarizes the main findings.

(2) For a recent reference incorporating imbalances into a quantitative model of trade flows, see Dekle, Eaton and Kortum (2007).

(3) The models assume, for example, that all workers were employed before trade liberalization and that following liberalization all workers are automatically redeployed to other sectors or firms. However, in the real world, the transition will certainly take time and entail welfare losses associated to temporary unemployment due to wage rigidity or to costs incurred through job search, re-location and re-training. While transitory unemployment is not a fundamental argument against globalization, it provides support to policy initiatives enhancing labour market flexibility and adaptability that may contribute to a rapid and efficient resource reallocation in the economy.

2. TEXTBOOK TRADE MODELS

According to international trade theory, countries engage in trade for two reasons: to take advantage of their differences and to benefit from economies of scale in production and product differentiation. In the first type of models, trade arises because countries can benefit from their differences by specializing in the production of goods that they are relatively efficient at producing, that is, in which they have a comparative advantage. The Ricardian model emphasizes technological (productivity) differences as the source of comparative advantage; the Heckscher-Ohlin-Samuelson model focuses on differences in factor endowments. The resulting trade is of the inter-industry kind, that is, trade in which a country's exports and imports come from different industries. In the second type of models, a combination of scale economies and consumer preferences for variety leads each country to specialize in the production of only some varieties. The resulting trade is intra-industry, that is, it consists of two-way trade in similar products or varieties (countries' exports and imports are in the same industry). Both patterns of trade are present in the undergoing globalisation process. However, comparative advantage trade models appear more pertinent to evaluate the impact of the growing integration in the world trade system of emerging market economies which differ considerably from more advanced economies in terms of relative productivities and/or availability of factors of production.

2.1. Ricardo Model

The Ricardo model is the simplest trade model that can be used to answer the question of how advanced economies may benefit from increasing trade with low cost emerging market economies. First, it is important to note that large differences in wage rates between advanced and emerging market economies largely reflect differences in labour productivity. That is, wages in China and India are low because productivity there is also low[4]. Second, these wages and productivities are national averages. There is considerable variation across the various sectors/industries of the economies. These differences across sector productivities and across countries are precisely what gives rise to international trade according to comparative advantage and associated benefits.

In its simplest form, the Ricardo model assumes two countries, two goods and only one factor of production (usually labour), which is immobile between countries. Goods are produced at constant returns to scale and there is perfect competition. The main concept of Ricardo's model is comparative advantage. The principle of comparative advantage is just a matter of relative efficiency and it states that all countries can gain if each tends to specialize in the production of goods that they are relatively more efficient at producing. Even if one country has higher productivity in all sectors vis-à-vis another country – that is, the country has an absolute advantage in producing everything – it can be shown that the two countries can trade to their mutual advantage. The high productivity country specializes in producing goods where its advantage is relatively greater and the less productive country specializes in producing goods where its production disadvantage is relatively smaller. In other words, each economy should specialize in the sector in which it has comparative advantage[5].

(4) See Golub(1998) for evidence that international differences in unit labour costs are much smaller than differences in wages rates because large disparities in wages mostly reflect equally large differences in productivity.

(5) More formally, assuming that production requires only labour in fixed amounts per unit of output (let a_{GC} be the amount of labour needed to produce one unit of good G in country C), then country A has a comparative advantage in producing good 1 if it can produce it with less labour relative to good 2, compared to country B. That is, $\frac{a_{1A}}{a_{1B}} < \frac{a_{2A}}{a_{2B}}$.
Comparative advantage involves a double comparison, across both goods and countries. Hence, it is impossible by definition for a country to have a comparative disadvantage in every good.

Trade specialization according to comparative advantage allows both countries' living standards to increase because the resulting world pattern of production is more efficient than if each country produced only for its own market. From trading according to comparative advantage, the residents in each country can import foreign goods at a lower relative price and export the home-produced goods at a higher relative price, creating an unambiguous increase in real income.

Given the simplicity of the Ricardian model it may be tempting to say that its implications may not be useful to describe the real world. However, the laws of comparative advantage have been shown to be valid in more general models (Deardorff (1980, 2005b)).

Another question that can be answered in the context of the Ricardo model is how the free trade equilibrium changes when the technological productivities available to one of the trading partners are altered. The question is pertinent given that some emerging market economies have been experiencing rapid productivity growth. The issue was raised in a paper by Samuelson (2004), which made the comparison between free trade and free trade with a trading partner experiencing technical progress in one sector. This author showed that the results were not clear cut. Rises in productivity due to technical change abroad may represent a benefit for both countries, but it can also benefit only one country while making the other worse off by reducing the potential gains from trade[6].

Consider the case in which one of the countries (the advanced economy) has an absolute advantage in the production of both goods and the other (the emerging market economy) experiences an increase in productivity in one of its sectors. The advanced economy will gain if the increase in productivity occurs in the production of the good in which the emerging market economy had a comparative advantage (and which the advanced economy was already importing). The rationale is that the advanced economy was entirely dependent upon foreign supply of that good in the initial trading equilibrium, so that the improvement in foreign technology encourages more production, which must improve the terms of trade for the advanced economy. Increased income in the emerging market economy may also lead to greater demand for the advanced economy exportable good. The emerging market country suffers a loss in its terms of trade. If such a relative price change is sufficiently large so as to offset the initial favourable effects of the increase in the country's productive capacity, a reduction in its welfare levels may occur. This is the case of immiserizing growth[7] for the emerging market economy, although most would argue that both economies would benefit from such a productivity increase.

If the productivity improvement in the emerging market economy occurs in the good in which it had not so far a comparative advantage, the advanced economy might end losing but there is also the possibility that it gains[8]. In the example presented in Samuelson(2004), the productivity increase was assumed to be of a magnitude that eroded the economies' entire comparative advantage – that is, countries became identical in terms of relative productivities – so that there was no longer a reason to trade. In that case, the advanced economy was made worse off by growth in the emerging market economy because it loses the gains from international trade and its welfare is the same as in autarky. The emerging market economy is better off in this no trade position than it was in initial autarky, since it now has the benefit of its higher productivity. Although the case is theoretically interesting – it can be seen as a worst case scenario – one should not overstate its practical relevance in a world where international trade is growing at rates exceeding output growth rates. Moreover, it can be shown that productivity improvements abroad in the good the advanced economy initially exports may result in an actual gain for its residents if the alteration in productivities leads to a reversion of comparative advan-

(6) Gomory and Baumol (2004) report similar findings in the context of a Ricardian model with scale economies.

(7) Bhagwati (1958) was the first to use the term immiserizing growth to designate growth that worsens the terms of trade sufficiently so that the country's real income falls.

(8) Ruffin and Jones (2007) detail the conditions for the different outcomes, when analysing the international transfer of technology in a Ricardian model.

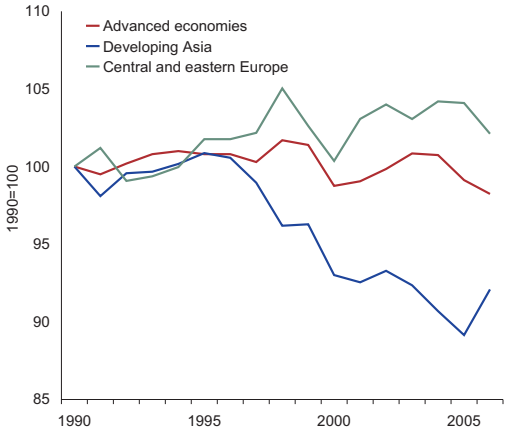
tage between the two countries (i.e. the advanced economy becomes an exporter of the good it previously imported). In sum, when faced with a productivity advance in the emerging market economy, the return to autarky would always imply a welfare loss for the advanced economy vis-à-vis the new free trade equilibrium, except in the extreme case considered by Samuelson, in which the two would be equivalent.

The discussion above serves to highlight that the terms of trade are highly relevant in assessing the welfare effects of globalisation. Note, however, that this indicator is also influenced by factors which may not relate directly to globalisation[9]. The evidence in Chart 2 seems to suggest that the intensification of globalisation and the rapid productivity growth experienced by emerging market economies have not been associated with a deterioration of advanced economies terms of trade. In fact, the terms of trade of this group of countries did not show major changes in the recent period, although this may hide some variation across economies. In particular, Chart 3 shows that while the terms of trade have remained virtually stable in the US, they have showed a slight decrease in the euro area. Japan did experience a more significant loss of terms of trade in the same period. A worsening of terms of trade was also observed in emerging market economies in Asia.

The questions that the Ricardian model can not be used to answer are the ones relating to the distribution of the gains from globalisation within the countries. Ricardo's is a representative agent model of the economy where everyone is the same, so that free trade must be welfare improving for all parties.

Chart 2

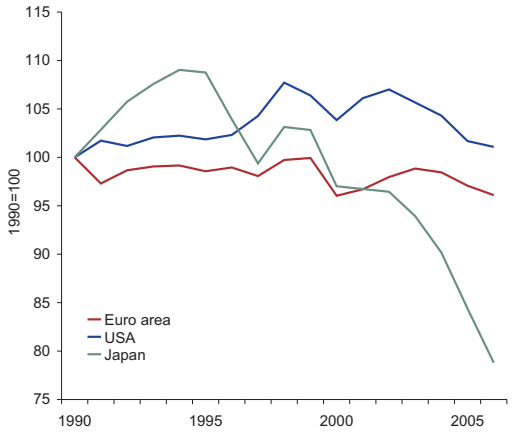
TERMS OF TRADE IN GOODS AND SERVICES



Source: IMF World Economic Outlook Database (Oct.2007).

Chart 3

TERMS OF TRADE IN GOODS AND SERVICES



Sources: IMF World Economic Outlook Database (Oct.2007) and Thompson Datastream.

(9) In recent years, there has been a rise in international prices of raw materials such as oil and metals, which may be indirectly associated to the intensification of globalisation. The increase in global production linked to globalisation implies an increase in the demand for raw materials which, given an inelastic supply, is likely to induce a rise in their relative price.

2.2. Heckscher-Ohlin-Samuelson Model

To think about potential issues concerning the distribution of the gains from globalisation within countries, the Heckscher-Ohlin-Samuelson (henceforth H-O-S) model is the one commonly used. This model explains why there may be winners and losers from globalisation within countries and exactly who they might be. The H-O-S model links specialisation and trade to differences between countries in the availability of factors of production such as capital and labour. Specifically, comparative advantage in this model results from differences in relative factor endowments across countries and differences in relative factor intensities across industries.

The H-O-S model in its original formulation considered two goods, two countries and two factors (labour and capital). The assumptions of the model consider identical countries except for relative factor endowments (that is, same preferences and technology). Both countries produce both goods and the production of both goods uses both factors, which move freely between sectors but not between countries. This model generates some important propositions.

The first is the Heckscher-Ohlin theorem that states that each country will specialize in and export the good whose production is relatively intensive in the factor in which the country is relatively more abundant. For illustrative purposes, let us assume that the advanced economy is capital-abundant and the emerging market economy is labour-abundant (abundance being defined in terms of the capital/labour ratio). Consider that the two goods are machinery and textiles, whose production is capital and labour intensive respectively (intensity depending on the ratio of capital to labour used in production). In the absence of trade, the relative price of machinery would be lower in the advanced economy than in the emerging market economy. Trade leads to a convergence of relative prices: the relative price of the machinery will rise in the advanced economy and decrease in the emerging market economy. In the advanced economy, that rise in the relative price of machinery will lead to an increase in the production of machinery and a decline in relative consumption, so that the advanced economy becomes an exporter of machinery and importer of textiles. The inverse takes place in the emerging market economy.

The second proposition emerging from the H-O-S model is the Stolper-Samuelson theorem that shows who wins and who loses when a country opens up to trade. It states that when the relative price of a good falls, the real return to the factor used intensively in its production will fall. Thus, the answer is that the relatively abundant factor gains and the relatively scarce factor loses. If capital is the relatively abundant factor in the advanced economy, an opening of trade will lead the return on capital in that economy to rise more than proportionately compared to the price of either good, whereas the return on labour will fall relative to the price of either good. This is a very important result widely cited in the debate on globalisation and income inequality. Changes in relative prices in the H-O-S model have quite large effects on income distribution: a change in relative goods prices changes the distribution of income in a way that benefits the owners of one factor of production while harming the owners of the other.

Finally, the factor price equalization theorem postulates that international trade will bring the returns to factors closer together across countries, implying complete equalization in certain circumstances. The intuition is that trade in final goods essentially substitutes for movement of factors between countries to equalize differences in relative factor returns.

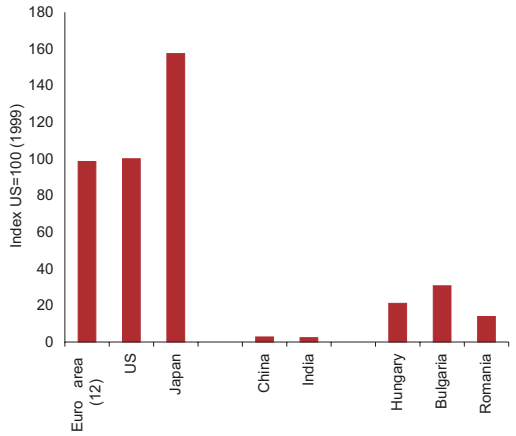
Although the results from the simple 2x2x2 H-O-S model are not easily generalized to models with higher dimensionality (more factors or more goods) or less strict assumptions, it can be shown that they may remain valid in a weaker form (Jones and Neary (1984)) [10].

The available evidence tends to confirm the idea that capital/labour ratios are much lower in emerging market economies than in advanced economies (Chart 4)[11]. In addition, workers with high skill levels (using as a proxy those which attained tertiary education) have a larger weight in the labour force of advanced economies than on some of those emerging market economies (Chart 5). This evidence, and the Heckscher-Ohlin theorem, give support to the view that advanced economies will tend to have a comparative advantage in the production of capital and some skilled-labour intensive goods, whereas the comparative advantage of emerging market economies is more likely to lie in the production of low-skilled labour intensive goods. This may seem obvious, but as remarked by Rogoff (2005), "(…) even today, it is amazing how many people seem convinced that China (which, with 1.3 billion people, is clearly a labor rich country) is going to export everything to everybody as free trade opens up".

The Stolper-Samuelson theorem remains the central theoretical result guiding the understanding of the distributional effects of trade between countries with different factor endowments. According to this theorem, the increasing integration of labour abundant economies in the world economy is expected to put downward pressure on the returns to labour in advanced economies (in which it is the relative scarce factor). This implies that the share of national income received by labour – the labour share, which can be expressed as the ratio of labour compensation per worker to average worker productivity – in those economies should fall as trade flows with emerging market economies increases and the associated specialization progresses. The data shows that there has been a decline in the labour share since the early 1980's across the advanced economies (see Chart 6). Nonetheless, this evolution may reflect other factors besides globalisation.

Chart 4

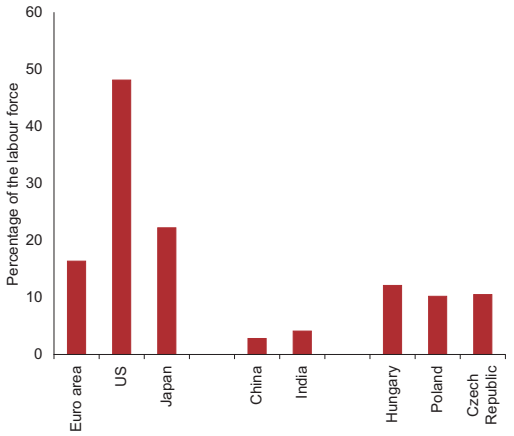
PHYSICAL CAPITAL/LABOUR RATIOS



Source: World Bank (Sandeep Mahajan (PRMEP), 2002). Prices and exchange rates are for 1987.

Chart 5

LABOUR FORCE WITH TERTIARY EDUCATION[(a)]



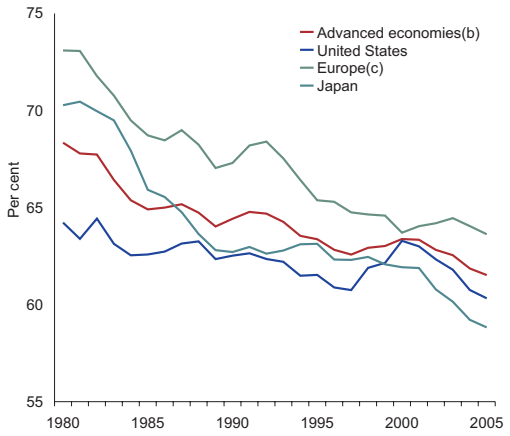
Source: Barro, R. and J. Lee (2000), *International Data on Educational Attainment: Updates and Implications.*
Note: (a) Percentage of the labour force aged 15 and over that attained tertiary education in 2000.

(10) Demonstrating that the H-O-S model holds empirically has been a difficult task (see Krugman and Obstfeld (2000) for an overview). Note, in particular, that complete factor price equalization is not evident in the data, which may reflect the fact that the some crucial assumptions needed to establish this result are not observed in the real world.

(11) There are several problems involved in the measurement of factor endowments, in particular of capital stocks. While using alternative data sources and methodologies may result in figures differing from the ones presented in Chart 4, the qualitative assessment does not change.

Chart 6

LABOUR INCOME SHARES IN ADVANCED ECONOMIES[(a)]



Source: IMF World Economic Outlook (Abr.2007).
Notes: (a) Income share of labour estimates the share of labour compensation of employees and "nonemployees" in value added. (b) Advanced economies include Australia, Austria, Canada, Belgium, Denmark, Finland, France, Germany, Ireland, Italy, Japan, Netherlands, Norway, Portugal, Spain, Sweden, United Kinddom, United States; weighted using series on GDP in US dollars. (c) Europe includes Austria, Belgium, Denmark, Finland, France, Germany, Ireland, Italy, Netherlands, Norway, Portugal, Spain, Sweden

The period under review was also characterized by significant changes in technology and labour market policies. Technological progress, especially in information and communication sectors, is expected to stimulate capital accumulation and to favour demand for skilled labour over unskilled labour. Therefore, globalisation and capital augmenting technological change are expected to have analogous impacts on compensation and the labour share. The labour share may also be indirectly affected by labour market policies, as these may help or hinder the adjustment of the economy to globalisation and technological progress. Because of the complex ways in which these factors interact, it is empirically difficult to isolate their effects.

Empirical work carried out by the IMF (2007) show that technological progress and, to a lesser extent, globalisation have contributed to the decrease in the labour share in advanced economies, whereas changes in labour market policies have generally had a smaller but positive impact on the labour share. These results are broadly consistent with findings reported in other recent studies (International Labor Office and the World Trade Organization (2007), Guscina (2007), Jaumotte and Tytell (2007), Ellis and Smith (2007))[12].

2.3. New Trade Models of Increasing Returns and Monopolistic Competition

Trade does not have to be the result of comparative advantage. Reciprocally beneficial trade can arise as a result of economies of scale and product differentiation. Increasing returns to scale make it advantageous for firms in each economy to specialize in producing only a limited range of differentiated products (or varieties), which enables a more efficient production. The countries then trade with each other in order to be able to consume the full range of products. This will be two-way trade within industries

(12) There is also an extensive empirical literature linking wage inequality between skilled and unskilled workers to globalization and technological progress, in particular for the US economy (see Slaughter (1998) for a survey). Most of these studies conclude that skill-biased technological change was a more important cause of wage inequality than international trade.

(that is, horizontal intra-industry trade), because firms in the two economies produce differentiated goods.

The new trade models introduced scale economies, product differentiation and utility functions including preference for variety and replaced the assumption of perfect competition on product markets with the one of monopolistic competition[13]. The seminal articles on this class of models were by Helpman (1981) and Krugman (1979, 1980, 1981). These models were to a large extent designed to explain why similar countries trade so much and why so much of their trade is intra-industry (as opposed to inter-industry trade driven by comparative advantage). For that reason, these models may be less pertinent to evaluate the impact of the current wave of globalisation which is characterized by particularly fast growth of trade flows between economies differing in their resources and production technologies. However, the process of convergence of per capita income of emerging market economies will likely be accompanied by a movement towards greater similarity of capital–labour ratios, skill levels, technology, etc., vis-à-vis advanced economies. This implies that trade between these groups of countries will gradually shift from inter-industry to intra-industry type and that the findings of the new trade models may acquire growing relevance.

How does the existence of intra-industry trade driven by scale economies and product differentiation change the conclusions reached in the previous sections concerning the effects of trade on the welfare and income distribution for advanced economies?

First, intra-industry trade produces supplementary gains, in addition to those arising from trade based on comparative advantage. By engaging in intra-industry trade, a country can at the same time reduce the number of goods it produces and increase the variety of goods available to domestic consumers. By producing fewer varieties, the country can produce each at larger scale, with higher productivity and lower costs (pro-competitive and scale effects). At the same time, consumers benefit from increased choice of differentiated products (variety effect)[14].

Second, the previous section's analysis of the distribution of the gains from trade demonstrated that trade would not benefit everyone, that is, trade in the H-O-S model induces changes in the income distribution within a country that are always enough to insure that the real income of the scarce factors of production diminishes. If, however, intra-industry trade is the dominant kind of trade, the extra gains from increased choice and scale economies are expected to outweigh any income-distribution effects and everyone may actually gain from trade (Krugman (1981)).

Hence, the impact of trade with emerging market economies on the income distribution of advanced economies depends on the determinants of that trade. If horizontal intra-industry trade gains increasing weight vis-à-vis inter-industry trade in the exchanges between these two groups of countries, the benefits from trade will tend to be more evenly shared among factors of production than would be the case if only the second type of trade was present.

3. "NEW NEW" TRADE MODELS WITH FIRM HETEROGENEITY

The trade models surveyed in the previous sections have in common the fact that they treat the sector as the unit of analysis, ignoring differences among firms belonging to the same sector. However, re-

(13) We will only refer to trade models of economies of scale internal to the firm (that is, the firm's average costs fall as its own output rises), which imply an imperfect competition market structure. External economies of scale, which occur when the unit cost depends instead on the size of the industry, can also be a cause of international trade. However, trade based on external economies of scale has more ambiguous effects on national welfare compared to trade based on internal economies of scale. For a general introduction to both types of models, see chapter 6 of Krugman and Obstfeld (2000).

(14) Recent empirical work measuring the gains from variety has shown that these may be considerable. Broda and Weinstein (2006) estimated that the number of imported product varieties offered to the United States' consumer has been multiplied by a factor of four over the period 1971-2001, entailing a welfare gain for the United States economy corresponding to almost 3 per cent of GDP.

cent empirical evidence shows that differences among firms are crucial to understanding several stylized facts of world trade. For example, most firms do not export at all while exporting firms tend to export only a small fraction of their total sales and tend to be larger and more productive than other firms in the same industry[15]. Hence, the "new new" trade theory emerged, incorporating firm-level heterogeneity to account for some of these firm-level empirics (see Bernard, Eaton, Jensen and Kortum (2003) and Melitz (2003) for early theoretical papers in this literature; Bernard, Jensen, Redding and Schott (2007) for a recent survey).

