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PROSPECTS FOR THE PORTUGUESE ECONOMY: 2003-2004

1. INTRODUCTION

This section presents projections for the Portuguese economy for the years 2003 to 2004, prepared by the Banco de Portugal within the scope of the Eurosystem's spring 2003 macroeconomic projections exercise (published for the euro area as a whole in the June 2003 issue of the ECB's Monthly Bulletin). This exercise was based on a set of common technical assumptions, used by all central banks of the euro area countries, on short-term interest rates and exchange rates — considered to be constant during the projection horizon and based on data available up to mid-May — and assumptions on the demand for goods and services by countries not belonging to the euro area and on international commodity prices. Consistency among projections from the different countries was also ensured, namely in terms of external trade flows across euro area countries.

Projections for Portugal point to a significant deceleration in consumer prices and a decline in activity in 2003, followed by moderate growth in 2004 (see Table 1 and Charts 1 and 2). With regard to inflation, the average rate of change in the Harmonised Index of Consumer Prices (HICP) is projected to decline from 3.7 per cent in 2002 to around 2.5 to 3.5 per cent in 2003, and between 0.7 and 2.7 per cent in 2004. The projections for the gross domestic product (GDP) point to growth rates in a range of -1 to 0 per cent in 2003 and of 0 to 2 per cent in 2004.

Table 1

PROJECTIONS OF THE BANCO DE PORTUGAL

Percentage rates of changes

		Current projection		*Memo items:* *Economic Bulletin* Dec./2002		
	2002	2003	2004	2002	2003	2004
Private consumption	0.4	[-¾ ; ¼]	[½ ; 2½]	[0 ; ¾]	[¼ ; 1¼]	[1 ; 2½]
Public consumption	2.6	-1.6	-1.4	1.5	-1	-0.5
Gross fixed capital formation	-5.4	[-5¾ ; -3¾]	[-3 ; +1]	[-5 ; -3]	[-4¼ ; -¼]	[-2¼ ; 3¾]
Domestic demand	-0.5	[-2 ; -1]	[- ½ ; 1½]	[-¾ ; -¼]	[-¾ ; ¼]	[¼ ; 1¾]
Exports	2.4	[2¼ ; 3¾]	[5; 8]	[1 ; 2]	[5 ; 6½]	[6 ; 8½]
Overall demand	0.1	[-1 ; 0]	[¾ ; 2¾]	[-¼ ; ¼]	[½ ; 1½]	[1¾ ; 3¼]
Imports	-0.6	[-1¾ ; ¼]	[3 ; 6]	[-2¼ ; -¼]	[¼ ; 3¼]	[2 ; 6½]
GDP	0.4	[-1 ; 0]	[0 ; 2]	[¼ ; ¾]	[¼ ; 1¼]	[1 ; 2½]
Current account + capital account (%)GDP	-5.7	[-3¾ ; -1¾]	[-3¾ ; -¾]	[-6½ ; -5½]	[-6 ; -4]	[-5½ ; -2½]
Harmonised index of Consumer Prices	3.7	[2.5 ; 3.5]	[0.7; 2.7]	3.7	[2.4 ; 3.4]	[1.4 ; 2.9]

Chart 1
GDP
Year-on-year percentage rates of change

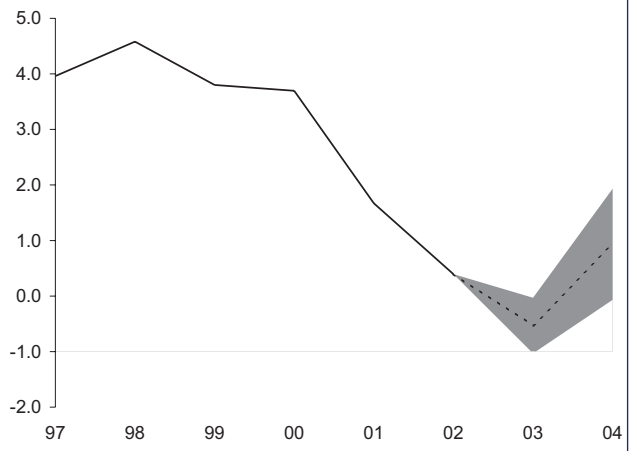
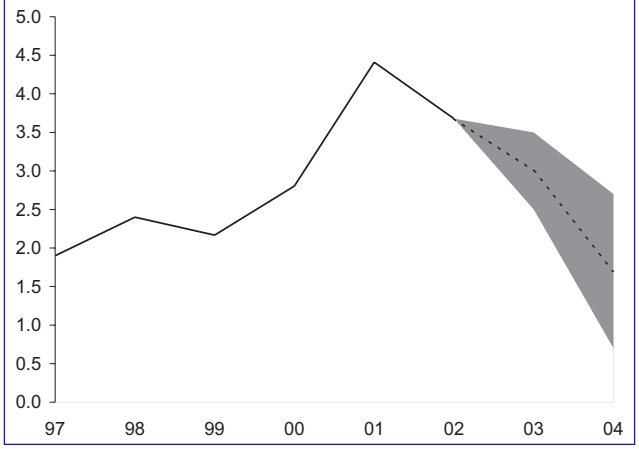


Chart 2
HARMONISED INDEX OF CONSUMER PRICES
Year-on-year percentage rates of change



There are various factors, both domestic and external, that support the projected decline in inflation over the forecast horizon. Weak activity growth will tend to softer demand pressures, especially in the services sector, in contrast to previous years. Public and private sector wages are expected to decelerate considerably. In particular, it is assumed that real wages will continue to show a significant degree of flexibility, similarly to other episodes of contraction of economic activity and increase in unemployment, and will grow clearly below productivity (in contrast to the past six years). Imported goods prices are also likely to grow rather moderately, considering the recent appreciation of the euro and the assumptions made with regard to exchange rates and international commodity prices. Finally, it should be noted that in the absence of new tax measures or administrative price regulations, the decline in the year-on-year inflation rate may be particularly sharp in the second half of 2003, due to a number of base effects stemming, inter alia, from the rise in the standard value-added tax (VAT) rate in June 2002.