These models – which currently comprise a significant share of international trade research – have shown that firms' differences have important consequences for assessing the gains from trade and globalisation and their distribution across firms and factors of production. Above all, these models have identified an additional source of welfare gain from trade: the opening up of the country to international trade produces an aggregated productivity gain, driven by reallocations of market share and resources towards the more productive firms in each industry.

We will start by briefly reporting the implications of globalisation in the Melitz (2003) model[16], which incorporates firm level productivity differences into a model of intra-industry trade. The basic setting of the model considers that firms produce horizontally differentiated varieties within the industry under conditions of monopolistic competition. There is a group of prospective firms that can enter the industry by paying a fixed entry cost, which is thereafter sunk. These potential entrants face uncertainty concerning their productivity. After paying the entry cost, it is assumed that these firms draw their productivity level from a known distribution. This productivity remains fixed thereafter, but firms face a constant exogenous probability of a bad shock in every period that forces them to leave. The existence of fixed production costs implies that firms drawing a productivity level below some lower threshold (the "zero-profit productivity cut-off") face negative profits and therefore exit the industry immediately after entering and never produce. In addition, there are fixed and variable costs of exporting. The fixed costs of exporting will typically include costs of research into product compliance, distribution networks, advertising, etc. in foreign markets and, in most part, are sunk prior to entry in the export market. This means that, of the surviving firms in an industry, only the relatively more productive will decide to export. That is, there is self-selection of the most productive firms into the export market: only those who draw a productivity level above a higher threshold (the "export productivity cut-off") find it profitable to export in equilibrium. The remaining firms will only serve the domestic market.

Melitz (2003) shows that the impact of trade liberalization in this type of model is to induce reallocations between firms, which in turn generate both aggregate productivity and welfare gains. In the model, trade has redistributive effects within industries, which operate through the domestic factor market where firms compete. Falling trade costs affect both the decisions about export market entry and industry exit. It offers new profit opportunities for the most productive firms that were selling only to the domestic market and can now sell to foreign markets as well (therefore reducing the "export productivity cut-off"). It also induces more entry as prospective firms react to the higher potential profits associated with a good productivity draw. Thus, labour demand within the industry rises, due both to expansion by existing exporters and to new firms beginning to export. This increase in labour demand bids up factor prices and reduces the profits of non-exporters (that is, it raises the "zero-profit productivity cut-off"). The reduction in profits in the domestic market induces the least productive firms to exit

(15) See Tybout (2003) for a survey. Bernard, Jensen, Redding and Schott (2007) and Mayer and Ottaviano (2007) present recent reports on this empirical evidence for the United States and European firms, respectively.

(16) The Melitz framework is particularly amenable to analysis and leads to predictions regarding the impact of trade liberalization similar to the ones derived from the framework developed by Bernard, Eaton, Jensen and Kortum (2003), which introduced stochastic firm productivity into a multi-country Ricardian model.

the industry. As these less productive firms exit and as output and employment are shifted to more productive firms, aggregate productivity rises.

The Melitz model ignores comparative advantage by considering just one factor and industry and as such can provide only limited answers regarding the impact of globalisation. However, Bernard, Redding and Schott (2007) have remedied this by introducing firm heterogeneity in the model of inter and intra-industry trade of Helpman and Krugman (1985). Their model combines factor endowment di?erences across countries, factor intensity di?erences across industries, and heterogeneous firms within industries and is able to simultaneously generate inter-industry trade (countries are net exporters in their industries of comparative advantage), intra-industry trade (even within an industry where a country is a net importer, two-way trade happens), and selection into export markets (within both net exporting and net importing sectors, some firms export while many others do not). This model yields richer results concerning the gains from globalisation and their distribution across sectors, firms and factors of production for a given economy.

First, as in single-industry models of heterogeneous firms, trade liberalization is followed by compositional changes within industries, which increase aggregate productivity in all industries or sectors. However, in the model of Bernard, Redding and Schott (2007) these increases are stronger in the sector where the economy has comparative advantage. The idea is that the greater export opportunities in this sector lead to a larger increase in factor demand than in the comparative disadvantage sector, which bids up the relative price of the factor used intensively in the comparative advantage sector. This leads to greater exit by low-productivity firms and thereby larger rises in average productivity in this sector compared with the comparative disadvantage sector. These differential productivity gains give rise to differences in average sector productivity that magnifies comparative advantage based on factor abundance and provides a new source of welfare gains from trade.

Second, according to the model, trade liberalization may have an impact on the distribution of income across factors that differ from the ones derived from more traditional models. While the Stolper-Samuelson effect still operates in this model, it is augmented with an additional effect. The opening of trade increases average industry productivity in both sectors and implies a decline in consumer prices for both goods, and so an increase in the real reward of both factors. This second effect contributes to increase the real return of relatively abundant factors while mitigating, or even potentially overturning, the decline of real returns of relatively scarce factors. If the productivity effect is sufficiently large, it becomes possible for both factors of production to gain from international trade.

Finally, the model by Bernard, Redding and Schott (2007) generates a more novel result, as it shows that trade liberalization is associated to factor reallocation both within and across industries. In particular, although trade liberalization generates net job creation in comparative advantage sectors and net job destruction in comparative disadvantage sectors, there is simultaneous job creation and job destruction in all sectors as low productivity firms exit and high productivity firms expand. This contrasts with the findings from more traditional models, in which there would be a simple flow of factors from comparative disadvantage sectors to comparative advantage sectors.

4. MODELS OF INTERNATIONAL FRAGMENTATION OF PRODUCTION

The models surveyed in previous sections assumed for simplicity that all the tasks involved in the production of a good or service were carried out within a country. However, the recent globalisation phase is not only characterized by rapid growth of international trade but also by a remarkable change in the nature of that trade, involving the rising international fragmentation of production, also referred to as offshoring, outsourcing, trade in tasks, global production sharing, vertical disintegration of production

across borders, etc. All these terms have been used to designate the relocation of components of the production of some goods and services to other countries, creating an interconnectedness of production processes across countries, with each specializing in a particular stage of the good's production sequence and trading between them the partially processed good[17]. Baldwin (2006) called it "the second unbundling" in the globalisation process: in his view, the first unbundling corresponded to the spatial separation of factories and consumers, while the second unbundling, characterizing the recent globalisation phase, spatially separates the factories and offices themselves. During the first unbundling, countries produced basically complete products that they consumed and traded with other nations. However, the tasks comprising the production of the goods had to be performed in close proximity due to high transport, communication and monitoring costs. The second unbundling results from a sharp reduction in these costs, which facilitates direct trade in tasks and generates global production networks for several goods and services.

The growing share of parts and components in world trade is an indication of the increase in the international fragmentation of manufacturing production. Jones at al. (2005) reviews empirical work documenting this trend. Yeats (1998) finds that trade in parts and components has grown much faster than trade in final goods and estimates that it could account for 30 per cent of world trade in manufactures in 1995. Recent advances in information technology have implied that trade integration has also progressed quickly in services. Amiti and Wei (2005) report that outsourcing of services has increased considerably, but remaining at relatively low levels compared with manufacturing outsourcing.

How does the possibility of dividing a productive activity into parts that can now be done in different locations alter the conclusions of the previous sections regarding the impact of globalisation? The answer is that while trade models incorporating international fragmentation of production do not change the basic message about the overall benefits of free trade, they nevertheless may change the views on the sharing of these gains among the different factors of production.

International fragmentation of production can be modelled as if it were just like trade in new goods (intermediate goods). Contributions on this line of research include, among several others, Arndt (1997), Venables (1999), Deardorff (2001, 2005a), Bagwati et al. (2004) and Markusen (2005), besides Jones and Kierzkowski (1990), the most common cited reference in this area[18]. This branch of literature presents a set of alternative conceptual frameworks, by adapting the trade models surveyed in section 2 to allow for the breakdown of the production process of a good into sub-processes that can be undertaken in different locations. The main conclusion from these studies is that outsourcing/offshoring leads to the usual gains from trade with the standard caveats applicable to conventional trade. The idea is that breaking down the integrated production process into separate stages opens up new possibilities for exploiting gains from specialization and trade[19]. The main caveat results from the possibility of an adverse movement in the terms of trade, specifically that the beneficial impact of the introduction of outsourcing may give rise to sufficiently strong adverse terms of trade effect that offsets the former. Regarding income-distribution effects, this literature does not offer general conclusions as the impact of offshoring on factor rewards depends upon many variables. In some cases, the scarce factor is made worse off by the possibility of offshoring, but it is also possible to find situations in which all factors are better off after the change. While this line of research has produced interesting insights, it can be viewed as a collection of special cases: the results depend heavily on the assumptions and it is not possible to draw general principles from the analysis.

(17) This can be accomplished by the firm opening a subsidiary in a foreign country or by contracting with a foreign supplier under an outsourcing arrangement. A branch of trade literature has examined which organisational form is preferable in different circumstances (e.g., Grossman and Helpman (2005), Helpman (2006)).

(18) See Baldwin and Robert-Nicoud (2007) for a brief survey of these works.

(19) Offshoring some parcels of production allows Ricardo's logic of trade according to comparative advantage to be applied separately to each of those individual parcels of production.

Hence, Grossman and Rossi-Hansberg (2006a,b) have alternatively proposed a more general model of offshoring, which they boldly called a new paradigm. They developed a model of trade in tasks – defined as the individual steps involved in the production process – as compared to the usual approach of modelling just trade in goods. In their model, the production process in each sector – one exportable and one import competing – involves a continuum of tasks to be performed by each of the factors of production (unskilled labour, skilled labour or others, like capital). As in the H-O-S model, it is assumed that the two goods differ in their factor intensities and that the country exports the good that makes intensive use of its relatively abundant factor.

The tasks can be performed abroad or domestically. Offshoring tasks might entail savings in factor costs but also imply costs. Some tasks are moved abroad more easily than others. The cost of offshoring a task may reflect how much routine it incorporates, how important it is that the task be delivered personally, how difficult it is to transmit or transport the output of the activity, etc. While the model recognizes these differences, it assumes that the costs of offshoring the various tasks are exogenous.

The model can be used to study the impact of task trade or offshoring on factor prices. In the papers, these factor prices are the wages of skilled and unskilled labour, as it is assumed that the relevant tasks are performed by these two types of labour but the results could be re-interpreted in terms of the returns to labour and capital. It is also assumed that when there is a reduction in the cost of offshoring tasks requiring a given skill level, this reduction is proportional across both sectors of the economy. This insures that when, for example, unskilled labour intensive tasks are offshored then they are offshored by the two sectors. The model allows decomposing the effect on wages of this cost reduction for offshoring tasks into three components.

The first is the relative price effect. Improved possibilities for offshoring some tasks provide different incentives for the two sectors to expand, which changes the composition of output. If the offshoring country is a large one, this would create imbalances in world markets at the initial prices and so the relative price of goods will have to adjust. This change in relative prices has implications for factor returns that are familiar from the H-O-S model (Stolper-Samuelson theorem).

The second is the labour supply effect. The increasing offshoring of some tasks imply that the demand for workers performing those tasks at home is reduced, which, other things constant, imply that their wage would have to fall to maintain full employment[20].

Finally, the authors identify a productivity effect that benefits the factor performing the kind of tasks that are moving offshore. This effect seems to have been largely unnoticed in the previous literature. When the tasks performed by a certain type of labour can be transferred abroad, the firms that use this type of labour intensively in their production processes are the ones that gain the most in cost savings[21]. Thus, these firms experience the greatest increase in profitability which induces them to expand relative to firms that use intensively other types of labour. Expansion of these firms leads to a net increase in demand for the type of labour which was used in the offshored tasks. Thus, the real wage for that type of labour rises, other things constant. Grossman and Rossi-Hansberg derived the name for the effect by drawing an analogy between falling costs of offshoring tasks and factor-augmenting technological progress: both reduce the cost of using a factor and the amount of local factor needed to produce a given amount of output, both benefit firms that use the factor intensively, both create incentives for

(20) This effect did not appear in the H-O-S model with incomplete specialization of section 2.2 (in that model, factor growth can be accommodated by a change in the composition of output in each country, without any impact on factor prices). However, in other trading environments, in which the number of the country's factors of production exceeded the number of tradable goods that it produces, factor prices do respond to factor supplies.

(21) Firms' costs fall for two reasons. First, firms choose to offshore new tasks that were previously performed at home. Second, firms save on inframarginal tasks that were already performed abroad before the drop in the cost of offshoring. This second effect is the most important. The idea is that the information and technology revolution changes the ability to perform entire ranges of tasks.

these firms to expand and the expansion of these firms can lead to a net increase in demand for factor whose productivity has increased.

The authors show how the productivity effect can prevail over the other two effects in well-known trade environments. When this happens, reductions in the costs associated to offshoring imply an actual rise in the real wages of the domestic workers that have skill levels similar to those used in performing the tasks that are being offshored. Thus, in contrast to the distributional conflict that results from reductions in the cost of trading goods in traditional trade frameworks like the H-O-S model, reductions in the cost of trading tasks may generate gains for all domestic factors[22].

In the framework developed by Grossman and Rossi-Hansberg, adjustments to globalisation occur at the task rather than the sector level, that is, the tasks chosen to be offshored may be undertaken in a wide range of sectors (e.g. data-entry tasks in all sectors). The model also highlights that not all tasks requiring a given skill level can be transferred abroad, i.e., there is a weak relationship between the tasks being offshored and the level of labour skill required to perform them[23].

5. A SMALL OPEN ECONOMY: SOME POLICY ISSUES

The results from the models surveyed in the previous sections apply directly to a small open economy, such as Portugal. The models show that, in the long run, participating economies may gain from the intensification of the globalization process. One source of those gains is the change of patterns of comparative advantage, which implies restructuring and reallocation of productive factors. Those changes in comparative advantage patterns may be particularly significant for countries like Portugal - with relatively low levels of human capital and technological development compared with other advanced economies – thus requiring policy actions to improve the economy's adjustment capacity.

The benefits from globalisation do not come automatically. The restructuring process associated with globalization implies that firms must be able to reallocate resources rapidly to take advantage of new opportunities and potential income gains and to minimise adjustment costs. The velocity of the adjustment matters, as a rapid adjustment would minimize the losses from having resources locked into inefficient uses in the transition period.

In this context, globalisation may well have increased the importance of economic policy. In particular, the realisation of the full net benefits of globalisation requires the establishment of a suitable institutional framework that facilitates the needed changes and minimizes the adjustment costs. As referred by Rodrick (2007), there is a wide consensus supporting the idea that trade openness alone is unlikely to lead to economic growth in the absence of a wide range of complementary institutional and governance reforms.

Globalisation may require government responses on many levels to reduce the related adjustment costs. The duration of the adjustment period and the magnitude of the adverse effects on employment are linked to the flexibility of the labour market, i.e. how easily labour can move from declining to advancing sectors. Therefore, the promotion of a set of policies in the labour market to ensure flexibility is essential to facilitate a rapid resource reallocation, especially in countries such as Portugal where several rigidity factors still hamper an efficient functioning of the labour market. Initiatives aimed at improv-

(22) Grossman and Rossi-Hansberg report some rough evidence that productivity gains associated to offshoring of tasks performed by low skilled labour have contributed to sustain wages for that type of workers in the United States. However, the available empirical evidence on the productivity effects of offshoring is mixed (see Olsen (2006)).

(23) Blinder (2006) empirically documents this less than perfect relationship by referring to the cases of typing services (a low-skill job) and security analysis (a high-skill job), both of which are examples of services already being offshored to low cost countries. In contrast, there are the cases of services of taxi drivers and airline pilots. Neither can be offshored, but the first is a job with negligible educational requirements and the second is quite the reverse. He also mentions that most physicians need not fear that their jobs will be moved offshore, while radiologists are already seeing that happen.

ing the sectoral and occupational mobility of labour – in particular by investing in human capital, including worker retraining – are also important. These will ultimately enhance the adaptability of the economy to change, whether driven by globalisation or by other perhaps even more important factors like skill biased technology shocks. Policies and regulations promoting product market flexibility and competition also contribute to the efficient use of available productive factors, their adequate sectoral allocation and the incentive to adopt new productive processes. Finally, sustained investments in research and innovation, in particular by the private sector, are also required to take advantage of the opportunities created by the increasing integration of markets, given the ongoing changes in comparative advantages at the global level.

6. CONCLUSIONS

The theoretical models surveyed predict that globalisation is welfare improving for the countries involved in the long run. What is meant by welfare improving is that countries gain with globalisation in terms of the income of the average inhabitant. These welfare gains may arise from reallocating factors to their most productive use across industries, from providing consumers access to a broader range of product varieties than is available domestically and from aggregate industry productivity increases due to self-selection of the most efficient firms[24].

However, the benefits of globalisation are obtained by relocating resources. This restructuring is likely to be associated with distributional impacts, both in the short term, as a consequence of adjustment costs, and in the long term, as a result of permanent changes in relative factor demands (Rodrick (1998)). Therefore, globalization implies efficiency gains but also costly dislocations and potentially distributional consequences.

Based on the more traditional trade models, e.g the H-O-S model, the reshuffling process triggered by globalisation is expected to take place mainly across sectors. According to these models, each country would have a set of identifiable exporting sectors and import-competing sectors. Increasing trade would imply that exporting sectors would expand production and their demand for labour, while import competing sectors would reduce production and possibly lay-off workers. For advanced economies, it was expected that labour-intensive sectors would shrink, while skill and/or capital intensive sectors would expand. Jobs would therefore be destroyed in labour-intensive sectors and capital employed in those sectors would have to be re-employed. Regarding the distributional consequences of globalisation, the traditional result based on the Stolper-Samuelson theorem was that it would negatively affect the returns to the relatively scarce factor – labour or unskilled labour – in the advanced economies.

The more recent theoretical literature shows that the adjustment to globalisation and its impact on the income distribution may be more complex and nuanced. Regarding the adjustment processes, the recent trade models with firm heterogeneity predict that significant resource reallocation may also take place within sectors and not only between sectors. These models incorporate mechanisms according to which globalisation encourages the expansion of high-productivity firms and the closing down of less efficient firms in all sectors, that is, in both net-exporting and net-importing sectors. The recent task trade model by Grossman and Rossi-Hansberg also suggests that job destruction and creation associated to offshoring need not take place according to a well established sectoral pattern or specific skill level. Regarding the distributional effects of trade, the prediction of the Stolper-Samuelson theo-

(24) These aggregate productivity increases may also result from self-selection within firms, in a general equilibrium model of international trade with multi-product firms which are heterogeneous in both firm-specific ability and firm-product-specific expertise (Bernard, Reddding and Schott (2006)). Following trade liberalization, there is reallocation of resources across firms (as firms with low overall productivity exit) and within firms (as surviving firms drop their marginally productive products).

rem is mitigated in the more recent trade models. In the models of scale economies and product differentiation, in the "new new" trade models with firm heterogeneity and in the model of task trade, there is the possibility that globalisation may generate gains for all production factors.

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THE EFFECT OF FINANCIAL FRICTIONS ON ECONOMIC DEVELOPMENT*

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1. INTRODUCTION

Restrictions on financial markets vary greatly between countries. Many of them, such as explicit or implicit taxes on financial services, have an impact on the net margin of financial intermediation, this being a way to measure the difference between rates of interest on deposits and on lending. Demirgüç-Kunt *et al.* (2004) show that the level of financial repression is very high in countries such as Belarus, Burundi and Ghana, but very low in Switzerland or the Netherlands.

There is another kind of constraint on the credit markets, and this has to do with the quality of the legal system. The World Bank (2005) has documented very large differences between countries in terms of collateral requirements on loans and bankruptcy laws. La Porta *et al.* (1998) show that the quality of the institutions that enforce these laws is positively correlated with the level of economic development.

It would therefore be interesting to see to what extent these differences in financial frictions between countries explain the differences in economic development, measured by GDP *per capita* or the ratio of total credit to GDP.

This article studies the effect of these two types of credit market frictions on countries' economic development.[1] The two types of friction are the costs of financial intermediation and the capacity to enforce credit contracts. A general equilibrium model is used, with heterogeneous agents in terms of initial wealth and entrepreneurial talent, along with independent estimates for the two types of financial frictions. This provides us with a partial explanation of the differences observed between the American economy and other economies in different stages of development (advanced and developing in Europe; Latin-American; Asian).

An initial conclusion is that the real capacity to enforce credit contracts can explain to a considerable degree the differences observed between advanced European economies and the U.S. in a number of spheres (GDP *per capita*, ratio of total credit to GDP and so on). The differences can be explained in the most part by the varying capacity to enforce credit contracts. In the model, this corresponds to the fraction of credit that financial intermediaries seize if the debtor defaults. This financial friction also explains a significant part of the differences, in terms of GDP *per capita*, between Latin-American and developing European economies, on the one hand, and the U.S., on the other.

A second conclusion is that the quantitative implications of the model depend critically on the existence of a general equilibrium effect in wages and in the rate of return on capital. This effect varies depending on whether the return on capital is determined exogenously (*i.e.* it is given by international market values) or endogenously (*i.e.* it is determined as if the economy was completely closed). The effects of financial frictions on *per capita* GDP in the economy are typically more pronounced in the first than in the second case. This implies that changes in policy affecting the two forms of frictions - and above all the capacity to enforce credit contracts - will have effects that are especially relevant in the case of small

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

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(1) For a more detailed analysis of this topic, see Antunes *et al.* (2008).

open economies like the Portuguese. Numerical simulations suggest that a significant part of the difference between *per capita* income in Portugal and the United States can be explained by differences in financial frictions, especially the level of creditor protection.

This article is structured in the following way: in the next section we outline the model used and make a short summary of the literature on the topic; Section 3 details various quantitative exercises; Section 4 concludes.

2. CREDIT MARKET FRICTIONS WITH HETEROGENEOUS AGENTS

We start by giving a qualitative description of the model used in the article. The interested reader will find a short review of the economic texts available on the topic in Section 2.2 and a more detailed description of the model in Section 2.3.

2.1. The Model: qualitative description

Let us postulate an economy where the agents reap benefits from consumption and from the resources their predecessors have left them. As life begins, each agent is characterized by the amount bequested (given here as b) and their entrepreneurial talent (x). On the basis of this and looking at wage (w) and interest (r) rates, the agent decides whether to become a worker or an employer.

If the option is to become worker, a salary will be earned, a fraction of the accumulated wealth will be consumed (including the initial bequest capitalised at the rate of r), with the remainder passed on to the next generation.

If the option is to become an employer, a business scheme will be set in motion, relying on a technology based on the number of workers and the amount of capital used. But more important than this, the quantity of goods that entrepreneurs manage to produce from a specific quantity of inputs depends directly on their entrepreneurial talent. The employer will have a credit market available to finance the business. The interest rate for employers in this market is $r + \tau$, where τ reflects implicit and explicit taxes, along with other market frictions.

Each agent decides on whether to b a worker or employer by comparing the two options in terms of wealth spread across a lifetime.

The financial intermediaries, whom we can call banks, receive funds from all the agents. They pay out at rate r on deposits and charge $r + \tau$ on loans to entrepreneurs. Financial intermediaries, however, only lend up to a point where the entrepreneurs have an interest in honouring their commitment at the end of the contract: the credit contracts must be compatible with the incentives of the borrower. In order to define this amount clearly, there must be some penalty in the case of default by the debtor. Let us designate as ϕ the fraction of the borrower's gains that the creditor could recoup if default occurs. This parameter measures the level at which the legal structure of the economy favours borrowing and the factors involved are the bankruptcy laws and the collateral pledged against credit. This measurement, focusing on the level of protection afforded to the creditors, is a convenient designation which will be used in this work. The bigger the value of ϕ the bigger the penalty for the borrower who defaults and the greater the amount of credit that a borrower with specific characteristics can obtain from a financial institution.

In this economy, the wage rate *w* is determined endogenously by the equilibrium between supply and demand for labour. Demand comes from agents who decide to become workers; supply is the aggregation generated by employers.

As for the interest rate, two situations will be detailed. In the first, the banks are considered as having access to a market of external credit, without frictions, at the exogenous rate *r*. They can therefore borrow enough to cover the demand for funds from entrepreneurs. This situation is that of a small economy open to capital flows.

In the second situation, the interest rate is determined by the equilibrium between the supply and demand for funds in the credit market. Supply is equal to the aggregate value of bequests at the beginning of the agents' life; demand comes from the capital which entrepreneurs are planning to invest. This model is closer to closed economies or to economies where size affects the international credit markets.

In this type of economy, it is possible to demonstrate that the distribution of wealth left as a bequest is constant across the generations. The same happens with the price of factors after a period of transition. It is this "steady state" of the economy that we are going to study.

2.2. Literature

The model described above is related to at least three facets of the economic literature. The first takes in occupational choices, the dynamics of economic development and inequality, in a tradition dating back to Lucas (1978) and Banerjee and Newman (1993).

The second group covers the issue of disparities in the average income of various countries, in a tradition going back to Solow (1957). More recent studies by Prescott (1998) and Hall and Jones (1999) looked at the contribution of capital accumulation and TFP in various countries to explain observed disparities. Other contributions of similar nature have attempted to explain TFP differences through friction differences in the markets, distortions caused by economic policies or barriers against new technologies (Parente and Prescott, 1999; Acemoglu and Ventura, 2002).

The third relevant focus is the research on financial market development and economic growth. Some studies approach this theme from a historical standpoint and look to explain the joint development of markets and economic progress (Greenwood and Jovanovic, 1990; Boyd and Smith, 1998). This article fits better in another branch of the literature – studies of the impact of changes in the parameters of the economy (related with contract policies or others) on the endogenous variables. The work of Castro *et al*. (2004), Amaral and Quintin (2007) and Erosa and Hidalgo-Cabrillana (2007), among others, fits in with this group.

2.3. The model: formalisation

There follows a more detailed description of the type of economy used in this article. Any reader less interested in the technical aspects of the model can go directly to Section 3.

2.3.1. Agents

Let us suppose that there is a continuum of agents measurable in linear fashion. Each agent, indexed by $i \in [0;1]$, lives for a fixed period, the same fro everybody, and leaves behind another individual.

Each generation has measure one. The connection between successive generations arises through bequests. Each agent gains from consumption and from the bequest left to their successor in line with the utility function:

$$U^{i} = \left(c_{t}^{i}\right)^{\gamma}\left(b_{t+1}^{i}\right)^{1-\gamma},\ \gamma \in (0;1)$$

where c_{t}^{i} and b_{t+1}^{i} are respectively the amount consumed by agents through their life and the quantity of goods left as a bequest to the successor. The form of this utility function implies that the agent will consume fraction γ of his wealth at the end of the period and will leave $1-\gamma$ as a bequest. For the sake of simplicity, the individual indicator *i* is hereinafter dropped.

Each agent is given a "entrepreneurial talent" *x*. This variable is exogenous, independent and distributed identically across generations, with a cumulative distribution function $\Gamma(x)$ defined in the interval $\left[0;\overline{x}\right]$. We shall standardise $\overline{x}$ to 1. Each agent's talent for business is not hereditary, nor can it be manipulated by the agent.

2.3.2. Production

Production follows a technology of decreasing returns to scale given by:

$$y = xk^{\alpha}n^{\beta}$$

where $\alpha, \beta > 0$ and $\alpha + \beta < 1$. The good produced can be consumed, used as capital or left as a bequest. Capital depreciates totally during the production period.

2.3.3. The credit market

Every agent has two options for investing capital. The first is to lend risk-free to financial intermediaries at rate *r*. The second is to use their own resources to start a project and then, if necessary, use the credit market to raise additional capital, on which $r + \tau$ is paid. In this last case, let us assume that the agents are not able to commit to paying off the loan (capital plus interest) at maturity. In other words, if it is more advantageous for agents not to pay off the loan at maturity, in the light of the penalty for default, they will not do so. The bank, of course, factors this into its calculations and, knowing the profile of the borrower, it will only give a loan up to the point where the agent will always choose to pay off at maturity. The calculations underlying this specific amount will be detailed below.

2.3.4. The agents: optimal behaviour

All agents optimise their use of resources with a view to production of the final good. Let us first consider the problem of a businessman with entrepreneurial talent *x* for a fixed amount of capital *k* and given wage level *w*:

$$\pi(k,x;w) = \max_{n}\ xk^{\alpha}n^{\beta} - wn$$

This function gives us production net of wages, with the associated labour supply function $n(k,x;w)$. This is the part which can be seized by the authorities in the case of default, since the capital depreciates totally during the production period.

Let a be the investment made by the entrepreneur in question and / the borrowing needed from financial institutions. The optimization problem for an entrepreneur with talent x and bequest b is:

$$V(b,x;w) = \max_{a\geq 0,\, l\geq 0} \pi(a+l,x;w) - (1+r)a - (1+r+\tau)l$$

subject to:

$$\phi\pi(a+l,x;w) \geq (1+r+\tau)l$$

$$a \leq b\,.$$

The objective function is easy to understand. The first term represents output net of wages. The second term is the opportunity cost of capital financed by the entrepreneur. The third term is repayment of the loan, and includes principal, interest and the costs of intermediation.

The first constraint ensures that the loan is compatible with the incentives of the bank and the entrepreneur. The amount which the creditor manages to seize on default, $\phi\pi(a+l,x;w)$, is equal to or higher than the amount to be repaid by the debtor, $(1+r+\tau)l$. This constraint ensures that the entrepreneur prefers to pay the loan rather than default. The amount that the entrepreneur manages to retain if default occurs, $(1-\phi)\pi(a+l,x;w) - (1+r)a$, should not be more than what they get if the loan is paid off, $\pi(a+l,x;w) - (1+r)a - (1+r+\tau)l$. This restriction is clearly equivalent to the first. The parameter ϕ will therefore have a major influence on the maximum figure of the loans in question.

The second constraint means that the level of self-finance is determined by the agent's bequest.

There is an investment function $k(b,x;w,r)$ associated with this problem. It gives us the scale of investment for each entrepreneur, given type and prices.

2.3.5. The choice of occupation and consumption

Given their types, (b,x), and prices, (w,r), agents will choose the occupation that affords them most revenue: they will choose to be entrepreneurs if $V(b,x;w,r) > w$; they will choose paid employment if $V(b,x;w,r) < w$; they will have no specific feelings either way if $V(b,x;w,r) = w$. To simplify, let us suppose that in the third case above, they all decide to be entrepreneurs. Such a hypothesis is completely innocuous.

The agent's total income through life is given by:

$$Y = \max\{V(b,x;w,r), w\} + (1+r)b\,.$$

This amount will be spread between consumption and a bequest for the agent's successor, in accordance with the utility function detailed earlier.

2.3.6. Market equilibrium

If $\Upsilon(b)$ is defined as the measure (or if preferred, as the cumulative distribution function) of all bequests at the start of the period, there will be equilibrium in the labour market if:

$$\iint_{\text{entrepreneurs}} n(x;w,r)\Upsilon(db)\Gamma(dx) = \iint_{\text{workers}} \Upsilon(db)\Gamma(dx)\,.$$

The integral on the left is calculated on the pairs (b, x) such that, given the prices (w, r), the agents prefer to be entrepreneurs. This corresponds to the demand for labour, and the integral on the right corresponds to the labour supply. The equilibrium wage rate is the one that makes the integrals equal.

As for the interest rate – in the case it is exogenous – the labour market equation determines economic equilibrium. If the interest rate is endogenous, we need an additional equation to characterize the credit market:

$$\iint_{\text{entrepreneurs}} k(b, x; w, r)\Upsilon(db)\Gamma(dx) = \iint_{\text{all agents}} \Upsilon(db)\Gamma(dx).$$

The left side of this equation is the demand for capital from entrepreneurs for investment. The right side translates the amount of resources existing at the start of the period, which will then be used in production. This is therefore the supply of capital. Antunes *et al.* (2007) show that this economy's steady state is characterised by a unique endogenous distribution of bequests $\Upsilon(b)$ and a pair of prices (w, r). The size clearly depends on the model's parameters, particularly those of most interest in this article, τ and ϕ.

3. QUANTITATIVE EXERCISES

For a quantitative analysis of the frictions in the credit market that interest us, we must first calibrate the model for a real economy. This will be our baseline. We then use independent estimates of the parameters of interest in our problem and compare the results with the baseline. In this way, we will be able to assess changes in the economic policies that affect the parameters in terms of their impact on different measures of economic performance such as *per capita* GDP or the total credit granted as a percentage of GDP.

3.1. Calibration

The calibration process consists in selecting specific measurements of the real economy that we consider important for this analysis, and then choose parameters in such a way that the measurements obtained in the model are "similar" to the real ones.

The American economy in a steady state was used as the baseline. This was taken as a long-term equilibrium where economic variables grow at a constant rate. The reasons for this choice are based on the availability of data, the relevance of this economy and above all that it is considered to be close to a steady state. If, for instance, we look at a graph of real GDP *per capita* for the United States over time in log terms, we can see (taking out the economic cycle component) something very similar straight line (with slope equal to the average American's income real rate of growth). In addition, the quotient between capital and output or between salaries and output, shows a clear stability over time, suggesting that the economy is indeed near a steady state.

Table 1 shows the value given to each parameter in the model by our calibration and the measurements in the real economy that we try to reproduce in our model. The duration of each period in this economy is 35 years. In terms of the parameters for the production function, we have used values that ensure that the fraction of salaries and remuneration of capital in GDP are equal to the amounts in fact observed. The fraction of income left as a bequest was chosen in such a way as to make the model's equilibrium interest rate r equal to the real rate of return on post-war U.S. T-bills, 2% according to the International Financial Statistics of the IMF.

Table 1

MODEL PARAMETERS – CALIBRATION FOR THE AMERICAN ECONOMY

β	0.55	Fraction of wages in output
α	0.35	Fraction of capital returns in output
γ	0.94	Fraction of income consumed
ε	4.422	Distribution of entrepreneurial ability
τ	0.005	Intermediation cost
ϕ	0.26	Creditor protection

For the cumulative distribution function of entrepreneurial talent, we choose the parametric form $\Gamma(x) = x^{\frac{1}{\varepsilon}}$. The parameter ε was calibrated in such a way that the Gini index of entrepreneurial income was 45%, a figure reported by Quadrini (1999).

Intermediation costs were based on Demirgüç-Kunt and Huizinga (1999) and correspond to implicit or explicit taxes paid as a percentage of banks' assets.[2]

Finally, parameter ϕ is calibrated in such a way that the percentage of entrepreneurs in the total population is around 9 percent, a figure reported by Quadrini (1999).

Table 2 compares some of the measurements obtained from the model using this calibration with their real counterparts. The aims of the calibration are achieved in a sufficiently accurate way (annual interest rate, proportion of entrepreneurs, Gini index of entrepreneurs' income). Besides this, the capital-output ratio and the quotient between private credit and the product (variables not used to calibrate the model) are clearly near the figures for the U.S. economy. This gives us a certain comfort when comparing different economies in terms of these two entities.

Table 2

BASIC STATISTICS FOR THE AMERICAN ECONOMY AND THE MODEL ECONOMY

	American economy	Model economy
Yearly real interest rate (%)	2	2
Taxes as a percentage of bank assets	0.5	0.5
Percentage of entrepreneurs	9	8.8
Gini index for entrepreneurs (%)	45	45.35
Capital to output ratio	2.5	2.24
Credit to output ratio	1.98	2.02

3.2. Impact of the parameters

There are changes in some of the endogenous variables of the model stemming from variations in the parameter of financial intermediation, τ, and creditor protection, ϕ. These variations are calculated by taking into account the exogenous or endogenous rate of interest.

3.2.1. Financial intermediation

Table 3 shows the variation in some of the endogenous entities in the model when we multiply by 4 the cost of financial intermediation relative to the baseline case. Let us look first at the case where the rate of interest is exogenous. Product *per capita* falls to 85.2 per cent of the baseline case and the equilibrium wage rate to 85.9 of the initial level. The percentage of entrepreneurs rises, while the quotient be-

(2) The use of measurements such as the net margin of financial intermediation has some drawbacks (see Antunes *et al.*, 2008, for more details).

Table 3

IMPACT OF A FOUR-FOLD INCREASE IN THE COSTS OF INTERMEDIATION ON SOME OF THE MODEL'S VARIABLES

	Base	Exogenous interest rate	Endogenous interest rate
Output (base = 100)	100.0	85.2	93.7
Wage rate (base = 100)	100.0	85.9	96.7
% of entrepreneurs	8.8	9.3	9.1
Credit to output ratio	2.0	1.5	2.0
Gini index for entrepreneurs (%)	45.4	44.8	46.1
Yearly real interest rate (%)	2.0	2.0	0.8

tween credit granted and product *per capita* falls from 2.02 to 1.46. The inequality among entrepreneurs, measured by the Gini index, falls from 45.35 to 44.83 per cent. How can these changes be explained when τ moves from 0.5 per cent to 2 per cent? This increase in the costs of intermediation has the effect of reducing the demand for loans from entrepreneurs for a specific rate of interest. This is a demand effect. The reduction in the amount of loans means that the investment in capital falls and this cuts the demand for labour. For there to be equilibrium in the labour market, there will have to be a combination of lower salaries and a larger number of small enterprises, offsetting the fall in demand. This means that there will be additional agents choosing to be entrepreneurs and self-financing their operations; at the margin, these agents are also less productive and will have smaller bequests. In this way there will be more entrepreneurs but with less productive projects and smaller enterprises. There is a tendency for entrepreneurs' incomes to be standardised.

When the rate of interest is endogenous, the effects of changes in τ in the endogenous variables that we have seen are much lower. Product *per capita* falls to 93.7 per cent of the baseline level. The wage rate becomes 96.7 of the initial level. The percentage of entrepreneurs goes up (although less than previously) while the quotient between total credit and the product remains virtually unchanged. The inequality in distribution of income among entrepreneurs now rises to 46.1 per cent and the real rate of interest falls to 0.82 per cent. How can these results be rationalised? The demand effect described earlier has now an added *general equilibrium effect*. As the rate of interest is endogenous, the fall in demand for funds, stemming from the rise in the costs of intermediation, causes the rate of interest to fall. A lower rate of interest implies a bigger level of capital, more productivity and bigger companies. The rise in inequality in distribution among entrepreneurs suggests that the fall in income already existing (which would reduce inequality) is more than offset by the lower productivity of the additional entrepreneurs. The general equilibrium effect is partial compensation for the demand effect in a variety of ways. The results set out in Table 3 suggest that the general equilibrium effect is quantitatively important.

3.2.2. Creditor protection

If the figure for creditor protection ϕ is reduced to a quarter of the baseline (Table 4), there are major effects when the rate of interest is exogenous. Product *per capita* falls to 57.6 per cent of the initial level, while salaries fall to 55.3 per cent of the baseline figure. The percentage of entrepreneurs rises considerably to 12.9 per cent of the active population, while the ratio of credit granted to product *per capita* falls from 2.02 to 0.46. The inequality of income among entrepreneurs narrows, although the average income is substantially lower. Again there are more entrepreneurs in the economy but they are less productive. The lower level of creditor protection reduces the incentive for credit contracts, and this

Table 4

IMPACT OF A FOUR-FOLD INCREASE IN CREDITOR PROTECTION ON SOME OF THE MODEL'S VARIABLES

	Base	Exogenous interest rate	Endogenous interest rate
Output (base = 100)	100.0	57.6	96.9
Wage rate (base = 100)	100.0	55.3	98.7
% of entrepreneurs	8.8	12.9	10.2
Credit to output ratio	2.0	0.5	1.9
Gini index for entrepreneurs (%)	45.4	43.3	49.7
Yearly real interest rate (%)	2.0	2.0	-2.7

means a lower maximum amount available for each entrepreneur. The demand for funds for investment falls. The effects of this fall are similar to the demand effect described earlier.

When the rate of interest is endogenous, the effects are quantitatively identical to the previous case and again we see the importance of the general equilibrium effect. The real rate of interest falls to a negative figure (-2.6 per cent per year). This result is consistent with the observation of Calomiris and Beim (2000) that some financially repressed economies (closed economies with low levels of creditor protection and high intermediation costs) in Latin America, the Middle East and North Africa had negative real rates of interest (between -10 and 0 per cent per year) until the start of financial liberation in the 90s.

3.3. Counterfactual analysis

Having identified the main effects caused by variations in the parameters τ and ϕ, let us see how the model can be used to compare different economies. The exercise consists in collecting independent estimates of τ and ϕ for a number of countries and resolve the model using these figures, leaving all the other parameters equal to those in Table 1. The purpose of this exercise is to check what would be the product *per capita* in the U.S. if the costs of financial intermediation and the level of creditor protection were the same, for example, as Russia. In this way, an attempt is made to isolate the effects due solely to these two factors. The simulations will be made for both exogenous and endogenous interest rates.

The results for representative economies will be given – Brazil for Latin America, France and Portugal for Europe, Russia for transition economies and Singapore for high-growth Asian countries. The costs of intermediation are measured by explicit or implicit taxes on intermediation as a percentage of the total assets paid by banks (see Table 5). The level of creditor protection is based on the World Bank (2005) and Djankov *et al.* (2005). This consists of a scale of 1 to 10 measuring the extent to which access to credit is conditioned by bankruptcy laws and the laws applicable to the use of collateral. This amounts to *a de juris* measurement of ϕ. In order to construct *a de facto* measurement of ϕ, the previous figure is multiplied by a measure of the extent to which entrepreneurs consider that the laws are applied (Kaufmann *et al.*, 2003). This figure is then standardised using the level for the U.S. as the baseline ($\phi = 0.26$; see Table 5).[3]

When the rate of interest is exogenous, these two factors explain more than half of the differences in terms of product *per capita* between Brazil and the U.S. and the whole difference in terms of the ratio of credit to product. Looking at the impact of each parameter separately, it is clear that the costs of financial intermediation are not as important as creditor protection. When the rate of interest is endogenous,

(3) The results obtained using the de juris figure for ϕ mentioned earlier do not change the conclusions obtained for a wider range of countries de facto. See Antunes *et al.* (2008).

Table 5

COUNTERFACTUAL ANALYSIS

			Exogenous interest rate		Endogenous interest rate	
	ϕ	τ (in %)	Output	Credit to output ratio	Output	Credit to output ratio
United States (base)	**0.260**	**0.5**	**100.0**	**2.0**	**100.0**	**2.0**
Brazil (data)	**0.039**	**1.1**	**22.0**	**0.4**	**22.0**	**0.4**
Intermediation cost	0.260	1.1	94.2	1.8	97.8	2.0
Creditor protection	0.039	0.5	49.2	0.3	93.8	1.9
Both	0.039	1.1	47.6	0.3	93.5	1.9
France (data)	**0.100**	**0.2**	**77.0**	**0.9**	**77.0**	**0.9**
Intermediation cost	0.260	0.2	103.1	2.1	97.8	2.0
Creditor protection	0.100	0.5	68.4	0.7	97.7	1.9
Both	0.100	0.2	70.1	0.8	98.7	2.0
Portugal (data)	**0.136**	**0.3**	**53.0**	**1.3**	**53.0**	**1.3**
Intermediation cost	0.260	0.3	101.1	2.1	100.8	2.0
Creditor protection	0.136	0.5	76.9	1.0	98.4	2.0
Both	0.136	0.3	78.3	1.0	99.0	2.0
Russia (data)	**0.045**	**1.9**	**23.0**	**0.2**	**23.0**	**0.2**
Intermediation cost	0.260	1.9	86.3	1.5	93.9	2.0
Creditor protection	0.045	0.5	51.2	0.3	96.5	1.9
Both	0.045	1.9	46.9	0.2	87.7	1.9
Singapore (data)	**0.380**	**0.5**	**68.0**	**1.2**	**68.0**	**1.2**
Intermediation cost	0.260	0.5	100.0	2.0	100.0	2.0
Creditor protection	0.370	0.5	114.3	3.1	101.1	2.1
Both	0.370	0.5	114.3	3.1	101.1	2.1

these financial frictions only explain a small part of the difference in product *per capita* and the ratio of credit to product. The simulations for Russia give similar results, though the costs of intermediation would seem to have greater effects than for Brazil.

The case of Singapore is interesting because the parameter for creditor protection is larger than in the U.S. and the costs of intermediation are the same. The model anticipates a product *per capita* 14.7 per cent higher than the U.S., but the data actually point to a product *per capita* 32 per cent lower. In the context of the model, this discrepancy can be explained by two kinds of factor:

I. Parameters such as those that govern the distribution of entrepreneurial talent (ε and $\bar{x}$) or the fraction left as bequest ($1-\gamma$). For example, if U.S. entrepreneurs were to have average qualifications different from Singapore, or if the institutional infrastructure which American entrepreneurs use (excluding whatever is related to credit markets, which are explicitly modelled) were to be different from Singapore, then parameters ε and $\bar{x}$ could be different in the two economies, contrary to what has been assumed here.