The pattern of output developments is in line with the expected performance of activity in euro area economies as a whole, i.e. an acceleration in economic growth from the second half of the current year onwards and higher growth in 2004 than in 2003. However, throughout the projection horizon growth in Portugal is likely to be lower than average euro area growth, as a reflection of the influence of the ongoing adjustment process of the Portuguese economy, which will continue to condition the expansion of activity and, in particular, of domestic demand.

The sharp reduction in interest rates in the second half of the 90s, together with pro-cyclical fiscal policy, induced very strong increases in consumption and investment, leading to a considerable increase in the indebtedness of resident economic agents. The imbalance in private sector borrowing requirements reached its peak in 1999/2000, having been corrected ever since, especially in 2002, in a less buoyant international environment. The reduction, in real terms, in final household and corporate expenditure and the gradual recovery of the household savings rate, which had reached an all-time low in 1999, have already allowed for a slight decrease in private sector external borrowing requirements. However, this process is not concluded and is likely to continue conditioning developments in private domestic demand, at least until the end of this projection horizon. With regard to the public sector, changes were introduced in the fiscal policy stance only in 2002. Until then, fiscal policy contributed to amplify the stimulus to domestic demand of the cut in interest rates. When the private sector started to adjust its financial situation, against a deteriorating external background, a serious fiscal crisis became apparent, requiring a consolidation effort in the Portuguese public finances in the current less favourable stage of the business cycle. This also contributes to the weakness of domestic demand in the forecast horizon, although it is instrumental to avoid the wid-

ening of the general government deficit to values far above the limits set in the Stability and Growth Pact, and especially, to create sustainable growth conditions in the Portuguese economy.

In this context, for 2003 it is projected negative real growth rates for all domestic demand components. Gross fixed capital formation (GFCF) is likely to record the sharpest drop, confirming the higher sensitivity of this component to the economy's cyclical situation. Since Portuguese economic growth cannot be led by domestic demand performance, the resumption of positive annual growth rates for output in 2004 relies on the assumption of a recovery in external demand relevant for the Portuguese economy from the second half of 2003 onwards. If this holds true, private consumption and investment are likely to return moderately to positive rates of change in 2004. In turn, general government final expenditure is likely to maintain negative rates of change, due to the ongoing fiscal consolidation process. Furthermore, with regards to public investment, the gradual declined foreseen in the structural funds transferred by the European Union within the scope of the Third Community Support Framework reinforces this negative trend.

The different trends projected for domestic demand and for the international markets relevant for Portuguese exports, as well as the interruption of the deterioration of competitiveness indicators, associated with the moderation of wage costs, imply the progressive narrowing of the deficit of the goods and services account, which may allow the reduction of the Portuguese economy's net external borrowing requirements (to values between 1¾ and 3¾ per cent in 2003, and between ¾ and 3¾ per cent in 2004).

With regard to the projections published in the December 2002 issue of the *Economic Bulletin*, prepared within the scope of the Eurosystem's autumn 2002 macroeconomic projection exercise and using information available up to mid-November 2002, current projections for economic activity represent a significant downward revision(1), as a reflection of: (i) a more unfavourable international environment, translated into a downward revision of growth projected for the external markets most relevant for the Portuguese economy; (ii) the deterioration of economic conditions from the second half of 2002 onwards — highlighted by the fast slowdown in activity, the increase in unemployment and the trend of confidence indicators towards historically low levels — more significant than the information available in the previous exercise allowed to anticipate; and (iii) the need for supplementary efforts aimed at correcting current public sector imbalances, in a context where results achieved for the general government deficit in 2002 were decisively influenced by temporary measures.

2. ASSUMPTIONS UNDERLYING PROJECTIONS FOR THE PORTUGUESE ECONOMY

2.1. Interest rates and exchange rates

In the Eurosystem's projection exercises, as technical assumptions, the short-term (3-month) interest rates and the exchange rates are kept unchanged throughout the forecast horizon (at the values prevailing in mid-May). In annual average terms, these assumptions imply a decline in interest rates, given their downward trend over the previous year, and a significant exchange rate appreciation of the euro, namely against the US dollar, given the considerable appreciation of this currency in the course of 2002 and early 2003 (for details on the monetary conditions of the Portuguese economy in the forecast horizon implied by these technical assumptions, see the "Box 2: *Contribution of monetary conditions to inflation and to the GDP growth rate*". The technical assumption regarding to long-term interest rates is based on market expectations, which in this exercise point to a slightly rising profile throughout the horizon, albeit towards levels below those recorded in 2002 in annual average terms.