II. Creditor protection and access to credit may not have a monotone relationship, as assumed in this model. Dubey *et al.* (2005) show that when some agents default in equilibrium there may be an optimum creditor protection level.

When the interest rate is exogenous, the differences in financial frictions between Portugal and the U.S. explain around half the difference in terms of product *per capita*. This suggests that, as with Singapore, other factors (namely entrepreneurial talent) may explain part of the remaining difference. In the ratio of credit to product, the model undervalues the figure shown in the data: 1.03 against 1.27. In the context of the model, the Portuguese financial sector appears, however, to be more efficient than the creditor protection parameter would seem to show. Lower creditor protection may be partially offset, for example, through closer follow-up of those projects that are financed. When the rate of interest is endogenous, the results are in essence the same as for the baseline case.

France is similar to Portugal, except that the real data show greater similarity with the American economy than the model. The remarks made on Singapore are also applicable here.

In Antunes *et al.* (2008), it is demonstrated that the results above are valid for a wide range of countries: when the rate of interest is exogenous, variations in the two parameters explain a large proportion of the differences between countries in terms of product *per capita* and the ratio of credit to product. If the rate of interest is endogenous, these results are substantially lower through the general equilibrium effect. The results are also valid when there is a sector of large enterprises with no credit constraints.

The two paradigms analysed (exogenous and endogenous rates of interest) can be seen as two extremes in terms of the capacity of financial institutions to obtain outside resources at market rates of interest. This suggests that in a small open economy, the rate of interest is likely to be exogenous, while in a closed or large economy, the rates of interest are likely to be influenced by the economy's own parameters. The corollary of this is that *reforms leading to cuts in the costs of intermediation or to increases in effective creditor protection will have a bigger impact in small countries with financial markets open to the outside world*. These reforms may not be effective in closed economies (as happened in Latin America, the Middle East and North Africa before financial liberalisation in the 90s), since the general equilibrium effect tends to cancel out the looked-for demand effect.

It is worth noting that in small open economies, the foreign interest rate in fact paid by financial intermediaries may be affected by the state of these economies and is not therefore totally exogenous. There may exist, for example, a market, liquidity or operational risk premium or indeed other factors. This implies that the figures obtained for the exogenous rate of interest will be the upper limit of the effects of variations in the parameters which we have looked at. In a small open economy like Portugal's, where other frictions and uncertainty exist, the effects are likely to be found somewhere between the two cases analysed (exogenous and endogenous rates of interest).

4. CONCLUSION

In this article, a model has been structured for a qualitative and a quantitative study of the effects stemming from two financial frictions – costs of intermediation and creditor protection – on variables used to gauge economic development: product *per capita*, the ratio of credit to product, the proportion of entrepreneurs in the economy, and inequality in distribution of income.

With independent measurements used for the two frictions, it is possible to see that the model explains part of the differences observed between countries in terms of product *per capita* and the ratio of credit to product. The quantitative implications of the market depend critically on whether the rate of interest is exogenous or endogenous, with the effects on product *per capita* typically more pronounced when the rate of interest is exogenous.

The implications for economic policy are clear: when it is reasonable to assume that the rate of interest is exogenous, as happens if banks have access to finance abroad at market rates, there is a big impact on the improvements to the technologies of creditor protection and financial intermediation. If the rate of interest is endogenous, as when the banks cannot draw on finance from abroad at market rates, there is a big price effect on the factors that tend to hamper the impact of reforms.

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GLOBALISATION, STRUCTURAL CHANGES IN EXPORTS AND THE PORTUGUESE TERMS OF TRADE*

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1. INTRODUCTION

Fluctuation in the terms of trade is an issue frequently addressed in economics. The terms of trade have direct effects on welfare, since they condition the domestic resources that must be assigned to assure the same level of imports, but they are also extremely volatile, and a major source of economic fluctuations. Thus, it became frequent to use formulas to measure the effect of terms of trade on GDP mechanically [see Gutman (1981)] and to consider the terms of trade as an important factor in business cycle fluctuations [Backus and Crucini (2000)].

This paper analyzes the evolution of the Portuguese terms of trade over the last few decades. The focus is on trade excluding energy, as the short and medium-run effects of energy import prices on the terms of trade are clearly visible and easy to quantify, given the big volatility of international oil prices, the high share of net imports and the low price elasticity of demand. Section 2 characterizes the recent gains in the terms of trade (excluding energy) recorded by the Portuguese economy. It is important to evaluate this phenomenon from an historic perspective and to look into whether this evolution is a special feature of the Portuguese economy. Additionally, it analyses whether this behaviour in the terms of trade is more related to the evolution of export or import prices.

In Section 3, the evolution in the terms of trade is broken down by products following very closely the approach used in Baxter and Kouparitsas (2006). The first component of this decomposition measures the effects of the specialization of each country across various sectors. An economy tends to face an increase in its terms of trade if it is more specialized in products where international prices are growing faster. Those effects can be interpreted as being relatively exogenous - at least in the short run – given that it is not easy or even possible to change output rapidly across a range of sectors. Typically, this type of specialization depends on endowments of labour, capital and natural resources. The second component is related to differences between export and import prices for each type of product, and thus to the position of national production in several market segments and also to the country's capacity to import from markets with lower prices.

The results show that terms of trade developments have been dominated by the specialization effects related to the evolution of oil prices. Excluding energy and focusing on manufactured goods, the increase in terms of trade is strongly connected with the positive evolution of relative exports prices in some groups of products, in particular what are usually designated as traditional sectors: textiles, clothing and footwear.

Sections 4 and 5 go deeper into these results, which suggest that the effects of globalization on import prices and some structural changes in traditional export sectors are factors that explain the recent

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terms of trade gains. In Section 4, an estimate is presented for the direct effect of low-cost countries in the import prices for Portuguese manufacturing, using a methodology similar to that used in some studies for other countries. In Section 5, the clothing sector is considered as a case study to evaluate the role of structural changes in the export sector. There is evidence that a composition effect occurred in this sector, towards a bigger proportion of high-range markets, contributing to the increase in average price of exports.

Finally, Section 5 summarizes the main conclusions.

2. CHARACTERIZING THE RECENT GAIN IN PORTUGUESE TERMS OF TRADE

How unusual is this increase?

The evolution of Portuguese terms of trade over the last 60 years is presented in Chart 1, using the Banco de Portugal's historical series [Pinheiro *et al*.(1999)] for the period before 1995 and the external trade deflators of the *Instituto Nacional de Estatística* (INE) for the latest period.

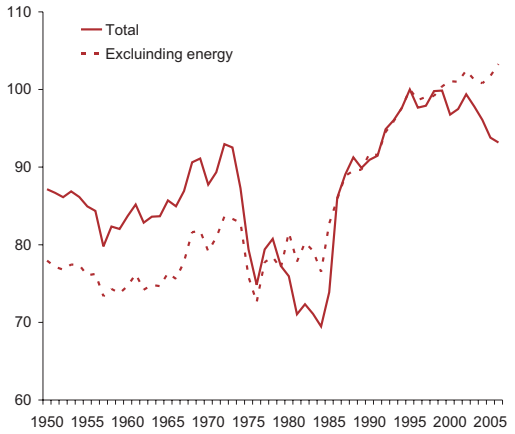
Since the end of the 80s, contrasting with apparent stability previously, terms of trade started to move on a positive trend, interrupted in the most recent years because of the marked increase in oil prices. This positive trend cannot be explained by the direct effects of oil prices. In fact, excluding the energy component, the increasing trend in the terms of trade since the end of the 80s becomes even more evident.

Is this increase a special feature of the Portuguese economy?

Chart 2 presents the evolution of terms of trade for the OECD countries, considering external trade on goods and services excluding commodities. It seems clear that there has been a generalized gain of terms of trade across the OECD countries since the beginning of the 90s, and that these gains were

Chart 1

PORTUGUESE TERMS OF TRADE
External trade of goods, 1995=100

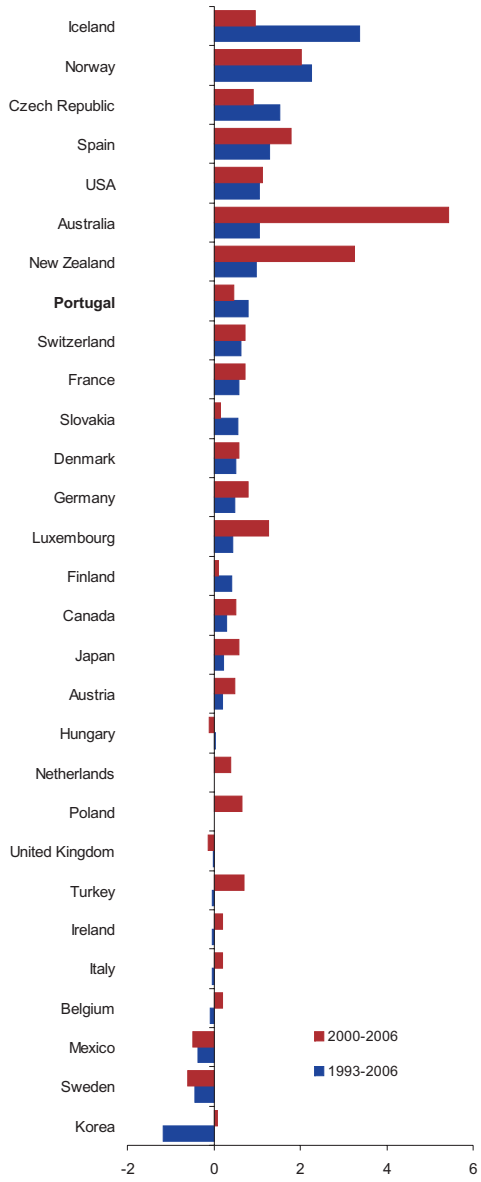


Sources: *INE* and Banco de Portugal [Pinheiro *et al*. (1999)].

Chart 2

TERMS OF TRADE IN OECD COUNTRIES

Goods and services excluding commodities
Annual average changes

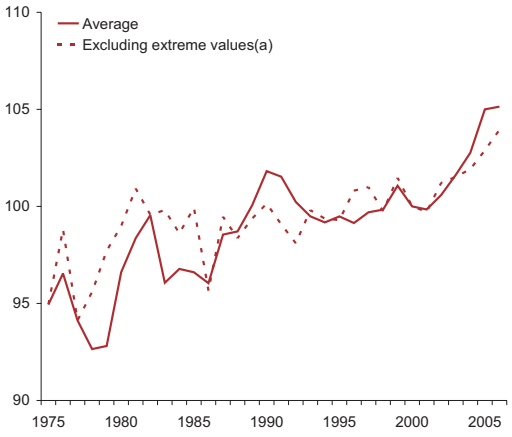


Source: OECD.

Chart 3

TERMS OF TRADE IN 23 OECD COUNTRIES

Goods and services excluding commodities, 2000=100

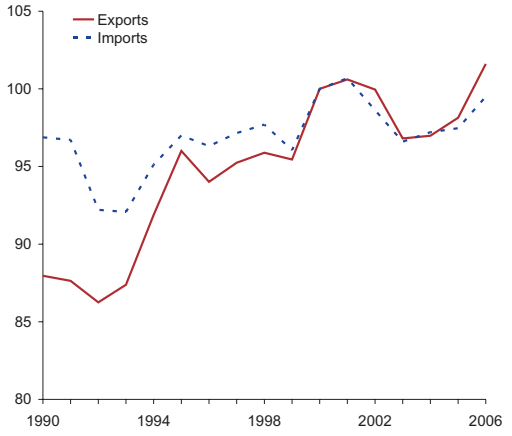


Source: OECD.
Note: (a) Excluding observations outside the range defined by two standard deviations around the average.

Chart 4

PORTUGUESE EXTERNAL TRADE PRICES

Goods excluding energy, 2000=100



Source: *INE*.

more pronounced in the most recent period. In terms of non-weighted average of the OECD countries, the average annual increase was 0.8 per cent from 2000 onwards, against the annual gain of 0.5 per cent from 1993.

The same evidence seems to emerge when a longer period is considered. Chart 3 presents the evolution of terms of trade (goods and services excluding commodities) for the period starting in 1975, using a sample of 23 OECD countries. Terms of trade stood at higher levels in the second part of the sample, this upward trend being particularly pronounced over the most recent years, when the terms of trade reached maximum figures.

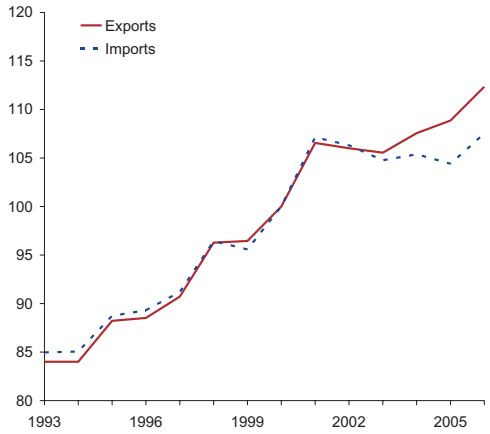
Is this evolution mostly related to import or export prices?

The increase in Portuguese terms of trade excluding energy in the first half of the 90s occurred in a context where both export and import prices were increasing (Chart 4). But the story seems to be different from 2000 onwards, when both export and import prices started to record more contained evolutions. This is even more evident when intermediated goods are excluded – in this case both export and import prices have declined since 2000 (by 4.9 and 1.8 per cent, respectively).

This evolution of import prices did not occur only in Portugal. Chart 5 presents the evolution of export and import prices (excluding commodities) for the OECD countries, emphasizing that the gains in terms of trade since the end of the 90s occurred in a context of stagnating of import prices.

Chart 5

OECD COUNTRIES EXTERNAL TRADE PRICES
Goods excluding commodities, 2000=100



Source: OECD.

3. DECOMPOSING TERMS OF TRADE EVOLUTION

Terms of trade can be written as a difference between indices measuring external trade deflators for exports (Px) and imports (Pm), which can be expressed as a weighted average of their various components:[1]

$$P_{x,t} - P_{m,t} = \sum_{i=1}^{n} \left(\frac{p_{x_i,t}}{p_{x_i,t-1}} \omega_{x_i,t} - \frac{p_{m_i,t}}{p_{m_i,t-1}} \omega_{m_i,t} \right) \quad (1)$$

where p_{xi}, and w_{xi} (p_{mi} and w_{mi}) represent the price and weight of each i component on exports (imports). In line with Baxter and Kouparitsas (2006), an adjustment in the previous equation makes it possible to decompose the evolution in terms of trade into two components:[2]

$$P_{x,t} - P_{m,t} = \sum_{i=1}^{n} \left(\omega_{x_i,t} - \omega_{m_i,t} \right) \frac{p^{*}_{i,t}}{p^{*}_{i,t-1}} + \sum_{i=1}^{n} \left(\frac{p_{x_i,t}}{p_{x_i,t-1}} - \frac{p_{m_i,t}}{p_{m_i,t-1}} \right) \omega^{*}_{i,t}, \quad (2)$$

$$\frac{p^{*}_{i,t}}{p^{*}_{i,t-1}} = \frac{\frac{p_{x_i,t}}{p_{x_i,t-1}} + \frac{p_{m_i,t}}{p_{m_i,t-1}}}{2}, \qquad \omega^{*}_{i,t} = \frac{\omega_{x_i,t} + \omega_{m_i,t}}{2}$$

The first term may be designated as an **inter-sector specialization effect**, measuring the effects of differences in composition between import and export baskets. A country tends to obtain a terms of trade gain (loss) if is more (less) specialized in goods whose prices are growing faster. The obvious example is related to commodities, in particular oil. When oil prices increase, importer countries tend to record a deterioration in the terms of trade. The other term may be designated as the **intra-sector effect**, since it is related to the relative prices of exports and imports for each type of product. Its evolution is related to the position of national production across various segments and to the ability to import from markets with lower prices.

The results of this decomposition for the period after 1995 are presented in Chart 6, while Table 1 contains detailed information for the evolution of import and export prices across groups of products and their contribution to the evolution of terms of trade through these two types of effects.

Portuguese terms of trade were dominated by the inter-sector specialization effect, linked to the evolution of oil prices (the contribution of the energy component and the overall evolution of terms of trade have a correlation coefficient higher than 0.8). The **energy component** contributed negatively in 9.7 p.p. to the 6.4 per cent decline in total terms of trade observed since 1995. This contribution has been particularly negative during the most recent years.

When energy is excluded and the focus is on manufacturing trade, the intra-sector effect can be seen to have most contribution to the increase in the terms of trade, in particular after 2000. This type of fluctuation may be related to quality effects and to a differentiated evolution in the composition of exports and imports in each sector.

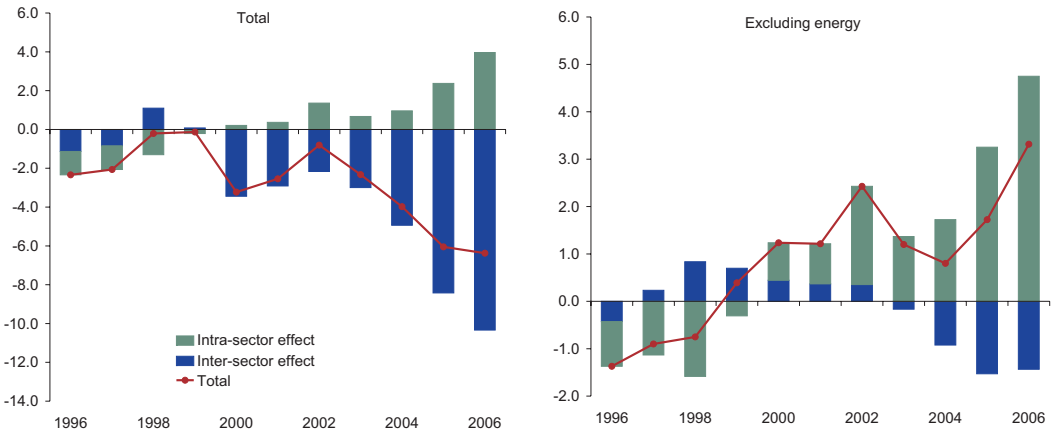
(1) External trade deflators (Px and Pm) are computed as Paasche type indices, which measure the evolution of prices from the previous year.

(2) Baxter and Kouparitsas (2006) presented this type of decomposition to explain terms of trade volatility. The dependency of the results on the level of disaggregation shoud be pointed as a caveat of this type of decomposition.

Chart 6

PORTUGUESE TERMS OF TRADE

Contributions to accumulated growth, in p.p.



Source: Calculations based in information from *INE*.

The terms of trade in the **manufacturing** trade recorded a 2.6 per cent increase over the period considered. However, this was not generalized across the various groups of products considered.

The total effects were clearly related to the behaviour of external trade prices for **textiles, clothing and footwear**, which contributed positively in more than 4 p.p. to the overall evolution of terms of trade. These gains were broadly based across the three groups of products, reflecting the strong decline in import prices, which recorded a negative growth rate of around 14 per cent from 1995 onwards, while export prices increased by more than 11 per cent.

The same type of phenomenon occurred in **rubber and plastics products**, which also gave an important contribution to the terms of trade gains. The strong decline in import prices (around 13 per cent) and the maintenance of a positive growth of export prices (above 18 per cent) were translated into an increase in the terms of trade of more than 30 per cent. **Chemical products** also recorded a positive contribution but not related to a decline in import prices, which continued to grow, albeit at a slower pace than export prices.

Machinery and equipment also recorded a remarkable decline in import prices, but in this case the same occurred in export prices and the contribution to the overall evolution of the terms of trade was slightly negative. It should be mentioned that this result entails very different situations across the subsectors, reflecting the usual lack of homogeneity in this kind of products. In the classification considered, there was a strong increase of the terms of trade in **office machinery and computers** reflecting the decline in import prices; **the radio, television and communication** sector recorded a decline in exports prices and thus in terms of trade; and **other machinery and equipment** recorded small variations in import and export prices, and thus relatively stable terms of trade.

The external trade prices of **transport equipment** presented a singular evolution. Import prices continued to grow, while export prices recorded a decline, and this sector gave therefore the most negative contribution to the evolution of the terms of trade.

Table 1

EXTERNAL TRADE AND TERMS OF TRADE BY GROUPS OF PRODUCTS (1995-2006)

In percentage

	Implicit average weights		Accumulated growth rate			Contributions to terms of trade accumulated growth rate		
	Exports	*Imports*	Export prices	Import prices	Terms of trade	Inter-sector effect	Intra-sector effect	Total effect
Agric, hunting and fishing	***1.3***	***5.3***	**27.9**	**3.0**	**24.9**	**-0.6**	**0.7**	**0.1**
Energy	***2.2***	***9.0***	**189.3**	**219.1**	**-29.8**	**-8.9**	**-0.8**	**-9.7**
Mining and quarrying	***0.8***	***0.3***	**78.2**	**20.6**	**57.6**	**0.3**	**0.2**	**0.5**
Manufacturing	***95.7***	***85.4***	**5.1**	**2.5**	**2.6**	**-1.1**	**3.8**	**2.7**
Food and beverages	*6.3*	*8.5*	6.5	11.7	-5.2	-0.2	-0.3	-0.5
Textiles, clothing and footwear	23.9	*9.0*	11.6	-14.1	25.8	0.3	3.9	4.2
Textiles	*8.8*	*4.8*	4.4	-14.9	19.3	-0.2	1.3	1.2
Clothing	*9.1*	*2.2*	8.3	-20.0	28.3	-0.1	1.5	1.4
Leather and leather products	*6.0*	*2.0*	30.7	-2.8	33.5	0.6	1.1	1.6
Wood, cork, pulp and paper products	*9.4*	*3.8*	-2.0	-2.2	0.3	-0.2	0.1	-0.1
Mineral and metal products	*9.4*	*9.6*	18.4	17.8	0.7	0.2	-0.2	0.0
Chemical products	*5.4*	*10.8*	28.0	12.4	15.6	-1.0	1.5	0.5
Rubber, plastic products	*3.0*	*3.2*	18.5	-13.0	31.5	0.1	1.0	1.1
Machinery and equipment	*19.3*	*22.4*	-8.8	-7.3	-1.5	-0.2	0.0	-0.2
Office machinery and computers	1.1	2.7	44.4	-41.9	86.3	-0.1	1.6	1.5
Radio, television and communication	*6.2*	*5.8*	-32.9	-0.2	-32.7	0.0	-2.2	-2.2
Other machinery and equipment	*12.0*	*14.0*	4.2	-0.5	4.6	-0.1	0.5	0.5
Transport equipment	*16.1*	*15.6*	-7.3	10.9	-18.2	-0.1	-2.7	-2.8
Other products	*2.9*	*2.5*	15.9	-2.5	18.3	0.0	0.6	0.5
TOTAL	***100.0***	***100.0***	**8.9**	**15.7**	**-6.8**	**-10.3**	**4.0**	**-6.4**

Source: Calculations based on information from *INE* (quarterly Paasche index).