Subsequent to the cut-off date for the Eurosystem's projection exercise, in 5 June 2003, the Governing Council of the ECB decided to lower its key interest rates by 50 basis points. However, in mid-June, the 3-month EURIBOR continued to stand at levels close to those considered in the exercise (which already incorporated the expectation

(1) For a more detailed analysis of the revisions of the projections for GDP growth regarding the December 2002 issue of the *Economic bulletin*, see the box entitled "Revision of the projections for GDP growth".

of a cut in interest rates), similarly to exchange rates. Thus, in the weeks following the completion date of this forecast exercise, its technical assumptions continued to be rather updated, despite the decline in key ECB interest rates.

2.2. External demand relevant for the Portuguese economy

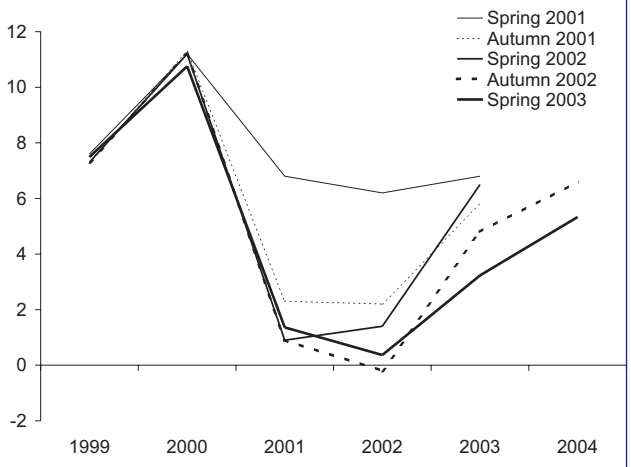
Overall, both the assumptions for developments in economies not belonging to the euro area and projections for the euro area point to a rebound in economic activity throughout the horizon, starting already in the second half of 2003. Uncertainties surrounding military operations in Iraq seem to have had a negative impact on the confidence of economic agents in the first half of this year. The Eurosystem's spring projection exercise admits that the partial unwinding of these geopolitical uncertainties is likely to boost a rebound in economic activity.

Thus, in the case of the US economy, activity is assumed to accelerate in the second half of 2003, albeit at rates below those seen at the end of the 1990s. US economy growth is likely to remain influenced by the imbalances in the financial situation of households, companies and, more recently, of the general government, which in macroeconomic terms translate into high public and external deficits. The Japanese economy is expected to rebound slightly, while for the remaining Asian economies projections point to continued strong dynamics. In turn, Eastern European countries will admittedly continue to grow at a high pace. In this context, world economy excluding the euro area is likely to grow by around 3.5 per cent in 2003, accelerating to values close to 4.5 per cent in 2004. Growth in export markets relevant for euro area exporters is likely to increase from 4.5 per cent in 2003 to 7 per cent in 2004.

Economic activity in euro area countries as a whole is also expected to accelerate, with Eurosystem's projections pointing to GDP growth between 0.4 and 1 per cent in 2003 and between 1.1 and 2.1 per cent in 2004. Both the higher external market growth and the assumption of the maintenance of interest rates at low levels contribute to the acceleration profile of GDP.

Taking into consideration developments in the Portuguese major trading partners, external demand relevant for the Portuguese economy is likely to accelerate from 0.4 per cent in 2002 to 3.2 per cent in 2003, and to 5.3 per cent in 2004 (Chart 3).

Chart 3
RELEVANT EXTERNAL DEMAND FOR THE PORTUGUESE ECONOMY
Year-on-year percentage rates of change



2.3. International prices

Technical assumptions for international commodity prices are based on expectations implied in the respective futures markets. In the case of the oil price, following the speedy resolution of the conflict in Iraq and the consequent lower probability of disturbances in the international supply of oil, it is assumed a downward trend throughout the projection horizon. In the case of non-energy commodities, the assumptions based on futures markets correspond to an increase in international prices in US dollars, whose effects on the euro area inflation rate will tend to be mitigated by the recent appreciation of the euro against the US currency.

Against this background, and notwithstanding some pressures associated with the projected recovery in economic activity — translated into the maintenance of the growth pace of wages over the horizon — Eurosystem projections point to a gradual reduction in the inflation rate for euro area countries as a whole, with the HICP growth rate declining from 2.3 per cent in 2002 to values in a range of 1.8 to 2.2 per cent in 2003, and of 0.7 to 1.9 per cent in 2004.

2.4. Specific assumptions for Portugal

The current projections also rely on a set of specific assumptions for Portugal, in particular those regarding developments in public finance variables. Following the fiscal consolidation effort, the number of general government employees is assumed to decrease, associated with an only partial replacement of retired employees, and it is also assumed a significant restraint of expenditure on goods and services, both in 2003 and in 2004. Taken together, these assumptions imply a reduction in public consumption of around 1½ per cent in 2003 and 2004, in real terms (Table 1). Public investment will admittedly decline in 2003, associated with a sharp reduction in the share corresponding to projects not co-financed by the European Union. In 2004 projections still point to a decline in public investment, chiefly as a reflection of the expected decrease in transfers from the European Union within the scope of the Third Community Support Framework.

It is further assumed that, in general terms, the growth of consumer prices subjected to administrative procedures will be similar to the previous years. Fuel prices will be a remarkable exception, since they are likely to move in line with the oil price in international markets. This implies a reduction in these prices throughout the horizon, given the afore-mentioned assumptions.

3. PROSPECTS FOR THE PORTUGUESE ECONOMY

3.1. Economic activity

The current projections, now disclosed, point to the continuation of the adjustment process of the Portuguese economy. By conditioning domestic demand developments, this process has contributed to a significant slowdown in economic activity, which is likely to be more strongly felt in 2003. According to projections, GDP is expected to record a negative rate of change in 2003. The recovery in 2004, boosted by a more favourable external environment, will still be relatively modest, since domestic demand cannot reach more significant growth rates until the adjustment process is concluded. Thus, despite showing a pattern similar to that projected for the main Portuguese trading partners, current projections for the Portuguese economy, whose recovery will start in the second half of 2003, show a growth pace slower than that of the euro area, due to the constraints related to developments in both public and private domestic demand.

Developments in private domestic demand will continue to be conditioned by the high household and corporate indebtedness levels. In fact, the burden of loans taken out in most recent years and the fact that many economic agents cannot continue to borrow at a pace similar to that of the past will tend to limit the resources available for consumption and investment expenditure. In addition, this expenditure will also be conditioned by unfavourable expectations regarding future developments in economic activity and unemployment.

The reduction in economic activity in 2003 and the moderate growth in 2004 will trigger a rise in the unemployment rate. However, the unemployment rate is not likely to exceed the average level prevailing in the euro area, partly because of a clear moderation is expected for real wages, which will grow less than productivity, in contrast to recent years. Therefore, current projections admit that the sensitivity of wages to economic conditions — one of the most striking features of the Portuguese labour market in the past — will continue, albeit more mitigated, in a context of low inflation levels and of the absence of the foreign exchange instrument. The containment in general government wages in 2003 also contributes to the slowdown in compensations, not only due to its impact but also to its influence on private sector wage agreements. In fact, developments in real wages play a key role in the projection of a fast reduction in the economy's external borrowing requirements, via the competitiveness of sectors producing tradable goods, allowing for a resumption of growth on more sustainable bases.

The gradual adjustment process of domestic demand is particularly apparent in components such as the consumption of durable goods, housing investment and corporate investment. These components are particularly sensitive to liquidity restraints stemming from high indebtedness levels and to developments in expectations regarding future economic conditions. In the same vein and as already mentioned, projections assume real negative growth rates for public consumption and in-

vestment, thereby countering the significant increases seen in most recent years, in a context of gradual correction of the public finance imbalance.

Throughout the projection horizon, against a background of technical assumptions according to which short-term interest rates will stand at rather low levels and the external demand for the Portuguese economy will rebound strongly, economic activity in Portugal is projected to accelerate, in parallel with a progressive easing of financial restrictions on the behaviour of private domestic demand, which is likely to show growing signs of recovery during 2004.

(i) Private consumption

Private consumption growth is projected to decline in 2003, after gradually decelerating from above 5 per cent at the end of the 1990s and growing by only 0.4 per cent in 2002. In 2004, the recovery of private consumption is also expected to be gradual (Chart 4), following improved global economic conditions. It should be noted that these projections envisage a stabilisation of the savings rate throughout the horizon (after the rise seen in previous years), although the less favourable cyclical position of the Portuguese economy, the maintenance of interest rates at historically low levels and the projected reduction in the inflation rate tend to exert downward pressures on the savings rate. Conversely, the need to repay loans taken out mainly for house purchase will tend to sustain, or even increase, household saving.

Chart 4
PRIVATE CONSUMPTION
Year-on-year percentage rates of change

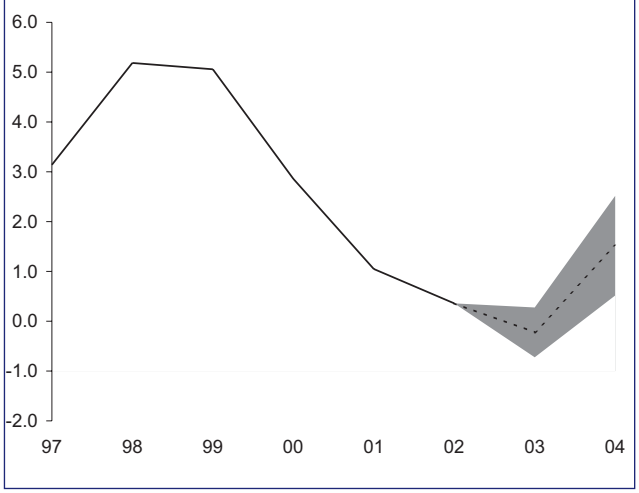
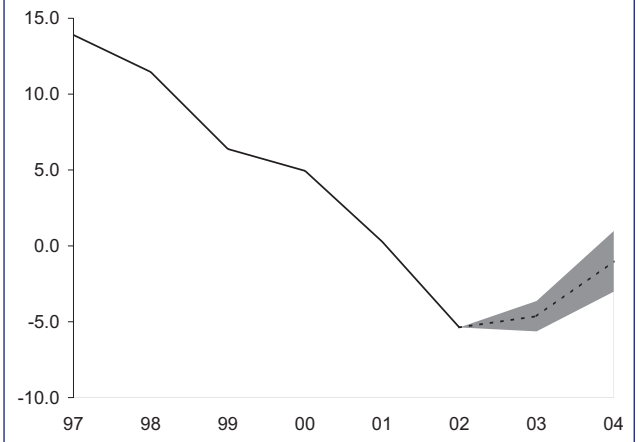