4. THE EFFECTS OF LOW-COST COUNTRIES ON PORTUGUESE MANUFACTURING IMPORTING PRICES

As mentioned above, the recent gain in manufacturing terms of trade has occurred in a context of relative stabilization of import prices. This Section looks at the links between this evolution and the role of low-cost countries in Portuguese imports. In fact, the increasing participation in international trade of some of these countries is often pointed out as a reason to explain why manufacturing import prices have shown a very contained growth in recent years. This is related to a simple composition effect: products with lower prices from some developing countries are increasing their share in total imports, pushing down the average unit value of imports.

Table 2 shows the shares in Portuguese manufacturing imports of 41 countries defined as low-cost, for the period from 1998 to 2006.[3] These shares recorded an increase (especially in the most recent years), which has bee common to all sectors, with the exception of "food and beverages". "Textiles, clothing and footwear" are the ones where the share of imports from low-cost countries records the highest figure (close to 16 per cent in 2006). The item "mineral and metal products" also came in with a share above 10 per cent in 2006.

Considering the evidence of contained growth in import prices and in line with some studies for other countries [see Kamin *et al* (2004), Røstøen (2004), Sveriges Riskbank (2005), Bank of Finland (2006), Glatzer *et al*. (2006) and ECB (2006)], an estimate was produced for the direct effect of low-cost countries in Portuguese manufacturing import prices. This was done through the computation of Paasche indices to each group of products, using import unit value figures at the most detailed available level (8-digit of Combined Nomenclature).[4] This information, covering more than 8000 different products, was adjusted by the exclusion of outliers, considered as the items whose unit values rose more than 100 per cent or fell by more than 50 per cent in each year. An import deflator was then computed for a

Table 2

PORTUGUESE WEIGHTS OF IMPORTS FROM LOW-COST COUNTRIES IN MANUFACTURING PRODUCTS

Per cent

	1998	1999	2000	2001	2002	2003	2004	2005	2006	Average	Variation (in p.p.)
Total manufacturing	5.8	5.4	6.3	6.5	6.8	6.8	6.9	7.5	8.6	6.7	2.9
Food and beverages	8.7	8.8	7.4	7.2	6.4	7.5	7.5	7.7	7.5	7.6	-1.3
Textiles, clothing and footwear	13.3	11.9	13.0	14.7	13.0	13.4	14.5	14.7	16.1	13.8	2.8
Wood, cork, pulp and paper products	6.0	6.9	6.9	6.9	7.5	6.8	9.2	8.5	7.6	7.4	1.7
Chemical products	2.3	2.4	3.4	3.3	3.3	3.2	3.5	4.5	4.6	3.4	2.3
Rubber, plastic products	3.8	4.1	4.2	4.3	4.3	5.1	5.1	5.5	6.2	4.7	2.5
Mineral and metal products	7.0	7.2	8.0	8.8	9.5	10.3	9.1	11.8	13.8	9.5	6.8
Machinery and equipment	3.3	3.2	3.5	3.2	4.6	4.3	4.5	5.0	6.4	4.2	3.1
Transport equipment	3.9	3.4	6.7	7.3	8.0	7.0	6.9	6.5	7.9	6.4	4.0
Other products	6.6	6.7	8.0	7.8	7.9	8.4	9.4	9.5	9.7	8.2	3.1

Source: *INE*.

(3) As selection criterion, the economies considered had having a price level less than 75 per cent of the Portuguese. Using Purchasing Power Parity data from the IMF's World Economic Outlook for the period 1995-2006, 41 countries were classified as low-cost countries according to this criterion: Albania, Algeria, Argentina, Bangladesh, Belarus, Bolivia, Brazil, Bulgaria, Cameroon, China, Colombia, Côte d'Ivoire, Czech Republic, Egypt, Estonia, Hungary, India, Indonesia, Kazakhstan, Kenya, Kyrgyz Republic, Latvia, Lithuania, Macedonia, Malaysia, Morocco, Nigeria, Pakistan, Paraguay, Peru, Philippines, Poland, Romania, Russia, Slovak Republic, Sri Lanka, Thailand, Tunisia, Turkey, Ukraine and Vietnam.

(4) The unit values may differ slightly from the official data on external trade deflators - the most important difference is that the unit values are not quality-adjusted. However, this problem is minimized (but not solved) when a very disaggregated level of detail of products is used.

group of trading partners excluding the economies classified as low-cost countries. The difference between these two import deflators (the overall and the one excluding low-cost partners) is used as a measure of the direct effect of low-cost countries imports. This arithmetical decomposition should of course be interpreted carefully, and probably constitutes a lower bound for the total effect of low-cost countries on import prices. Firstly, this estimate is just a rough measure of the direct effect, given that it does not account for the products arriving indirectly from low-cost countries but recorded as imports from other economies. Secondly, this measure does not account for indirect effects on the export prices of developed countries.

Table 3 shows the estimates of the direct effect on Portuguese manufacturing import prices for the period 1998-2006. As expected, the overall effect is negative, in particular from 2003 onwards – the positive figure for 2006 is an exception, and is related to higher growth in the export prices of low-cost countries that more than offset the downward pressures associated with the rise in import share of those countries with lower price levels.

According to these estimates, imports from low-cost countries contributed directly to an annual average reduction in the growth of manufacturing prices of around 0.2 percentage points (p.p.) (0.4 p.p. from 2003 onwards). Among the several groups of products considered, this negative effect was more important in textiles, clothing and footwear (an annual average of -0.5 p.p.). This direct effect seems to be rather small, when compared with the various estimates produced for other countries following the same type of methodology.

Kamin *et al*. (2004) estimated that the rising share of China in US imports had a downward effect of about 1 p.p. in import price changes, on average annual terms, over the period 1993-2002. Applying the same methodology to 26 countries, these authors estimate an average annual impact of China on import prices growth of -0.25 p.p. (-0.1 p.p. for Portugal) with higher impacts of about -1.0 p.p. on countries with the strongest trading links with China (US, Korea, Japan).

Higher effects are also reported in other recent studies for some specific countries. The Bank of Finland (2006) estimates that imports from low-cost countries have slowed the annual increase in Finish import prices of industrial goods by approximately 1 p.p. between 1996 and 2005, mostly concentrated after 2000. An average annual effect of -0.7 p.p. in the Austrian manufacturing import price growth rates in the period 1995-2005 is reported by Glatzer *et al* (2006). These results are broadly in line with the ones reported by the Sveriges Riskbank (2005) for Sweden and in Røstøen (2004) for Norway. As expected, the results for the euro area as a whole point to a bigger effect, given the exclusion of the intra-trade flows and thus the higher share attributed to low cost countries: the ECB (2006) estimates a

Table 3

EFFECTS OF LOW-COST COUNTRIES ON IMPORT DEFLATORS

In percentual points

	1998	1999	2000	2001	2002	2003	2004	2005	2006	Average
Total manufacturing	-0.4	-0.1	0.5	0.0	-0.1	-0.7	-0.6	-0.4	0.3	-0.2
Food and beverages	-0.8	-0.1	1.0	0.1	0.1	-0.5	0.1	-0.3	0.4	0.0
Textiles, clothing and footwear	-1.4	-1.1	1.5	0.2	-1.5	-0.7	-0.8	-1.1	0.9	-0.5
Wood, cork, pulp and paper products	-0.2	0.0	0.7	-0.1	0.0	-0.8	0.9	0.2	0.7	0.2
Chemical products	0.0	0.1	0.5	-0.6	-0.2	-0.3	-0.2	0.4	0.3	0.0
Rubber, plastic products	-0.1	-0.9	-0.1	0.2	0.2	-1.3	-0.8	0.2	0.4	-0.2
Mineral and metal products	-0.3	-0.1	0.5	-0.4	-0.2	0.7	1.0	-1.3	-1.3	-0.2
Machinery and equipment	-0.4	0.0	-0.3	0.3	-0.1	-1.1	-1.1	-0.4	0.6	-0.3
Transport equipment	-0.4	0.7	1.2	-0.3	0.2	-1.1	-1.8	-0.1	-0.1	-0.2
Other products	-0.1	0.3	-1.2	0.4	0.3	-1.0	-0.6	-1.3	-0.4	-0.4

Source: Calculations based on information from *INE*.

Table 4

WEIGHTS OF IMPORTS FROM LOW-COST COUNTRIES
(EURO AREA COUNTRIES MANUFACTURING PRODUCTS)
Per cent

	All 41 countries			of which					
				Central and Eastern Europe[a]			China		
	1998	2006	var	1998	2006	var	1998	2006	var
Austria	9.9	14.3	4.3	8.0	10.2	2.1	1.0	2.8	1.8
Belgium-Luxemburg[a]	9.0	12.9	3.9	3.0	4.8	1.8	2.3	4.7	2.4
Finland	8.8	20.4	11.6	5.6	10.2	4.7	1.7	7.6	5.9
France[b]	12.8	20.3	7.5	3.7	7.4	3.7	2.8	5.7	2.9
Germany	16.8	24.4	7.6	10.1	13.7	3.6	3.1	7.4	4.3
Greece	10.6	17.8	7.2	5.2	9.1	4.0	2.5	5.2	2.7
Ireland	4.6	8.4	3.9	0.9	2.4	1.5	1.5	3.8	2.3
Italy	12.9	23.3	10.4	5.7	10.8	5.2	2.7	7.2	4.4
Netherlands	11.2	24.4	13.2	3.4	5.1	1.6	2.5	13.1	10.6
Portugal	5.1	8.1	3.0	1.4	3.4	2.0	0.9	1.9	1.0
Spain	7.5	16.0	8.5	2.0	5.4	3.4	2.4	6.3	3.9

Source: World Trade Atlas.
Notes: The differences observed in Portuguese import shares between table 2 and table 4 are due to different data sources. (a) Bulgaria, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Macedonia, Poland, Romania, Russia, Slovakia, Turkey and Ukraine. (b) First available year is 1999. In the case of France, shares are computed in total imports of goods.

sizeable dampening in overall euro area import price growth of approximately 2 p.p. per year over 1996-2005.

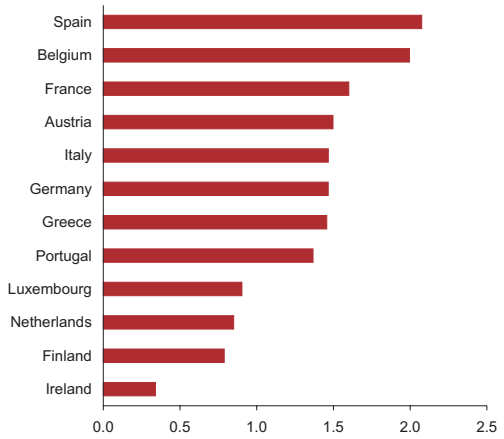
As in Kamin *et al*. (2004), the smaller direct effect estimated for Portugal is related to the lower importance of imports arriving directly from countries characterized by low production costs.

Table 4 compares the proportion of these countries in manufacturing imports of several euro area countries. In fact, Portugal is the country where this share is smaller (both in levels and in accumulated variations), and this difference is basically explained by the low proportion of imports arriving from China and from Central and Eastern Europe. This notable difference between Portugal and the other euro area countries may be related to some geographical features or to a more similar specialization between Portugal and those developing countries [Esteves and Reis (2005)]. However, it should be stressed that this lower direct effect was not translated into a differentiated evolution of import prices – using data from Eurostat, the growth in Portuguese manufacturing import prices was very close to the average of the euro area countries (Chart 7).

Chart 7

MANUFACTURING IMPORT PRICES IN EURO-AREA COUNTRIES

Annual average changes: 1998-2006



Source: Eurostat (Comext).

5. THE CLOTHING SECTOR AS A CASE STUDY

Given the important contribution of the so-called traditional sectors, it is relevant to explore the evolution of their terms of trade. While the decline of import prices is often pointed out as being related to the increasing competition from low-cost countries, the differentiated evolution of export prices may constitute a signal of some structural changes.

In general terms, the evolution of export unit values can be decomposed into: (i) the weighted evolution of individual prices; (ii) the changes in shares weighted by price levels; (iii) and a cross term accounting for both the variations of prices and shares

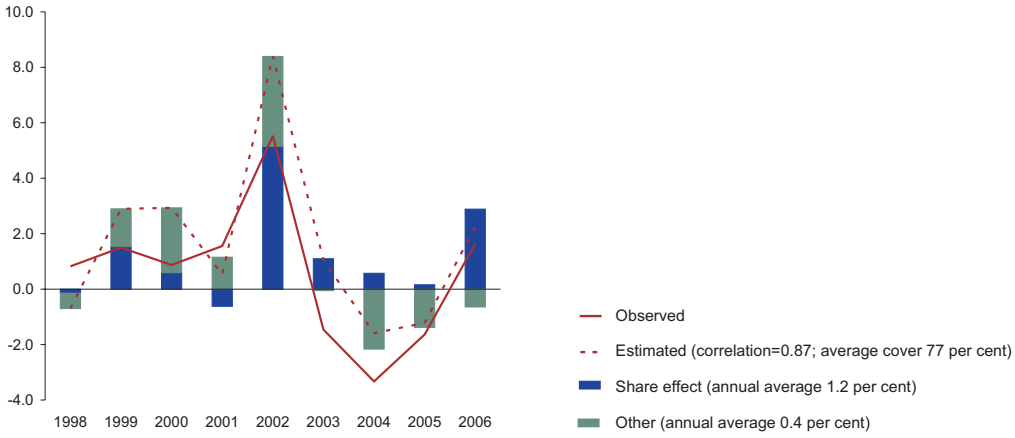
$$\Delta p = \sum_i \alpha_i \Delta p_i + \sum_\iota \Delta\alpha_i p_i + \sum_\iota \Delta\alpha_i \Delta p_i$$

The second term accounts for a composition effect. If the structure of exports is moving towards more (less) expensive products, this would imply an increase (decline) in the aggregate export price. Chart 8 presents this decomposition for export prices in the clothing sector, using the available micro data for around 420 different products, both in nominal and volume (in Kg) terms.[5] The results show a regular positive share effect, pointing to an annual average contribution of 1.2 percentage points for the evolution of export prices in the clothing sector. This suggests some recomposition in this sector, translated into an increase of relative weight of more expensive products, with a decline in exports of lower-end products and/or a redirection of exports to high-range markets. The information that was used does not allow for a conclusion as to which of these two composition effects was predominant. However, the decline of production in these sectors over the most recent years suggests that part of this composition effect might be related to the destruction of production in some products oriented to low-range markets.

(5) Products not available for two consecutive years are excluded. Moreover, products with prices growing outside the range (-25%,+25%) or with quantities rising outside (-50%,+50%) were also excluded. It should be mentioned that the same type of exercise was attempted for the textiles and footwear sectors. However, the micro data did not allow for a reasonable reproduction of the evolution of the respective export prices. This may be related to some important quality adjustments when computing the official figures for export prices. In general, it is not possible to reproduce these adjustmentents, and they are likely to be particularly important in sectors with less product homogeneity.

Chart 8

EXPORT PRICES IN THE CLOTHING SECTOR
Contributions to annual growth, in percentual points



Source: Calculations based on information from *INE*.

6. CONCLUSIONS

This article analyses the recent evolution in the Portuguese terms of trade. This evolution is analysed from an historical perspective and compared with the one recorded by other OECD countries. Additionally, in line with the approach presented in Baxter and Kouparitsas (2006), the evolution of terms of trade is broken down into two effects: a first component measuring the effects of the specialization of each country across the several sectors; and a second component related to differences between export and import prices for each type of product.

The results point to the fluctuations in oil prices as the major factor explaining the evolution of terms of trade. When the energy component is excluded, and the focus is on manufactured goods, the terms of trade gain is strongly related to an increase in relative prices in some group of products, in particular in textiles, clothing and footwear. The results suggest that the recent increase in terms of trade may be related, among others, to two factors.

The first is the increasing competition of low-cost countries in international markets. Terms of trade gains were common across OECD countries and started to occur in the 90s, when increasing international competition seemed to gain momentum. Moreover, the role of globalization is suggested by the fact that, both in Portugal and in the other OECD countries, the increase in terms of trade was connected with a very contained evolution of import prices. Several empirical studies point out the increasing competition from low-cost countries as having contributed to this evolution [see, for instance, Kamin *et al*. (2004) and ECB (2006)]. In the Portuguese case, this negative effect of increasing competition on manufacturing import prices was particularly strong in the so-called traditional sectors (textiles, clothing and footwear), i.e. the sectors where imports from low-cost countries recorded the highest shares and where import prices gave the most important contribution for the rising path of terms of trade.

The second factor is more specific to Portuguese economy, since it related to a significant increase in terms of trade in the traditional sectors. In line with recent results for the textiles sector concerning the evolution of labour and wages [see Banco de Portugal (2006)], there is evidence that a composition change within the clothing sector has contributed to the positive evolution of export prices, which may

also be related to increasing international competition. Such integration has translated into a progressive change in global comparative advantages, implying not only the redirecting of some national production to high-range markets, but also a decline in the proportion of exports of lower-end manufactures goods. The results presented do not allow for a conclusion as to which of the two composition effects was the most important.

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EFFICIENCY ANALYSIS OF PUBLIC HOSPITALS TRANSFORMED INTO PUBLIC CORPORATIONS: AN APPLICATION OF DATA ENVELOPMENT ANALYSIS*

*Sara Moreira***

1. INTRODUCTION

In the last few years, in-depth reforms introducing corporate management practices in the public sector have been implemented in Portugal. This process is particularly evident in the health area, where, since 2002, several hospitals included in the general government sector have been transformed into public corporations (EPE Hospitals) and afterwards into public enterprises.[1] As in other countries, this reform raised the issue of evaluating the effects of different management and financing practices on hospitals' efficiency. This study aims to carry out this analysis for the Portuguese case, focusing on the first set of hospitals transformed into corporations. Accordingly, a comparison is made between the performances, before and after the reform, of the EPE hospitals and a control group composed of hospitals which are still within general government (SPA hospitals). Data for 64 public hospitals was collected for the period ranging from 2001 to 2005 (not including specialized hospitals such as psychiatric, university or maternity hospitals). The analysis is always carried out in relative terms through a comparison with a control group, assessing technical efficiency of the production units, i.e. the ability to produce the maximum level of outputs given a certain level of inputs or alternatively to use the minimum level of input to produce a given level of output. The study of efficiency is based upon a non-parametric method known as Data Envelopment Analysis (DEA). Throughout this paper this methodology is used in its multiple variations. The results should be interpreted with some caution, in particular due to the limitations of the database. Nonetheless, most of the approaches conclude that EPE hospitals, starting from a worse relative position, achieved relatively higher efficiency gains (significant in statistical terms) vis-à-vis SPA hospitals.

DEA is a technique which uses mathematical programming models to analyze the optimal combinations of inputs and outputs given the observed performance of production units. The set of optimal combinations constitutes a frontier and allows the measurement of relative efficiency levels. DEA models are frequently used to assess the efficiency of the provision of services by general government entities. This is because of their flexibility, which is essential to the evaluation of complex organizations such as hospitals. Two different estimation procedures are used. In the first, linear programming models are solved, including all hospitals in each year. The performance of the two groups under analysis – enterprise hospitals and control group – is then evaluated and the perceived difference in efficiency between them is checked for statistical significance. The inclusion of all observations in the same model is equivalent to implicitly assuming that all hospitals have access to the same technology. Considering

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(1) The units were initially transformed into public corporations with the State as the only shareholder under corporate law (SA), and were later converted into public enterprises (Entidades Públicas Empresariais – EPE). The main differences between SA and EPE are that the capital of EPE hospitals cannot be privatised; they come within the EPE law of 1999 instead of the commercial code, and their accounts are controlled by a single supervisor appointed by the Ministry of Health.

that EPE hospitals face a new operational framework, it is arguable that this approach involves too strong an assumption. Accordingly, in the second estimation procedure, the sample is divided into two groups and different frontiers are estimated. Each hospital's efficiency is evaluated vis-à-vis the frontier of its group and subsequently a new model is defined based on the adjusted data for all units, which is then used to make comparisons between performances of the two groups of hospitals. The objective of this procedure is to compare the best practices by analysing the maximum efficiency instead of the average efficiency of each group.

The paper is structured as follows. Section 2 presents the reform of public hospitals in the context of the Portuguese health system. Section 3 describes the conceptual framework of efficiency analysis with particular focus on measurement problems in hospitals' activity. Section 4 summarizes the methodology used. Section 5 provides a description of the sample, variables and the estimation procedure. Section 6 comments on the results and the sensitivity analysis. Section 7 concludes.

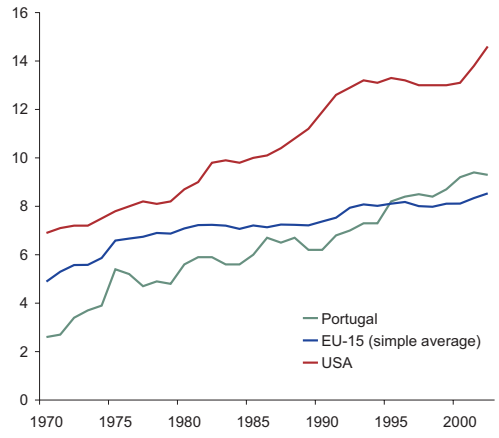
2. THE PORTUGUESE HEALTH SYSTEM AND THE REFORM OF PUBLIC HOSPITALS

In most developed countries the ratio of health care spending to GDP has followed an upward trend in the last few decades (Chart 1). In Portugal it recorded a sharp growth, even surpassing the EU-average. Government spending accounts for most of this rise, and represents more than two thirds of total spending in recent years (Table 1). OECD projections point to a strong growth of health expenditure in the next decades. In order to deal with the challenges raised by this trend, many governments have been introducing new policy measures for both supply and demand in the health services. Among the reforms on the supply side, those whose objective is to enhance economic efficiency in the provision of health care are particularly relevant.

In Portugal, public health care covers all residents and is ensured by the National Health Service (NHS) on the continent and by the regional health services in the Azores and Madeira. At the same time a considerable share of the population (about a fourth) benefits from supplementary health protection subsystems, either public (like ADSE for public employees and specific schemes for some min-

Chart 1

HEALTH EXPENDITURE
As a percentage of GDP



Source: OECD Health Data (2005).

Table 1

PUBLIC EXPENDITURE ON HEALTH CARE
As a percentage of total expenditure on health care

	1972	1982	1992	2002
Portugal	60.0	56.2	59.6	70.5
EU-15 (average)	73.2	80.0	76.5	74.5
USA	37.2	40.8	42.4	44.9

Source: OECD Health Data (2005).

istries/professional groups) or private (for example SAMS, which covers banking sector employees). Additionally, voluntary private health insurance coexists with these systems. All of them provide health services either directly or indirectly, through contracts with other entities.

Initially, the NHS combined public financing with the direct provision of health care. This sort of arrangements, however, is perceived to generate serious inefficiency problems and shows little responsiveness to patient needs (Docteur and Oxley, 2003). In Portugal some decentralization has been gradually introduced in the health sector since the mid-1990s. Nowadays, integrated services (primary health care centres and public hospitals) coexist with other entities which provide services under contract with the NHS. Indeed, the reforms transformed the public health system, making it increasingly closer to a model where the provision of health services financed by general government is based on contracts with external entities. The 2002 structural reform occurred in this context, focusing on the hospital sector[2] with the transformation of public hospitals into public corporations and the launch of public-private partnerships (PPP).

The 2002 reform was a major policy measure since it involved a significant number of hospitals that, taken as a whole, were responsible for nearly half of public hospital production, medical and nursing staff and capacity (measured by the number of beds). The selection of the hospitals to be included in the first round was based on a number of factors among which are dimension, the age of buildings and some economic factors.[3] The hospitals that are still working according to the former rules (SPA hospitals) and the new enterprise hospitals face very different conditions in the development of their activity, in particular regarding management procedures and the relationship between the financing/purchaser entities and the providers of health care services. Hence, from 2003 on, EPE hospitals have been financed according to their production, i.e. they receive a certain amount for each unit of service they provide to NHS beneficiaries. Their activity is framed by annual-contract programmes of production and convergence signed by the hospitals and the Ministry of Health. These contracts define the prices for every service and also set financial and economic convergence targets. Additionally, they specify monitoring and evaluation mechanisms as well as incentives and penalties. From 2005 on annual-contract programmes were also set up with the hospitals still belonging to the general government sector. Although these contracts are formally similar to the former (they also set objectives and quantitative targets), the financing of these hospitals is still done through an overall budget transfer.

(2) The Portuguese health sector is mainly composed of public hospitals, whose expenses represent a large share of NHS expenditure. Guichard (2004) identified the weak points of these units in terms of performance. In particular they do not comply with budget restrictions (non-realist budgets, high deficits that let to extraordinary budgets or *post hoc* settlement of debts with no penalties for defaults); there is no quality control; they face serious problems at staff level (below optimal recruitment level in certain areas, wages that are only a function of the professional category and career length) and have long waiting lists for consultations and surgeries.

(3) According to the *Observatório Português dos Sistemas de Saúde* (2003) 'the selection process used as benchmark a number of criteria of which the following can be highlighted: (i) dimension: hospital averages, measured by the number of beds, which vary between 150 and 600 beds; (ii) Building or asset age, more recent buildings were preferably selected; (iii) Criterion of economic nature: hospitals that would have a positive balance if they were financed by total production instead of historical values. Other types of criteria were used such as: (iv) geographical distribution: concern in involving hospitals from across the country; (v) a statement of will: whenever possible taking into account applications by the hospital's board of directors and (vi) the obligation of having deficit values that do not surpass 30%'.

After the reform, the public hospital sector comprised three different types of organizational arrangements: EPE hospitals, SPA hospitals and PPP. Since PPP hospitals do not have a significant weight, this study focus on EPE and SPA hospitals, where the latter serve as a control group.

3. EFFICIENCY

3.1 Concept and measurement

The methodologies used to assess efficiency are often classified in two broad categories: performance measurement indices and frontier methods.[4] The first category consists in a set of indicators that measure one or several particular features of the units under assessment, as for example the commonly used average productivity measures. The main disadvantage of this approach is its partial nature, which according to the indicator selected may lead to contradictory conclusions. One way to tackle this problem is to aggregate several partial indicators into one efficiency index. However, this procedure is also criticized on the basis of the arbitrariness that underlies the choice of the respective weights.[5] The second category corresponds to the approaches that lead to an overall efficiency index. Empirically, they usually involve two steps: the estimation of an efficiency frontier and then the calculation of each unit's deviation from that benchmark. Farrel (1957) presented the first alternative to measure efficiency, based on the distance between the unit under assessment and the production frontier. The latter would reflect results of the units with better performance. As such this approach allows the calculation of relative efficiency.[6]Over the last few decades several methodologies have been developed with the purpose of estimating efficiency levels using the concept of frontier. Stochastic Frontier Analysis (SFA) and Data Envelopment Analysis are the most commonly used. The first is a parametric methodology based on econometric methods. It allows for the existence of randomness in the analysis since it includes an error term that can be divided into two components: inefficiency and a statistical residual. One of the main drawbacks of this approach is the requirement of a priori specification of the production frontier's functional form and the distribution of the error term, which constrain the analysis of efficiency. In its turn, DEA is a non-parametric methodology that uses mathematical programming techniques. It allows the measurement of efficiency in the presence of multiple inputs and outputs without requiring the specification of a functional form. However, this method does not contemplate the existence of exogenous factors in the analysis, and consequently the unit's distance to the frontier is totally accounted as inefficiency. As a consequence, the results may be critically influenced by the existence of outliers or by the selection of variables in the study. Since the different methods present advantages and disadvantages, the characteristics of the sector under assessment in addition to the information constraints are crucial for choice of the most appropriate technique, in each case. In the performance assessment of public sector units the DEA method is often preferred because it seems to fit well into the particular characteristics of its productive process (Pedraja-Chaparro and Salinas-Jiménez, 2005).

(4) For greater detail, see Coelli, Rao and Battese (1998).

(5) To follow the activity of EPE hospitals, the Ministry of Health has relied upon a Tableau de Bord. An efficiency index was calculated, which aggregated several indexes of hospital activity such as operational, quality and financial. This index fits in the first category mentioned, therefore suffering from the referred problems.

(6) In his study, Farrel decomposes productive efficiency into two elementary components – technical efficiency and allocative efficiency (or price efficiency) – and presents a proposal for their measurement. Technical efficiency refers quantities, whereas allocative efficiency refers to prices.

3.2. Hospital efficiency

The measurement of hospital efficiency is particularly difficult due to the special nature of its productive process. The first problem emerges from the multiplicity of objectives and the definition of hospital production. Ideally, the output should be measured as the impact on the population's health status. Nonetheless, this analysis proves to be a very difficult task either conceptually or empirically. Health status depends on a multitude of factors, most of them exogenous to health care. Depending on the type of analysis, several different proxies have been used. In microeconomic analyses of efficiency, intermediate outputs, such as health services provided, are commonly used. The rationale for this procedure is that there is a positive and high correlation between the production of health services by hospitals and improvements in the population's health status. An additional difficulty is related to hospital heterogeneity, both in terms of backgrounds and production combinations. Indeed, it becomes harder to determine the underlying technology and as a consequence its functional form. It should be noted that in some countries the scarcity of available data is another barrier to the analysis since it makes a comparison between the different units under assessment more difficult and limits the authorities' ability to monitor performance and provide suitable incentives to improve it.

The number of studies that address the problem of efficiency measurement in the health sector has been increasing in the last few years (Hollingsworth, 2003). The DEA approach dominates the literature on the topic. It should be noticed, however, that a growing number of studies are using parametric methodologies and especially the SFA. The studies that assess the capability of the different methodologies to effectively measure hospital sector efficiency characterize DEA as a good technique for overall analysis, since the problems related to the model's specification have greater impact on individual results than on results for the group as a whole.

Regarding Portuguese hospitals' efficiency, there are only a few empirical studies based on frontier techniques. Barros (2003) used DEA and SFA methods to assess efficiency in 2000, with the objective of portraying EPE hospitals prior to their reform. The study concludes that the DEA presents results that are more robust. Dismuke and Sena (1999) and Lima and Whynes (2003) analyse the impact of changes in the financing mechanism on Portuguese hospitals' performance. Dismuke and Sena (1999), using three diagnosis techniques, assess the impact of the financing mechanism based upon Diagnosis Related Groups (DRG) on technical efficiency and productivity with DEA and other parametric approaches. The DRG are an internationally used empirical system of classification, defining clinically consistent and homogeneous groups as a function of similar characteristics and consumption patterns.[7] Lima and Whynes (2003) consider a wider period of analysis to evaluate the impact of the same change on costs per admission and per patient day, and also on average length of stay and number of admissions.

The economic evaluation of the transformation of public hospitals into EPE hospitals has already been done. A commission was created by the government to assess the impact of the reform on quality, accessibility, production and efficiency. In terms of economic efficiency, the commission opted for estimating a cost function (using the differences-in-differences methodology) and concluded that the reform reduced the production costs associated with the same quantities, complexity and quality of the services provided. Additionally, two other studies were carried out, using performance measurement indexes. One of them was carried out by the General Directorate of Health (*Direcção Geral de Saúde*)

(7) The use of this classification system for 'in-patient discharges' and 'out-patient surgeries' allows aggregating the patients of each hospital in about 500 groups. The existence of this system is particularly useful in studies such as the one presented here because it allows an easy comparison of production from the range of hospitals.

with the purpose of monitorising hospitals, using global performance indexes to make an assessment of hospitals efficiency and quality. The results reveal that in 2003, EPE hospitals were on average less efficient, whereas in 2004 they became more efficient than SPA hospitals. The other study by the Escola Nacional de Saúde Pública (Costa and Lopes, 2005) deals essentially with effectiveness in treatment and efficiency in hospitals performance in the period 2001-2004. To estimate efficiency, the authors calculate an absolute index that is a function of the average observed waiting time and of the average expected waiting time. Results reveal that EPE hospitals present better performance from 2003 onwards.

4. DATA ENVELOPMENT ANALYSIS

The DEA method was first proposed by Charnes, Cooper and Rhodes (1978) and since its conception it has been greatly developed and extended. For more details check Cooper, Seiford and Tone (2000). The technique is based on the empirical estimation of a frontier through the application of a mathematical programming model to the observed data. The frontier identifies the most efficient combinations between inputs and outputs. In its linear form, the model could be represented in the following way:

$$\underset{\{\theta_0,\lambda_j\}}{Min} \quad \theta_0$$

$$\text{subject to}: \quad \sum_{j=1}^{n} x_{ij}\cdot\lambda_j \le x_{i0}\cdot\theta_0$$

$$\sum_{j=1}^{n} y_{rj}\cdot\lambda_j \ge x_{i0}\cdot\theta_0$$

$$\theta_0,\lambda_j \ge 0; \quad i=1,2,\ldots,m; \quad r=1,2,\ldots,s; \quad j=1,2,\ldots,n$$

The objective of this problem is to find, for each analysed unit (in DEA, the entity under study is called a Decision Making Unit – DMU_j , j=0,1,2,…,n), a linear combination of the other units that reduces in proportional or radial terms the consumption of the *m* inputs for the least possible value given the production of the s outputs. A strictly positive value for λ means that DMU_j is a reference for DMU_0. It should be noted that the model calculates for each unit the most favourable weights that the *n* restrictions allow. The optimal value of the objective function represents the units' efficiency index. Therefore if $\theta_0^* < 1, U_0$, the DMU_0 will be classified as inefficient and the maximum proportion of inputs that could be reduced is given by $(1-\theta_0^*)$. It is worth highlighting that the frontier's construction involves the solution of the programme for all *n+1* production units and that the weights typically vary.

Within the scope of this technology, other alternative models could be specified with the same underlying optimality conditions. The model presented above is input-oriented since it is targeted to check whether the input usage could be reduced given an output level. Nonetheless, it would be possible to define an equivalent output-oriented model, which conversely would be based on the maximization of output for a given level of inputs. It should be also referred that DEA models have multiple extensions. One of the most important is related to the ability to measure scale efficiency/inefficiency, since the original framework (presented above) assumes that the frontier exhibits constant returns to scale. Another important extension of the model is the introduction of programmes that use artificial variables. With this framework it would be possible to find optimal solutions that do not correspond uniquely to radial reductions or expansions. This is of utmost importance because the former solutions sometimes do not provide a correct indicator of efficiency measured in relative terms. Therefore, in the model presented above, $\theta_0^* = 1$ is a necessary but not sufficient condition for a unit to be considered efficient.

5. DATA AND MODEL

5.1. Sources and samples

The data used in the study was essentially provided by the *Administração Central do Sistema de Saúde* (ACSS-Ministry of Health) through NHS annual reports, hospital balance sheets or other detached information directly provided. In addition, it was necessary to use information that was included in the EPE hospitals' annual reports. Due to differences in the data provided by different institutions, a single source was used whenever possible.

Since the aim of this study is to examine the impact from transformation of some hospitals into public corporations in terms of their efficiency, it was decided that the suitable period of analysis would be the years from 2001 to 2005. The hypothesis of using 2002 as the benchmark year was excluded because the EPE hospitals' financial data exhibit some discontinuities that result from the fact that the reform was carried out in the middle of December of that year. The decision to end the analysis in 2005 was taken mainly because the inclusion of more recent data would imply a substantial reduction in the sample. Indeed, the units for which there are no available data for the latest years would have to be excluded from the analysis. In addition, some hospitals were merged, leading to a consolidation of their data.

At the outset of the analysis, data were gathered for 80 Portuguese hospitals. From those a sample of 64 hospitals was selected. Some specialized hospitals like psychiatric, universities or maternities were excluded from the sample, as well as some hospitals with serious data problems.[8] Homogeneity among units is a very important feature in the application of the DEA framework, since this methodology employs a relative efficiency analysis and is non-parametric. It should also be referred that the two groups under analysis were balanced, since 27 EPE hospitals and 37 SPA hospitals were included. From this sample another sub-sample was selected, relatively more homogeneous, though slightly more reduced. This sample comprises 25 EPE hospitals and 23 control units (SPA hospitals). The homogeneity of the units was assessed taking into account hospital dimension and output mix.[9] This procedure resulted in a significant reduction in the number of SPA hospitals in the sample, mainly because there were many small hospitals within that category.

5.2. Variables

Table 2 summarises the variables used in the analysis. Taking into account the availability of data and the characteristics of Portuguese hospitals, the following variables among intermediate outputs were considered: in-patient discharges, external consultations, urgency episodes, day hospital sessions and out-patient surgeries. The treatment of in-patients is the service that mostly differentiates the activity of one hospital vis-à-vis the other units providing health care. In this study the number of in-patient discharges corresponds to the number of patients that leave the hospital adjusted by an index that captures different degrees of complexity among treatments. In Portuguese hospitals, treatments are classified in DRG and this, when aggregated according to their respective weights (function of the cost of

(8) The problems are more perceivable when different years and different sources are compared. Furthermore, it was necessary to aggregate (or disaggregate) observations from hospital centers when they were reported in different configurations.

(9) The reduced sample was selected using the 2001 data as a benchmark. The dimension was measured by the number of beds (between 90 and 650 beds) and resulted in the exclusion of 12 hospitals. The production mix criterion was substantiated in the existence of emergency episodes and of at least one of the following services: 'day hospital sessions and out-patient surgeries'.

each group), enable the computation of a single index: the in-patient case-mix index (I-CMI). This index therefore reflects the relative position of a hospital vis-à-vis other hospitals in terms of its proportion of treatments associated with complex pathologies, which are more resource intensive. In terms of out-patient treatment, it should be referred that the measurement unit used in this study for external consultation is the total number of consultations adjusted by the I-CMI. This adjustment results from the conviction that resource consumption in consultations is strongly correlated with the resource consumption of in-patient treatments. It was not possible, though it would be advisable, to disaggregate the total number of consultations between medical and non-medical. Nevertheless, the adjustment performed through the I-CMI partly overcomes this limitation. Regarding urgency episodes and day hospital sessions, it was not possible to adjust for treatment complexity. Given this, the observed number of cases was considered. To measure the out-patient surgeries, an adjustment similar to the external consultations was employed, but the index used was the out-patient case-mix index (O-CMI). It should be mentioned that out-patient surgeries are treatments that are also classified in DRG, allowing the computation of an O-CMI.

Conceptually, inputs are usually classified as capital and labour. In this study, capital is represented by the proxy 'occupancy', which represents the number of beds that are available and equipped to immediately receive in-patients (excluding nursery and observation beds). As regards labour, four proxies, measured in physical units, are considered: doctors, nurses, diagnostic and therapeutical staff and other staff. The chosen disaggregation reflects the differences in the costs associated with these professional categories. Due to data unavailability, it was not possible to measure these variables in terms of full-time equivalents. Additionally, the study considered the following variables: 'direct cost', 'adjusted external supplies and services' and 'staff costs', each measured in monetary units. Indeed, these variables encompass broad categories that include several inputs. The first variable reflects essentially the costs with pharmaceutical products and other material for medical consumption. The second variable encompasses general and administrative expenses such as water, electricity or communications supplies. Rent costs were not included (hence, the reason for the term 'adjusted') because differences in this item are explained by factors that are totally exogenous to the management. The staff costs variable includes income from labour such as regular wages, holiday subsidies or additional income (which is essentially related to overtime hours, night stands or supplements). Finally, it should be noted that the inputs 'total staff' and 'total cost' are obtained by summing up the other variables.

Table 3 presents the most important descriptive statistics relative to the year 2001 for both the large and the reduced sample. As already mentioned in the previous section, EPE hospitals are on average bigger than the control group. This fact is observable whenever variables other than occupancy are considered. This situation, however, is substantially attenuated in the reduced sample. The statistics also reveal that in general standard-deviations are very high, which shows that there is a significant heterogeneity between hospitals. Nevertheless, EPE hospitals seem to be a relatively more homogeneous group, in the sense that they present a lower dispersion around the mean. This evidence is most likely due to the criteria that were used to select the group of hospitals that would be transformed into EPE hospitals.

In terms of the evolution of outputs and inputs throughout the period 2001-2005 – presented in average terms in Chart 2 – it should be referred that the variables have a quite distinct behaviour over the period. Differences in the behaviour of outputs are particularly significant. Urgency episodes have stabilised, whereas the out-patient surgeries and the hospital day sessions have augmented considerably. Developments in inputs do not record such dispersion. Nevertheless, while occupancy presents a small decrease, staff and the financial inputs show some growth (quite significant in some cases). Taking into consideration the relative evolution of the two groups, it can be stated that production in the

Table 2

VARIABLES

	Name	Description
Outputs:		
IN	In-patient discharges	Number of in-patient discharges (excluding nursery and SO) adjusted by the in-patient case-mix index.
EC	External consultations	Number of external consultations adjusted by the in-patient case-mix index.
DH	Day hospital sessions	Number of day hospital sessions
UR	Urgency episodes	Number of attending in urgency service
OU	Out-patients surgeries	Number of out-patient surgeries adjusted by out-patient caxe-mix index.
Inputs:		
OC	Occupancy	Number of beds, excluding nursery and S.O. (at 31 December).[a]
DO	Doctors	Number of hospital doctors (at 31 July).[b]
NU	Nurses	Number of nurses (at 31 July).[b]
DI	Diagnostic and therapeutical staff	Number of diagnostic and therapeutical staff (at 31 July).[b]
OS	Other staff	Hospital staff, except doctors, nurses and diagnostic and therapeutical (at 31 July).[b]
TS	Total staff	Total staff
DC	Direct costs	Cost with pharmaceutical products and other material for medical consumption (count 616[c]), in millions of euros
ES	External suplies and services	Cost with external supplies and services (count 62[c]), except rents (count 62224[c]), in millions of euros.
SC	Staff costs	Cost with wages and salaries (count 6421), Christmas and holiday subsidy (count 6423[c]) and of additional benefits (count 6422), in millions of euros.
TC	Total cost	Includes COM, CFS and CPE.

Notes: (a) For some hospitals in only available the average number. (b) For some hospitals the staff is measured at 31 December, in particular in the case of EPE hospitals. (c) Counts of the official accounting plan (Plano Oficial de Contabilidade) of the Ministry of Health..