Chart 5
GROSS FIXED CAPITAL FORMATION
Year-on-year percentage rates of change



Developments projected for private consumption in 2003 envisage a further reduction in expenditure on durable goods, a component which is particularly sensitive to the business cycle, namely against the current background of financial restrictions to consumer behaviour and unfavourable expectations regarding the economic situation. In this context, reference should be made to the significant rise in the unemployment rate from the second half of 2002 onwards, which will tend to bring about greater caution in consumption decisions, particularly those that require the use of savings accumulated in the past and/or the assumption of commitments regarding payments in the future. If the current projection holds true, 2003 will be the third consecutive year of significant declines in the purchase of durable goods, in real terms, following increases above 10 per cent at the end of the 1990s. In 2004 this component is expected to record a marginally positive change.

The growth of the consumption of non-durable goods, traditionally less sensitive to the business cycle, is likely to move in line with real disposable income, whose pattern will tend to be similar to that of economic activity, given the pro-cyclical behaviour of real wages and employment.

(ii) Investment

GFCF is likely to fall further in 2003 and 2004 (Chart 5). This projection is conditioned by developments assumed for public investment. According to projections for the private component of GFCF, house purchase by households and corporate investment will return to positive growth in 2004, although recording a small rate of increase.

Developments in private investment highlight the gradual adjustment process of the Portuguese economy. Current projections for 2003 do not envisage a fall as strong as the one recorded in the 1993 recession (when corporate investment fell by almost 10 per cent and housing investment declined by around 20 per cent). However, if projections shown in this section are confirmed, private investment will have dropped for three consecutive years, i.e. 2001 to 2003, following high increases in the second half of the 1990s (for a general comparison with the previous recession, see the Box 3: "*Recession projected for 2003 — some differences between 1993 and 2003*".

The period of high investment growth in the second half of the past decade was associated with a phase of transition into a new monetary regime, characterised by lower and less volatile interest rates. Therefore this period could not be indefinitely extended, being necessarily followed by a less buoyant investment period. In addition, apart from the financial restrictions highlighted above, related to the increased consumer and corporate indebtedness levels, the slowdown in investment seems to have been exacerbated by a significant change in economic agents' expectations, reflected, for example, in stock price developments and confidence indicators, which appear to have contributed to a decrease in the desired capital stock and therefore to the postponement, resizing or even cancellation of some investment decisions.

(iii) Exports and imports

The real change projected for exports of goods and services largely reflects the rebound in external demand referred to above. Current projections envisage an interruption of the deterioration of external competitiveness indicators of Portuguese companies, mainly due to more moderate growth of wage costs. These developments will sustain some gains in market shares throughout the horizon, after the gains seen in 2001 and 2002 (following significant losses in the previous years). The projection of gains in the market share is also explained by a less buoyant domestic demand, which may cause some companies to redirect their sales to external markets, as it happened in the past under similar circumstances. It should also be noted that exports of tourism services tend to be particularly sensitive to the international economic environment, thus showing a particularly fast recovery(2). This effect will probably be reinforced in 2004, as a result of the European Football Championship, which will be held in Portugal. By contrast, the aggregate gain in the export share is likely to be limited by the negative developments projected for automobile sector exports, which account for a considerable share of Portuguese goods exports.

Developments in imports, in turn, are likely to reflect the pace forecast for the various components of overall demand, in particular those with higher import content(2). Given the further fall projected for domestic demand in 2003, in particular for the consumption of durable goods and corporate investment, similarly to 2002 imports of goods and services may record a real negative change in 2003. Subsequently, in 2004, and given the gradual rebound in economic activity, particularly in the demand components with higher import content, imports are likely to record again positive growth rates above that of GDP, albeit below that of exports.

(2) Considering data between 1978 and 2002, it can be seen that the rates of change in external demand relevant for the Portuguese economy — measured as the average of imports of goods and services from the main customer markets — and the rates of change in Portuguese exports of tourism services are positively correlated (0.65 correlation coefficient), although the volatility of the latter is four times higher than that of external demand.

(3) The fact that expenditure components, which traditionally show higher volatility, are simultaneously those that have the highest import content gives rise to a high variability of imports and a pro-cyclical behaviour of the ratio of imports to domestic demand. This explains the wide magnitude of projection ranges showed for import growth.