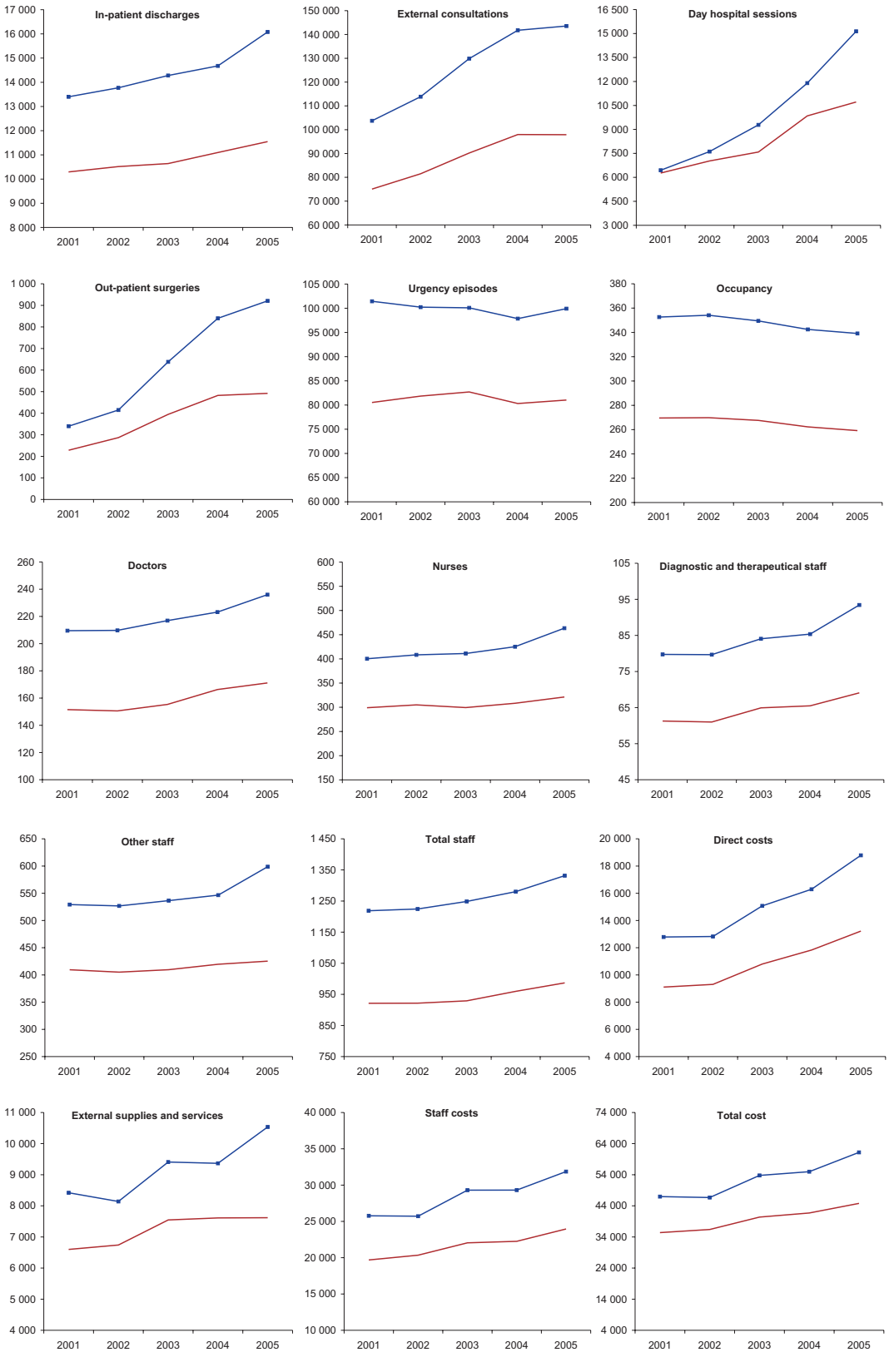
Table 3

DESCRIPTIVE STATISTICS (2001)

	Broader sample								Reduced sample			
	EPE				SPA				EPE		SPA	
	Mean	Std Dev	Max	Min	Mean	Std Dev	Max	Min	Mean	Std Dev	Mean	Std Dev
Outputs:												
IN	13 401	5 864	31 995	4 894	10 296	10 537	58 151	1 576	13 387	6 097	11 451	6 836
EC	103 737	87 341	466 190	24 829	75 071	88 333	452 762	7 120	102 743	90 831	82 654	67 000
DH	6 447	6 500	30 599	0	6 270	10 001	51 186	0	6 014	6 567	7 567	11 350
UR	101 442	54 935	208 249	0	80 528	38 210	175 065	25 299	109 558	48 407	90 879	36 824
OU	340	618	3 045	2	228	264	1 011	0	350	640	237	254
Inputs:												
OC	353	134	625	140	270	220	1 078	48	363	132	316	174
DO	210	155	795	47	152	185	902	6	210	160	172	147
NU	400	175	923	151	299	257	1 183	33	406	180	348	220
DI	80	43	215	21	61	63	330	1	79	44	69	44
OS	529	246	1 329	179	409	360	1 837	73	533	254	467	277
TS	1 219	594	3 262	400	921	855	4 252	144	1 228	614	1 056	671
DC	12 784	11 797	59 564	1 301	9 106	10 967	45 626	418	12 334	12 048	10 326	10 222
ES	8 421	3 922	19 707	3 055	6 599	6 780	37 154	764	8 564	4 041	7 404	4 517
SC	25 775	13 024	73 140	9 130	19 685	19 411	95 477	2 323	26 060	13 476	22 612	15 205
TC	46 981	27 645	152 411	13 486	35 390	36 684	178 258	3 692	46 958	28 771	40 343	29 425

Chart 2

EVOLUTIONS OF THE VARIABLES' MEAN VALUE IN EPE AND SPA HOSPITALS



EPE hospitals has shown a higher average growth than in SPA hospitals (with the exception of urgency episodes). Regarding inputs, the larger differences in behaviour are observed in some staff categories as well as in the 'direct cost' and 'adjusted external supplies and services' variables.

5.3. Model specification

To analyse hospital efficiency, frontiers are calculated according to the model presented in section 4 and the efficiency score (θ^*) is obtained for each unit. This procedure is repeated for all years under analysis. As mentioned before, the model assumes constant returns to scale, which means that the hospitals are operating at their optimal scale (there are no scale inefficiencies). By using a variable returns to scale model, this assumption could be relaxed. It would imply, however, a reduction in the number of reference units, leading to an increase in the number of efficient hospitals as well as an enlargement of the efficiency scores average. It should also be noted that the obtained indexes are radial, which means that they refer to a proportional reduction in inputs given current output levels. Models that make use of 'slack variables' relax such assumptions, but are difficult to employ in a case where the variables exhibit different measurement units. The decision between input-/output-oriented DEA models is generally taken with regard to the degree of flexibility in the choice of combinations and quantities for inputs and outputs. Since hospital managers are believed to have a much greater control over inputs than over outputs, which are essentially driven by the demand faced by the hospital, it was decided to use an input-oriented version of the DEA model.

This study considers a broader model that includes as inputs the variables 'occupancy', 'doctors', 'nurses', 'diagnostic and therapeutical staff', 'other staff' and 'direct cost', and as outputs, the variables 'in-patient discharges', 'external consultations', 'day hospital sessions', 'urgency episodes' and 'out-patient surgeries'. In addition to this extensive model, other specifications were estimated with the purpose of evaluating the sensitivity of results to different models. As mentioned before, this methodology allows the inclusion of variables measured both in physical and financial units, which explains the use of a proxy for pharmaceutical products and other materials for medical consumption defined in monetary units.

Two distinct DEA estimation procedures are used. First, mathematical programmes including all the hospitals of the sample in each year are solved, implicitly assuming that they have access to the same technology. This procedure is designated as 'global frontier analysis'. In the second procedure, based upon Charnes, Cooper and Rhodes (1981) and hereafter designated as 'group frontier analysis', the sample is split between EPE and SPA hospitals and different frontiers are estimated. After estimating the intra-group efficiency scores, hospitals are projected into their respective frontiers. Using these fictitious observations, a new frontier is constructed comprising all units. Subsequently, results from both groups are compared. This method assumes that EPE hospitals and SPA hospitals have different technologies. It is a DEA extension with two phases of estimation: the first consists of intra-group evaluation and the second reflects inter-group assessment. This procedure is a more refined technique that compares both groups' best practices instead of the groups' average efficiency levels, since maximum efficiency levels for each group are confronted. The results from the linear mathematical programming model are calculated, using two specific softwares: DEA-Solver (Kluwer Academic Publishers, 2000) and EMS (Efficiency Measurement System).

After the estimation phase, the individual efficiency scores are aggregated by group. In addition to a simple arithmetic average, a weighted mean, with the occupancy variable as weight, is also calculated. The latter allows the ascription of different weights to hospitals, therefore preventing the results from becoming too dependent on small sized units. The impact of the transformation into EPE hospitals is

determined by comparison between the pre-reform efficiency levels (years 2001 and 2002) and the post-reform levels (years 2003, 2004 and 2005).

6. RESULTS

A proper analysis of the results demands some clarifications about the interpretation of the efficiency measures used in this study. Hence, three remarks should be highlighted. Firstly, only technical inefficiency is estimated (in particular, how much could inputs be reduced while keeping outputs constant), without controlling for changes in the quality of services or even potential mechanisms of discrimination regarding access to health services. Secondly, the indexes presented are relative (the opposite of absolute measures), since they refer to the individual performance of a unit relative to the efficiency frontier constructed with the observations of the other units of the same sample. This point is particularly important when we are comparing the same unit in different years. As an example, a negative evolution of the efficiency score of a hospital does not necessarily mean that it is becoming more inefficient in absolute terms; it only means that its performance relative to other hospitals has been deteriorating. Finally, the consistency of the results is crucially dependent on the homogeneity of the units, as well as on data quality, as systematic measurement errors will have a considerable impact on the estimation results. In an attempt to minimize these effects, besides performing a sensitivity analysis, results for the reduced sample will also be presented.

6.1. Global frontier analysis

Using the DEA methodology, five efficiency frontiers are estimated (one for each year, including the same set of hospitals in each model) for the complete and reduced samples and efficiency scores are obtained for each hospital and year. Table 4 summarises the results for the total of observations and for the EPE and SPA groups. Efficiency levels are very dependent on the number of units and variables. Even using the broader sample, the number of observations is relatively low and, consequently, the number of possible frontier combinations is not very high. As a result, the DEA model allows for the classification of a high number of units as efficient. This result could be mitigated if there were more hospitals or if units were more homogeneous. The indicators for the total of hospitals (arithmetic and weighted averages) are similar in 2001 and 2002, whereas 2003 records a higher level followed by decreases in both 2004 and 2005. Since these indicators are a relative efficiency measure, it would be wrong to conclude that hospitals became technically more efficient during 2003 and subsequently less efficient throughout 2004 and 2005. As the standard deviation measure indicates, this result may be explained by a bigger proximity/distance from the inefficient units to the frontier. Indeed, in almost all years there is an inverse relationship between the average and the standard deviation. Moreover, the estimation points to a weighted mean smaller than the arithmetic one, which means that, on average, smaller hospitals have higher levels of relative efficiency than bigger ones.[10]

Chart 3 shows that the efficiency scores means for the benchmark years (2001 and 2002) are lower in the EPE hospitals group. Furthermore, the standard-deviation of this group is also smaller (Table 4). This suggests that the units chosen to become EPE hospitals were, on average, less efficient than the control units and supports the idea that EPE hospitals form a relatively more homogeneous group. Barros (2003), in his study on hospital efficiency prior to the 2002 reform (in the year 2000), concludes that the group later transformed into public corporations presented lower efficiency results than the

(10) As an example, in 2001, among the 15 hospitals with less than 100 beds, 11 had maximum relative efficiency indexes. The study of these results would demand a scale efficiency analysis, which is beyond the scope this study.

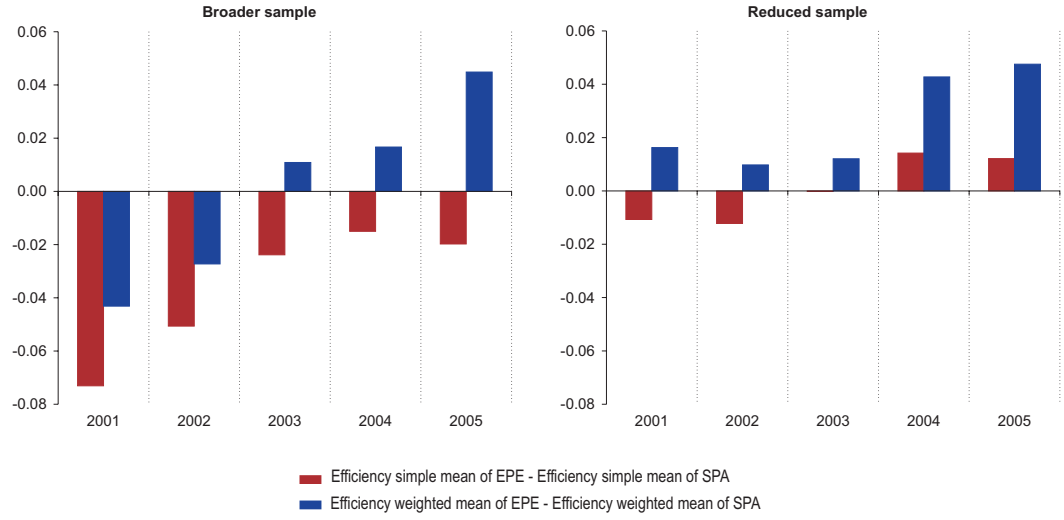
Table 4

EFFICIENCY SCORES OF THE GLOBAL FRONTIER ANALYSIS

	Broader sample					Reduced sample				
	2001	*2002*	*2003*	*2004*	*2005*	*2001*	*2002*	*2003*	*2004*	*2005*
Total										
Simple arithmetic mean	0.85	0.85	0.90	0.89	0.88	0.87	0.86	0.91	0.89	0.88
Weighted mean	0.83	0.82	0.87	0.87	0.85	0.86	0.85	0.90	0.88	0.87
Standard deviation	0.14	0.14	0.12	0.12	0.12	0.14	0.14	0.11	0.12	0.12
Minimum	0.56	0.57	0.62	0.60	0.59	0.57	0.58	0.68	0.63	0.63
Efficient hospitals	22	20	27	24	27	19	17	21	17	19
EPE										
Simple arithmetic mean	0.81	0.82	0.89	0.88	0.87	0.87	0.86	0.91	0.90	0.89
Weighted mean	0.81	0.81	0.88	0.87	0.87	0.86	0.85	0.91	0.89	0.88
Standard deviation	0.13	0.14	0.12	0.11	0.12	0.13	0.14	0.10	0.11	0.12
Minimum	0.59	0.62	0.62	0.60	0.59	0.60	0.62	0.72	0.64	0.64
Efficient hospitals	6	7	10	6	9	8	8	10	8	11
SPA										
Simple arithmetic mean	0.88	0.87	0.91	0.89	0.89	0.88	0.87	0.91	0.88	0.87
Weighted mean	0.85	0.84	0.87	0.86	0.83	0.85	0.84	0.90	0.85	0.84
Standard deviation	0.14	0.14	0.12	0.13	0.12	0.15	0.14	0.12	0.13	0.13
Minimum	0.56	0.57	0.63	0.62	0.63	0.57	0.58	0.68	0.63	0.63
Efficient hospitals	16	13	17	18	18	11	9	11	9	8
EPE/SPA Ratio										
Simple arithmetic mean	0.92	0.94	0.97	0.98	0.98	0.99	0.99	1.00	1.02	1.01
Weighted mean	0.95	0.97	1.01	1.02	1.05	1.02	1.01	1.01	1.05	1.06
Standard deviation	0.95	0.96	1.01	0.84	1.01	0.88	0.94	0.88	0.83	0.96

Chart 3

EFFICIENCY DIFFERENCES BETWEEN GROUPS IN THE GLOBAL FRONTIER ANALYSIS



hospitals that remained inside the general government sector. These results are similar to those now estimated for the period that immediately precedes the reform (2001 and 2002). In the last years of the analysis, EPE hospitals continue to present lower standard deviations (or roughly equal) vis-à-vis the control group levels, whereas the mean gets closer to that of SPA hospitals. Additionally, when a weighted mean is considered, EPE hospitals become even more efficient than SPA hospitals. A comparison between the first and the last year of the period under analysis therefore points to a change in the relative performance of EPE hospitals. It should be referred that the ratio of the EPE hospitals' to the SPA hospitals' efficiency index was higher in 2004 when based on a simple average and in 2005 if a weighted average is used. A more detailed analysis reveals that 10 hospitals out of 37 SPA hospitals stood in the frontier throughout the period, whereas only 3 hospitals from the EPE group managed to accomplish the same. If the extreme years of the sample 2001 and 2005 are compared, it can be observed that in the EPE group, 18 hospitals improved their relative efficiency position, 5 have maintained it and 4 hospitals saw their position deteriorate, whereas in the control group, 14 hospitals improved, 14 hospitals maintained and 9 got worse.[11]

A comparison between the former results with the ones stemming from the analysis of the reduced sample shows that the overall results do not differ much. Whichever sample is considered, efficiency average (either simple or weighted) increases significantly in 2003 and decreases from then on. The differences emerge when the evolution of the relative efficiency scores of both groups are confronted (Chart 3). When using the reduced sample, the simple average for EPE hospitals is closer to the control group average and at a certain point it even surpasses it (although only slightly). If a weighted average is used, EPE hospitals are relatively more efficient right from the first year of the analysis and only in 2004 and 2005 does the difference between the two groups become larger than the one observed in 2001 (in the broader sample it increases in 2002 and 2003). As regards standard-deviations, it should be referred that there is particularly strong evidence that EPE hospitals have less dispersed efficiency

(11) This exercise is also performed by comparing years 2001 and 2004. The results were similar. The greatest differences were concentrated on hospital centers. To test the sensibility of these results to such discrepancies, new efficiency frontiers were estimated that excluded these hospitals. As anticipated, average efficiency levels changed. Nonetheless, the behaviour of the ratio of EPE to SPA hospitals´ average remained virtually unchanged.

Table 5

TEST RESULTS OF THE GLOBAL FRONTIER ANALYSIS

	Broader sample					Reduced sample				
	2001	*2002*	*2003*	*2004*	*2005*	*2001*	*2002*	*2003*	*2004*	*2005*
Mann-Whitney test[a] p-value[b]	0.04	0.20	0.45	0.29	0.42	0.57	0.78	0.80	0.92	0.68
Permutation test[a] p-value[b]	0.02	0.08	0.22	0.32	0.26	0.40	0.39	0.49	0.66	0.64

Notes: (a) The null hypothesis in both tests corresponds to equal distributions between the efficiency of EPE and SPA hospitals. The alternative hypothesis in the Mann-Whitney test is a bilateral one, while in the permutation test it corresponds to the hypothesis of the EPE efficiency mean being lower than SPA efficiency mean. (b) The p-value represents the probability of rejection of the equality between distributions, this being the correct option. In general, a p-value minimum of 0.05 is used as reference to evaluate the null hypothesis. If the p-value is lower it is possible to reject the hypothesis that the two groups have equal efficiency distributions.

scores. When the situations of both groups in the first and in last are compared, the observed results are similar to the ones obtained from the estimation with the broader sample, even though the efficiency improvements are slightly lower.

To assess the statistical significance of the differences in efficiency between the two groups for the several years under analysis, two non-parametric techniques consistent with the DEA methodology are used. These are the Mann-Whitney rank test and the Fisher's permutations test. The use of standard significance tests is not possible since the model does not have a specific functional form and neither is there evidence that supports a particular distribution. The first test compares the distribution of both groups' efficiency measures as a function of the estimated rankings.[12] It is a non-parametric technique that is equivalent to the t-ratio parametric test. The results for the whole sample (Table 5) show that it is possible to reject the null hypothesis in 2001, whereas in the following it cannot be rejected. Therefore if only 2001 is considered, it can be concluded that before the reform the hospitals that were chosen to be transformed were less efficient than the rest. After that year, the same conclusion cannot be reached with a reasonable significance level. The second procedure uses a re-sampling without reposition with the purpose of creating a distribution by sampling.[13] The comparison of the groups in the various years is done considering differences in means as the test statistic. Table 5 presents the results for 10,000 repetitions. In 2001, using a 5% significance level, it is possible to reject the null hypothesis of equality in averages (at a 10% significance level it is also possible to do the same for 2002), hence it can be concluded that EPE hospitals were less efficient on average than the control group. After the 2002 reform, the null hypothesis cannot be rejected anymore and therefore there is a signal that EPE hospitals improved their relative efficiency. Test results for the reduced sample differ from these since it is not possible to reject the null hypothesis for the initial years. Hence, for the 48 units' set, there is no statistical evidence supporting the hypothesis of efficiency gains throughout the period resulting from the convergence of EPE hospitals to the control group.

6.2. Group frontier analysis

In the previous analysis, the EPE and SPA groups were compared on the basis of individual measures of efficiency stemming from a global frontier. In this subsection an alternative approach is presented by

(12) A version of the test, with correction for repeated rankings, is used. For more details check Brockett and Golany (1996).

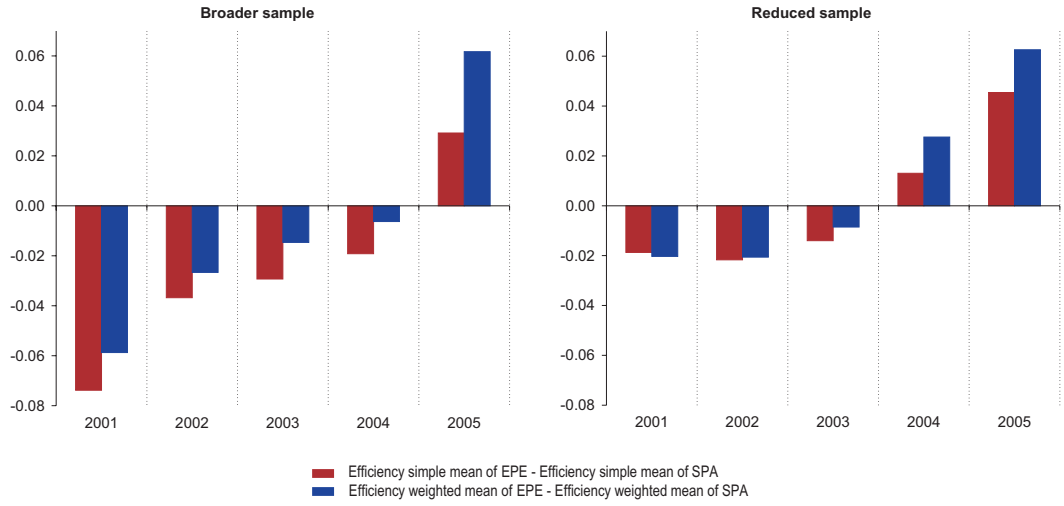
(13) In this analysis, the test consists in randomly combining the 64 (48 in the reduced sample) efficiency indexes of the two groups (with 27 and 37 units in the complete sample and with 25 and 23 units in the reduced sample) and observing the difference in means. This process is repeated a large number of times. If the null hypothesis is true, the populations could be confused and it would therefore make no difference to assign an observed unit to a different group. The permutations algorithm is very similar to the bootstrap algorithm. The differences between them stem essentially from the fact that the former is based on a process without reposition (values are always the same, only divided in different ways.). For more details about this test, see Efron and Tibshirani (1993).

computing efficiency frontiers by groups. Results for the broader and reduced sample are summarized in Table 1 of the annex.

For each year, intra-group scores result from the first step in the estimation procedure, which consists in the estimation of a distinct frontier for each group of hospitals. In terms of the broader sample, it should be referred that whichever group is considered the average relative efficiency increases in 2003 and decreases thereafter. This is similar to the results obtained in the global frontier estimation. Both groups present higher average relative efficiency levels than the ones obtained in the global frontier analysis. This is mainly a consequence of the sample reduction from 64 units into two group sub-samples of 27 and 37 units, for the EPE and SPA groups, respectively. It should also be noticed that even though both groups present higher average relative efficiency levels when compared to the global frontier situation, the difference is more significant in the EPE group (with the exception of 2005). This result can be explained by the higher homogeneity of EPE hospitals. In the second phase, the 64 hospitals are once again gathered in a single sample, but this time using the data that results from the hospitals' projection to their respective group frontier (estimated in the first step).[14] This way every virtually efficient hospital for both sub-samples is included in the analysis. This procedure enables the elimination of the within-group inefficiency, making it possible to compare the aggregate performances of EPE and SPA hospitals when they operate in an efficient fashion. As can be observed in Chart 4, during the benchmark years, EPE hospitals' efficiency frontier was below the SPA's frontier. Afterwards this difference decreases and in 2005 there is even a reversal in the relative position. These results confirm the improvement in the performance for EPE hospitals (although with distinct magnitudes) vis-à-vis the control group. The largest differences when compared with the approach followed in the previous section are related to the standard-deviations of the estimations. In this case, the dispersion of the average measure of efficiency between groups is smaller in the SPA hospitals group. This may be a consequence of the two-step estimation procedure, as a bigger share of the control group's dispersion is eliminated through the intra-group estimation and also because the following

Chart 4

EFFICIENCY DIFFERENCES BETWEEN GROUPS IN THE GROUP FRONTIER ANALYSIS



(14) The data of the hospitals that were considered as efficient in the intra-group frontiers are equal in both phases. For the hospitals with efficiency indexes lower than unit, the data in the second phase are replaced by the corresponding estimated optimal combination that lies on the intra-group frontier (which was used to determine the inefficiency level).

interaction with EPE hospitals does not lead to changes (in particular, because they are in a smaller number).