Chart 6
EXPORTS
Year-on-year percentage rates of change

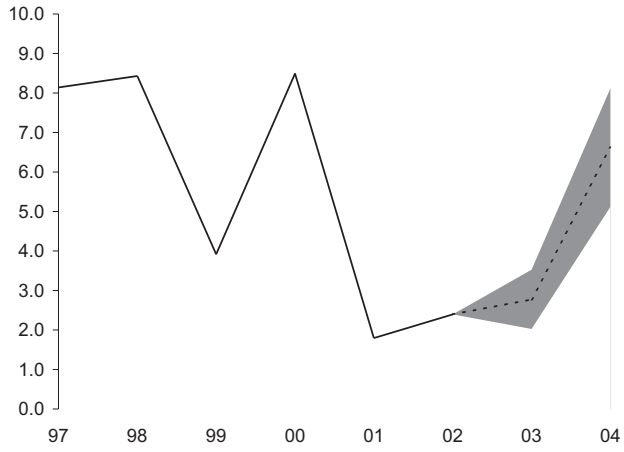
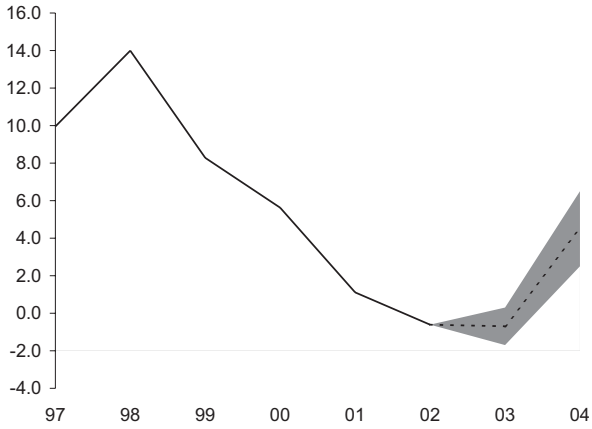


Chart 7
IMPORTS
Year-on-year percentage rates of change



3.2. Current and capital accounts

The significant reduction in net external borrowing requirements, assessed by the combined current and capital account deficit, that is projected constitutes one of the main features of the adjustment process of the Portuguese economy. The narrowing of the external deficit will rely chiefly on the significant improvement of the trade balance, given the prospects of a stabilisation of both the income deficit and the surplus of current and capital transfers.

The improvement projected for the trade balance deficit will reflect a volume growth of exports much stronger than that of imports, as a reflection, on the one hand, of the strong rebound in external demand highlighted above and, on the other hand, the projected domestic demand developments. In addition, the trade balance will also reflect improved terms of trade, chiefly resulting from the downward trend of the oil price considered in the external assumptions of the exercise.

In 2003 the stabilisation of the income account deficit will reflect the effects associated with lower interest rates and the appreciation of the euro exchange rate. Current and capital transfers are projected to increase in 2003 and to subsequently decline in 2004, as a percentage of GDP, to levels similar to those estimated for 2002.

3.3. Inflation

For 2003 the average rate of change in HICP is projected to decline to a value within the 2.5-3.5 per cent range, following an average value of 3.7 per cent in 2002. This projection envisages a significant deceleration in prices in the course of the year, which is likely to be more moderate during 2004, with the average inflation rate in this year standing between 0.7 and 2.7 per cent(4).

The maintenance of economic growth below its potential pace, with the consequent rise in the unemployment rate and the decrease in wage pressures, as well as the assumption of the maintenance of moderate developments in import prices, namely of oil, in a context of subdued international inflation and the recent appreciation of the exchange rate of the euro, are behind the downward pattern projected for the Portuguese inflation rate. Projections assume that the reduction in the oil price, given the changes in the fuel pricing regime introduced in early 2002, will pass through more directly to consumer prices, significantly contributing to the decrease in inflation.

The downward profile of inflation will tend to increase throughout 2003 due to the unwinding of

(4) In January 2003 the National Statistical Office (*INE*) started to release new series for the Consumer Price Index (CPI) and the HICP. Among methodological changes, reference should be made to the new treatment of seasonal prices (see Annex 1 of the January 2003 issue of the *Monthly Economic Indicators* for a more detailed presentation of the methodological changes), which is an additional uncertainty factor in current inflation projections.

some temporary factors, which affected price developments in the previous year. In fact, in the first months of 2003, the year-on-year rate of change in services prices declined significantly, mainly explained by the fact that these prices were particularly affected by the process of conversion of prices from escudos into euro that took place in early 2002[5]. However, these developments in the first months of 2003 seem to have been partly offset by an acceleration in energy prices due to the rise in the oil price in international markets, which rendered impossible a sharper reduction in the year-on-year rate of change in the HICP (from 4.0 per cent in December 2002 to 3.7 per cent in May 2003). In the second half-year, the return to lower levels of the oil price in international markets, and the associated lagged reduction of consumer fuel prices, as well as the unwinding of the effects from the rise in the standard VAT rate in June 2002, are likely to allow a sharp downward trend of the year-on-year inflation rate[6].

The effect of the economic slowdown in the behaviour of prices was basically incorporated in current projections through the impact of the deceleration in wage costs. This slowdown in wages seems to be confirmed by the information currently available for 2003. In fact, in the period from January to April, the wage change implied in collective agreements, excluding general government, was 2.8 per cent, compared with 3.6 per cent in 2002. It should be noted that actual paid wages depend not only on the increase agreed in bargaining, but also on the so-called wage drift, which tends to be rather sensitive to fluctuations in economic activity. Projections for 2003 regarding compensation per employee, consistently with the economy's recession, assume a deceleration in private sector wages higher than that seen in collective wage agreements.

Taking into account international price developments and the assumption considered for the exchange rate of the euro, the growth of import prices is likely to continue at a moderate pace, also contributing to the deceleration in HICP. Following a fall of around 3 per cent in 2002, the deflator of goods imports is likely to decline further in 2003, subsequently recovering somewhat with the unwinding of the effects associated with the appreciation of the euro and with the downward pattern assumed for the oil price.

In comparison with the values of the autumn exercise published in the December 2002 issue of the *Economic Bulletin*, current projections for inflation in 2003 are slightly revised upwards, notwithstanding the downward revision of economic growth. The acceleration of fuel prices in early 2003, as a result of the increase — not foreseen in the previous exercise — of the oil price in international markets, and the higher that anticipated resilience to the deceleration in the prices of a number of services, were the two main factors underlying the non-existence of a downward revision of the inflation forecast for 2003. For 2004 the currently projected inflation rate represents a slight downward revision compared with the previous exercise, basically reflecting the impact of lower economic activity growth in the behaviour of wage costs and the more favourable external environment for price developments in Portugal.

4. ASSESSMENT OF RISK FACTORS

The balance of risks underlying projections for economic activity mainly points to the possibility of lower growth than that currently projected, with the contribution from several factors. First, similarly to previous projection exercises, developments in the international environment are an important source of downside risk in projections for the Portuguese economy. As mentioned above, current projections incorporate a significant recovery in external markets starting in the second half of 2003 — assumed by the Eurosystem on the basis of data available in mid-May — when the signs of rebound in activity were still scarce. A month later, when this text was completed, there were still no evident signs of recovery in the external environment of the Portuguese economy, which increases the possibility that the recovery will not occur as soon as expected. The successive downward revisions of growth projected for Portugal's major trading partners — reflected in a less buoyant ex-

(5) See Santos, D., R. Evangelista, T. Nascimento and C. Coimbra (2002), "*Analysis on the impact of the conversion of escudos into euros*" in the September 2002 issue of the *Economic Bulletin* of the Banco de Portugal.

(6) The rise in the VAT rate in June 2002 is estimated to have gradually contributed around 0.7 percentage points to the rise in the year-on-year inflation rate. This contribution will tend to disappear over the second half of 2003.

ternal demand relevant for the Portuguese economy (Chart 3) — have, in fact, corresponded to the materialisation of this risk, identified rather regularly in previous projections of the Banco de Portugal for the Portuguese economy(7). In the case of current projections, the materialisation of this risk would determine a downward adjustment of output growth, especially in the current context of a projected upturn in economic activity, led by exports.

A second risk source for projections relates to labour market developments. The maintenance of the adjustment process of the Portuguese economy assumes that wages will continue to show a high degree of flexibility with regard to labour market conditions. In fact, the maintenance of this feature of the Portuguese economy, notwithstanding the new context of low inflation, plays a prominent role in the adjustment foreseen. The possible non-existence of this wage adjustment ability would tend to diminish the economic activity's growth potential, via the deterioration of the competitive capacity of the Portuguese economy, and to cause a much sharper rise in the unemployment rate.

With regard to inflation rate, the balance of risks points towards a rate closer to the upper bound of the projection interval, particularly in 2003. Despite domestic pressures on price developments turn to be more moderate, should risks of lower output growth materialise, other factors are predominant. One of the factors is the possibility that additional fiscal measures might translate into an increase in some prices subjected to administrative procedures, as a result of cuts in subsidies, contributing to higher HICP growth. In the same vein, a lower sensitivity of wages to labour market developments would tend to hamper the materialisation of the current downward trend projected for the inflation rate. For 2003, there is an additional upside risk source due to the fact that the observed May 2003 inflation rate have exceeded expectations. The May CPI was published in June, a few weeks after closing the projection exercise, resulting in an adverse carry-over effect which increased the probability that the average inflation for 2003 will lay in the upper bound of the projection interval. This May inflation unexpected value reinforce the high degree of uncertainty surrounding the projection for the inflation rate, in a context in which price developments will continue to be strongly conditioned by highly unpredictable phenomena, both of an external (such as developments in the oil price and in the exchange rate of the euro) and domestic nature (especially the strong volatility of some food prices).

Completed in mid-June, based on a projection exercise using information available up to 22 May 2003.

(7) As an example, it should be noted that the current figure for external demand growth in 2001 is 1.4 per cent, against a 6.8 per cent assumption in the spring 2001 exercise. For 2002 the correspondent spring projection exercise pointed to a 1.4 per cent growth for external demand. Nevertheless, the current estimation points to an increase of only 0.4 per cent in 2002.

Box 1: REVISION OF THE PROJECTIONS FOR GDP GROWTH

The macroeconomic projections released now by the Banco de Portugal introduce considerable revisions in the GDP growth prospects presented in the December 2002 issue of the Economic bulletin.