The previous remarks are consistent with the conclusions taken from the analysis using the reduced sample. In fact, in the intra-group estimation it is possible to observe the same evolution in the average efficiency scores. From the comparison of frontiers it can be concluded that, just as in the broader sample, the simple and weighted averages of EPE hospitals are smaller than the ones of the control group at the beginning of the period and come closer to each other as time goes by and even reverse positions (in years 2004 and 2005 in the reduced sample and in 2005 only for the broader sample). Relative to the comparison of the groups' frontiers in 2001 and 2005, results are again similar between samples, even though the estimated gains in efficiency are smaller for the set of 48 hospitals that constitute the reduced sample. It is curious to note that the results obtained with this estimation procedure for the two samples are more similar than the outcome presented in the previous section, specifically as concerns the pattern of evolution and differences between simple and weighted average.

According to the Mann-Whitney and Fisher permutations test, there is statistical evidence to reject the null hypothesis of similar efficiency frontiers between groups during the initial years (Table 2 of the annex). Therefore, the results seem to support the idea that an approximation between EPE hospitals' efficiency and SPA hospitals' efficiency occurred. It should be noticed that, contrary to what happened in the 'global frontier analysis', it is possible to find statistical evidence of efficiency gains also in the reduced sample.

6.3. Sensitivity analysis

The interpretation of the results previously presented demands some caution. As in many empirical studies, this work is also subject to many possible types of errors including measurement/sampling and specification errors. The measurement errors may have relevant consequences in the application of the DEA methodology. If the error occurs in an efficient hospital, the construction of the frontier will be affected and, consequently, also the calculated efficiency measures. If the error occurs in an inefficient hospital, the implications are not as serious as in the former case, since the error is limited to the efficiency index of that unit. This type of argument justifies the exclusion from the sample of some hospitals which revealed serious data inconsistencies, and additionally partly explains the use of a reduced sample.

Regarding specification problems, it should be acknowledged that the DEA does not impose a specific functional form and allows for multiple inputs and outputs, even though in does not provide many alternatives to check the robustness and significance of the variables. Following a suggestion by Nunamaker (1985) and Valdmanis (1992), other models with different specifications and variables were estimated to assess the robustness of the baseline model. This type of sensitivity analysis also enables the detection of measurement errors, since a variable with problems will influence the results of the models that have included it in the specification. In this context, an exercise was carried out to test the sensitivity of the results to an altering of the set of variables (in nature and in number) included in the estimation procedure. One of the limitations of DEA is related with the changes in efficiency levels brought about by a change in the number of variables. Seven additional production frontiers were estimated for years 2001 and 2005, which are comparable with one presented in the global frontier analysis (Table 3 of the annex). Since the results arising from the different specifications are very similar, the model estimated before can be considered robust.[15] EPE hospitals present in every specifi-

(15) In addition to this, it should be referred that, as expected, the models that predominantly use inputs measured in monetary units originate higher levels of inefficiency. This is because they are potentially measuring other types of inefficiency rather than only technical inefficiency.

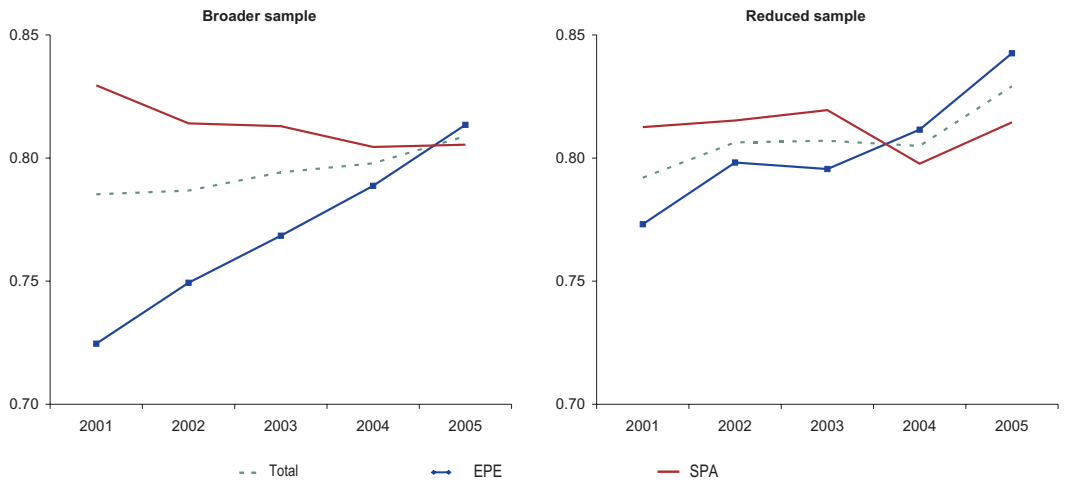
cation average levels of efficiency lower than SPA hospitals in 2001. For 2005, the differences are reduced and for some models EPE hospitals even show higher efficiency levels than the control group, particularly when a weighted average is considered. Concerning the standard-deviations, EPE hospitals seem to be more homogeneous in terms of their efficiency levels, in every model that is considered, with the exception of two models in 2005.

An alternative way of specification analysis, in which what is evaluated are not the variables included in the model but the chosen DEA model itself, is to estimate other models keeping the same combinations of inputs and outputs. The first specification considered introduced variable returns to scale. As referred before, the previous results are only valid in the case of constant returns to scale. The problem of abandoning this assumption is related with the subsequent reduction of units that can be used as a reference. This problem arises in the five estimations based on this procedure for the complete sample, since an efficiency score of 1 is awarded to about 60% of the hospitals in the sample. The second set of frontiers was estimated using a slack-based model, which allows for the calculation of non-radial measures of efficiency. In terms of the evolution of technical efficiency of EPE hospitals vis-à-vis the control group, it should be referred that the results in these two models are also similar, even though they are not as expressive as the results in the benchmark model.

Another issue that might question the validity of the results is the fact that all inter-temporal analyses are based upon static models. Efficiency frontiers were constructed for each year and the conclusions were drawn in relative terms by comparing both groups. Static models do not illustrate whether hospitals are becoming more or less efficient. For that purpose, the study should use dynamic models that account for variations as a result of efficiency and technological changes. By assuming that there was no technological progress in the sector during the period 2001-2005, the DEA methodology can be used to create a single frontier for all years. Chart 5 presents, for the complete and reduced samples, the evolution of the average efficiency for the set of hospitals and for both groups.[16] Obviously, this analysis has several limitations, particularly because it assumes that in five years no technological

Chart 5

EFFICIENCY SCORES IN THE CASE OF A SINGLE FRONTIER



(16) The frontier is estimated with 320 units (240 in the reduced sample), since hospitals in different years are treated as distinct units. The graph depicts the year's average for the 64 hospitals (48 in the reduced sample) and for EPE and SPA hospitals. As a consequence of the increase in the number of observations vis-à-vis the previous models, the mean efficiency is smaller and the dispersion is larger.

progress occurred in the sector. Nonetheless, it should be referred that this problem may be not very relevant since, conversely to what might be expected, the number of units that belong to the frontier decreases in the last years of the analysis.

7. FINAL CONSIDERATIONS

The objective of this study was to evaluate the impact of the 2002's Portuguese health system reform on hospitals' technical efficiency (without taking into account quality indicators or assess discrimination). The relative performance of EPE hospitals was compared with hospitals that remained within the general government sector, before and after the reform. In this context, it should be highlighted that the calculation of a global efficiency index for a hospital is complex given the specific details of its production process. The difficulties arise even at the product definition level, which in this study is delimited as a set of hospitals services: in-patient discharges, external consultations, urgency episodes, out-patient surgeries and day hospital sessions. In terms of inputs, labour (disaggregated into professional categories), a proxy for capital and some more financial variables are used. Given the specificities of the health sector, the DEA methodology seems to be adequate for the calculation of efficiency indexes, since it is a non-parametric technique that is based on the concept of efficiency frontier, enabling the use of multiple outputs and inputs without forcing strong assumptions on the functional form. In practice, two procedures were used: 'global frontier analysis' and 'group frontier analysis'.

The results from both approaches present evidence of efficiency gains by EPE hospitals vis-à-vis SPA hospitals. It should be noticed, however, that these differences are far from being heghly significant. Efficiency levels suggest that EPE hospitals were less efficient prior to the reform but in the following years their relative position has improved. It is important to point out that the worse relative position of EPE hospitals at the outset of the analysis may have implications, because the units with best practices have fewer opportunities to substantially increase their efficiency. On the other hand, some part of the favourable developments that are documented for the EPE hospitals group may have been caused by greater concern with the recording of information, which is presumably a consequence of the contract programmes. In addition to that, it should be highlighted that the way in which groups are compared – even though it is robust to specification changes and different samples – may not totally control for the fact that the initial selection of EPE hospitals is non-random. Still, it seems that even if some bias exists, it should not be a determinant factor in the results. Therefore, only the relative evolution of EPE hospitals vis-à-vis the control group is relevant to the analysis as against the position in a particular year. Overall, it corresponds to a non-parametric differences-in-differences analysis.

It is important to highlight that some important changes have occurred in the sector, notwithstanding the fact that available information and the considered period are too limited to enable a complete evaluation of the reform's effect on efficiency. It is not possible, however, to measure the potential gains of efficiency in the sector as a whole. The DEA framework is used to estimate relative efficiency levels as well as potential savings in resources. These values could be more meaningful, if it was possible to obtain an absolute efficiency score. Finally, it should be highlighted that to correctly monitor the health sector performance, measures should be taken in order to improve the diversity and quality of the information available. This issue is particularly relevant in the current context, in which the transformation of hospitals into public corporations is expected to be broadened to include all those not yet involved.

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Table 1 Annex

EFFICIENCY SCORES OF THE GROUP FRONTIER ANALYSIS

	Broader sample										Reduced sample									
	INTRA[a]					INTER[b]					INTRA[a]					INTER[b]				
	2001	*2002*	*2003*	*2004*	*2005*	*2001*	*2002*	*2003*	*2004*	*2005*	*2001*	*2002*	*2003*	*2004*	*2005*	*2001*	*2002*	*2003*	*2004*	*2005*
	EPE										**EPE**									
Simple arithmetic mean	0.94	0.94	0.96	0.95	0.91	0.91	0.93	0.95	0.95	1.00	0.94	0.93	0.96	0.94	0.91	0.96	0.96	0.96	0.97	0.99
Weighted mean	0.94	0.93	0.96	0.94	0.92	0.91	0.93	0.94	0.95	1.00	0.94	0.93	0.96	0.94	0.92	0.96	0.96	0.96	0.97	0.99
Standard deviation	0.09	0.08	0.08	0.08	0.10	0.10	0.07	0.10	0.09	0.01	0.09	0.08	0.08	0.08	0.10	0.04	0.05	0.06	0.08	0.02
Minimum	0.73	0.75	0.79	0.74	0.64	0.60	0.79	0.62	0.60	0.94	0.73	0.75	0.79	0.74	0.64	0.87	0.79	0.73	0.64	0.90
Efficient hospitals	17	15	17	14	10	7	8	14	9	19	15	14	17	13	12	9	9	13	13	21
	SPA										**SPA**									
Simple arithmetic mean	0.90	0.90	0.94	0.92	0.93	0.98	0.97	0.97	0.97	0.97	0.92	0.91	0.95	0.95	0.93	0.98	0.99	0.98	0.96	0.95
Weighted mean	0.87	0.89	0.93	0.91	0.91	0.97	0.95	0.95	0.96	0.94	0.89	0.89	0.95	0.94	0.92	0.98	0.98	0.97	0.94	0.93
Standard deviation	0.13	0.13	0.10	0.11	0.09	0.06	0.06	0.04	0.05	0.05	0.13	0.12	0.08	0.09	0.10	0.04	0.03	0.03	0.07	0.06
Minimum	0.61	0.58	0.66	0.69	0.67	0.65	0.65	0.82	0.75	0.79	0.64	0.65	0.79	0.73	0.69	0.81	0.85	0.88	0.77	0.80
Efficient hospitals	18	19	21	21	21	25	18	20	20	22	14	12	15	16	14	12	11	12	10	11
	EPE/SPA ratio										**EPE/SPA ratio**									
Simple arithmetic mean	-	-	-	-	-	0.92	0.96	0.97	0.98	1.03	-	-	-	-	-	0.98	0.98	0.99	1.01	1.05
Weighted mean	-	-	-	-	-	0.94	0.97	0.98	0.99	1.07	-	-	-	-	-	0.98	0.98	0.99	1.03	1.07
Standard deviation	-	-	-	-	-	1.70	1.14	2.42	1.72	0.23	-	-	-	-	-	1.02	1.50	1.86	1.12	0.32

Notes: (a) The intra-group analysis is based on the estimation of two distinct frontier models, one for each sub-sample. (b) The inter-group analysis consists in the estimation of a model with adjusted data of both samples.

Table 2 Annex

TEST RESULTS OF THE GROUP FRONTIER ANALYSIS

	Broader sample					Reduced sample				
	2001	***2002***	***2003***	***2004***	***2005***	***2001***	***2002***	***2003***	***2004***	***2005***
Mann-Whitney test[a]										
p-value[b]	0.00	0.02	0.76	0.31	0.10	0.06	0.09	0.68	0.25	0.00
Permutation test[a]										
p-value[b]	0.00	0.02	0.05	0.16	1.00	0.07	0.04	0.19	0.72	1.00

Notes: (a) The null hypothesis in both tests corresponds to equal distributions between the efficiency of EPE and SPA hospitals. The alternative hypothesis in the Mann-Whitney test is a bilateral one, while in the permutation test it corresponds to the hypothesis of the EPE efficiency mean being lower than SPA efficiency mean. (b) The p-value represents the probability of rejection of the equality between distributions, this being the correct option. In general, a p-value minimum of 0.05 is used as reference to evaluate the null hypothesis. If the p-value is lower it is possible to reject the hypothesis that the two groups have equal efficiency distributions.

Table 3 Annex

SENSITIVITY ANALYSIS: DATA FROM 2001 AND 2005

	Baseline model	A	B	C	D	E	F	G
				Models				
Outputs								
IN	X	X	X	X	X	X	X	X
EC	X	X	X	X	X	X	X	X
DH	X			X	X			
UR	X	X		X	X	X	X	X
OU	X			X	X			
Inputs								
OC	X	X	X	X		X	X	X
DO	X	X	X				X	
NU	X	X	X				X	
DI	X	X	X				X	
OS	X	X	X				X	
TS				X		X		
DC	X	X	X	X		X		X
ES				X		X		X
SC								X
TC					X			
				EPE/SPA ratio				
In 2001								
Simple arithmetic mean	0.92	0.93	0.94	0.90	0.85	0.91	0.93	0.91
Weighted mean	0.95	0.96	0.96	0.95	0.98	0.95	0.95	0.96
Standard deviation	0.95	0.97	0.97	0.95	0.58	0.96	0.97	0.95
In 2005								
Simple arithmetic mean	1.01	0.96	1.00	0.95	0.95	0.95	0.95	0.96
Weighted mean	1.06	1.03	1.04	1.02	1.06	1.01	1.02	1.02
Standard deviation	0.96	1.06	1.05	0.94	0.82	0.98	0.82	0.93

CHRONOLOGY OF MAJOR FINANCIAL MEASURES

January to March 2008

January

- **3 January (Decree-Law No 1/2008, Official Gazette No 2, Series I, Ministry of Finance and Public Administration)**

  Introduces changes to the Legal Framework of Credit Institutions and Financial Companies, approved by Decree-Law No 298/92 of 31 December and amended by Decree-Laws No 246/95 of 14 September 1995, No 232/96 of 5 December 1996, No 222/99 of 22 June 1999, No 250/2000 of 13 October, No 285/2001 of 3 November, No 201/2002 of 26 September, No 319/2002 of 28 December, No 252/2003 of 17 October, No 145/2006 of 31 July, No 104/2007 of 3 April and No 357-A/2007of 31 October. It amends a number of articles, adds a few others and revokes Articles 89 and 90 of the said Decree-Law, re-published in full in an annex (consolidated version). This Decree-Law establishes the market conduct supervision of credit institutions and financial companies, within the framework of the tasks of Banco de Portugal, thus reinforcing its supervisory powers. This Decree-Law shall enter into force on the day following its publication.

- **4 January (Circular Letter of Banco de Portugal No 3/2008/DET, Treasury and Issue Department)**

  Informs, within the scope of the framework for implementation of Decree-Law No 195/2007 of 15 May, with regard to the conclusion of contracts on euro banknote recycling, that in December 2007 Banco de Portugal signed a contract with the cash-in-transit company LOOMIS, S.A.

- **9 January (Circular Letter of Banco de Portugal No 1/08/DSBDR, Banking Supervision Department)**

  Conveys the understanding of Banco de Portugal as to the interpretation of Article 3 of Decree-Law No 240/2006 of 22 December with regard to the periodicity of revision of the benchmark used in variable-rate credit operations.

- **15 January (Notice of Banco de Portugal No 1/2008, Official Gazette No 15, Series II)**

  Under the terms and for the purposes of the provisions of Article 13(1) of Decree-Law No 221/2000 of 9 September, it determines which payment systems will benefit from the irrevocability of transfer orders and the enforceability of collateral set up on behalf of a participant or a bank integrating the European System of Central Banks (ESCB). This notice enters into force on 18 February 2008, or on the date of the actual migration of TARGET2-PT to the Single Shared Platform of TARGET2, if this migration can only occur on a later date.

- **15 January (Instruction of Banco de Portugal No 33/2007, BNBP 01/2008)**

  Regulates the operation of the Target 2 national system.

- **15 January (Instruction of Banco de Portugal No 34/2007, BNBP 01/2008)**

  Regulates the participation in the Large-Value Payment System (RTGS2).

- **15 January (Instruction of Banco de Portugal No 35/2007, BNBP 01/2008)**

  Creates the Intraday Credit Market.

- **15 January (Instruction of Banco de Portugal No 36/2007, BNBP 01/2008)**

  Amends Instruction No 25/2003, published in the Official Bulletin No 10 of 15 October 2003, with regard to the close of Financial Clearing and Settlement in the EFT System for the processing of operations sent and received within the scope of SEPA.

- **16 January 2008 (Circular Letter of Banco de Portugal No 5/2008/DET. Treasury and Issue Department)**

  Informs that Banco de Portugal will disseminate to the banking system requests for information submitted to it by individual persons, relating to the identification of bank accounts and/or other financial assets of deceased relatives. For that purpose, Banco de Portugal will make available, on the Bank Customer-oriented website, a form named "Request for the location of financial assets in case of death of the respective holders", which will allow for the filling-in and electronic sending of the request, as well as its printing and later forwarding by mail.

- **18 January (Circular Letter No 6/2008/DET Banco de Portugal. Treasury and Issue Department)**

  Informs, within the scope of the implementation framework set forth in Decree-Law No 195/2007 of 15 May on the contractual obligations relating to the recycling of euro banknotes, that Banco de Portugal has signed a contract with the cash-in-transit company *GRUPO 8 - Vigilância e Prevenção Electrónica, Lda*.

- **23 January (Circular Letter No 8/2008/DET Banco de Portugal. Treasury and Issue Department)**

  Publishes the procedures to be met in contracts to be signed with Banco de Portugal, arising from the new legal framework governing euro coin recycling, pursuant to Decree-Law No 184/2007 of 10 May. It provides clarification on the contract model to be adopted and informs on the procedures for handling euro coins unfit for circulation and for removing counterfeit coins from circulation. It establishes that the entities shall adjust to the transition period laid down therein, and informs that Banco de Portugal offers its availability in terms of cooperation, training and clarification regarding any issue.

- **24 January (Circular Letter No 6/2008/DSBDR Banco de Portugal. Banking Supervision Department)**

  Provides information, in the wake of the entry into force of Decree-Law No 371/2007 of 6 November, on the changes to the procedures relating to the Complaints Book to which Credit Institutions and Financial Companies should pay particular attention, with a view to a faster and more efficient treatment of the respective complaints. It also informs that a new service on claims is expected to be available soon, within the scope of BPnet, to be used for the electronic circulation of information flows between credit institutions and Banco de Portugal.

- **30 January (Circular Letter No 8/2008/DSB of 30 January 2008 Banco de Portugal. Banking Supervision Department)**

  Reminds credit institutions that they shall fully comply with the enforcement of attachments of bank accounts and securities, namely those stemming from the Directorate General of Taxation, with special attention to the applicable provisions of the Code of Civil Procedure. This reminder is provided in the wake of a number of complaints to the Ombudsman's Office. The Ombudsman addressed to the Governor of Banco de Portugal a recommendation pointing to the elimination of procedures adopted by some banking institutions that were deemed to be irregular.

February

- **4 February (Decision No 2727/2008 of 21 December 2007 Ministry of Finance - General Government. Minister's Office Official Gazette No 24 - Series 2**

  Approves, pursuant to Article 63 (1) of the Organic Law of Banco de Portugal (Law No 5/98 of 31 January), the new Chart of Accounts of Banco de Portugal, to enter into force as of 1 January 2008.

- **6 February Instruction of Banco de Portugal No 1/2008, BNBP 03/2008 (date of entry into force: 8 February 2008)**

  Introduces changes in Instruction No 4/2002, published in the Official Bulletin No 1 of 15 February 2002, which defines the information elements relating to liabilities on account of retirement and survivorship pensions to be supplied to Banco de Portugal.

- **18 February 2008 (Notice of Banco de Portugal No 2/2008, Official Gazette No 38, Series II)**

  Introduces changes in Notice No 12/91 of 31 December, in compliance with the amendments to the Companies Register, as a result of Simplified Business Information.

March

- **7 March (Parliament Decision No 6/2008, Official Gazette No 51, Series I)**

  Determines the setting up of a parliamentary committee of inquiry into the exercise of banking, insurance and capital market supervision.

- **17 March (Instruction of Banco de Portugal No 2/2008, BNBP 3/2008)**

  Revokes Instruction No 27/2000, published in the BNBP No 12 of 15 December 2000.

- **17 March (Instruction of Banco de Portugal No 3/2008, BNBP 3/2008)**

  Informs that credit institutions adopting the minimum banking services system laid down in Decree-Law No 27-C/2000 of 10 March shall fill in and send to Banco de Portugal, up to 15 January each year, the table in attachment to the present Instruction.

- **17 March (Instruction of Banco de Portugal No 4/2008, BNBP 3/2008)**

  Lays down the procedures to be followed in the application to the utilisation of internal models by institutions, as regards the calculation of own fund requirements to cover market risks.