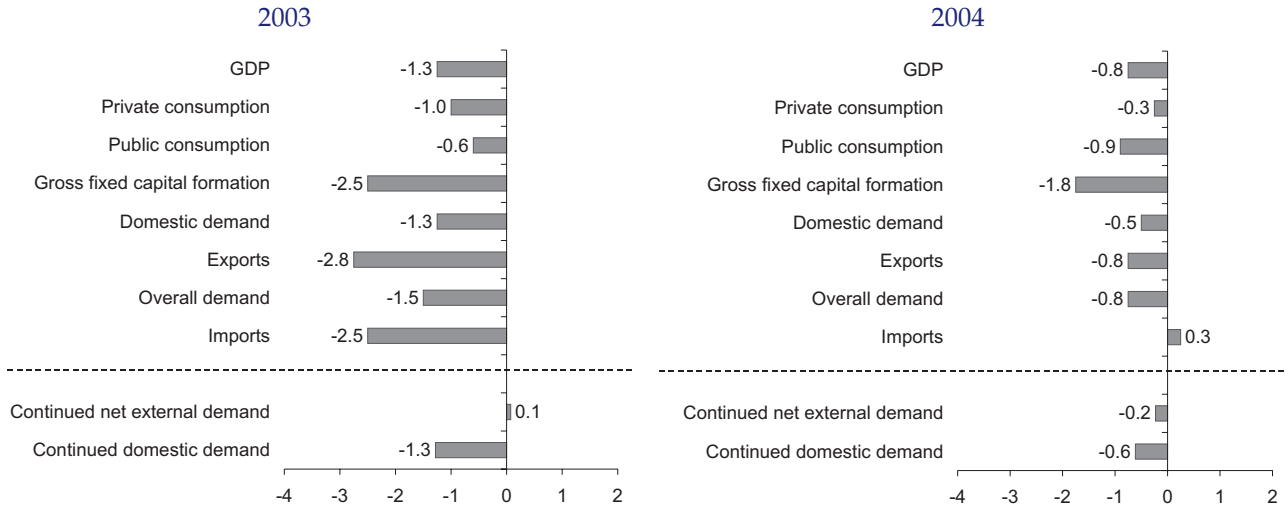
Considering the mid points of the projection ranges, GDP growth for 2003 and 2004 was revised downwards by around 1.3 and 0.8 percentage points respectively. As can be seen from Chart 1, these revisions resulted from a decline in growth projections for all overall demand components, both in 2003 and 2004. Revisions were particularly sizeable for GFCF and exports (especially regarding the latter and for 2003). It should also be noted that the assumption for the real growth of public consumption was subject to a significant downward revision.

The explanation of the revision is a result of both domestic and external factors. With regard to the latter, changes in the international economic environment translated, inter alia, into the revision of the technical assumptions regarding the effective exchange rate of the euro, short-term interest rates, external demand relevant for the Portuguese economy and the oil price (see Chart 2). The unfavourable effects of the less buoyant demand for Portuguese exports, the appreciation of the effective exchange rate of the euro and the upward revision of the oil price, compared with the assumptions of the Autumn 2002 projection exercise, more than offset the effects on activity of the decline in short-term interest rates (see Chart 3).

With regard to domestic factors, carry-over effects were predominant, given that the deceleration profile in the course of 2002 and early 2003 was more marked than considered in the previous projection[1]. The strong increase in the unemployment rate in late 2002 also contributed to the less buoyant domestic demand envisaged in current projections, through both the immediate effect on disposable income and the deterioration in household confidence. The assumptions on general government consumption and investment were also revised, in line with the most recent data and the need of further progress in the fiscal consolidation process to ensure that the general government deficit does not follow a divergent trend in the projection horizon.

Chart 1

REVISION OF THE PROJECTIONS COMPARED WITH THE DECEMBER 2002 ISSUE OF THE *ECONOMIC BULLETIN*[a]



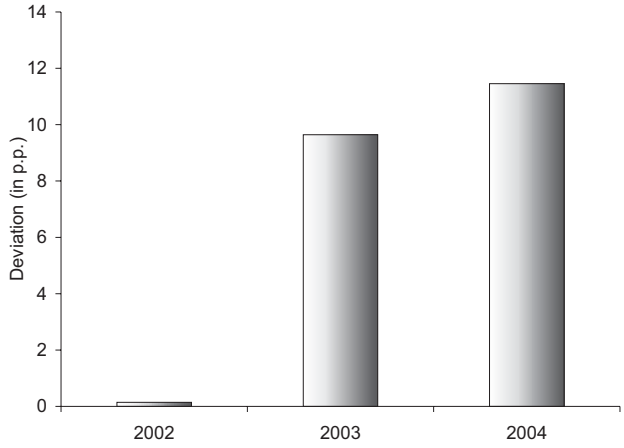
Note: (a) Taking into account the mid points of the projection ranges.

(1) *Despite the fact that GDP growth in 2002 was revised downwards by only 0.1 percentage point vis-à-vis the estimates published in the December 2002 issue of the "Economic bulletin", its composition changed considerably and its intra-annual deceleration profile became more marked. For a more detailed analysis, see the March 2003 issue of the "Economic bulletin", in particular the box entitled "Trend of the intra-annual economic activity in 2002"*

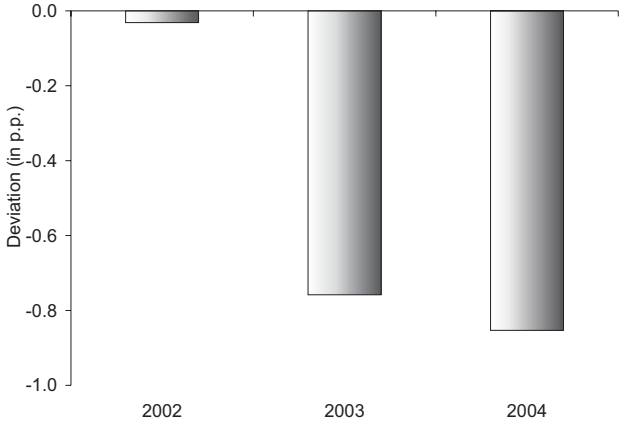
Chart 2

REVISION OF ASSUMPTIONS FOR EXTERNAL VARIABLES COMPARED WITH PROJECTIONS PUBLISHED IN DECEMBER 2002 ISSUE OF THE *ECONOMIC BULLETIN*

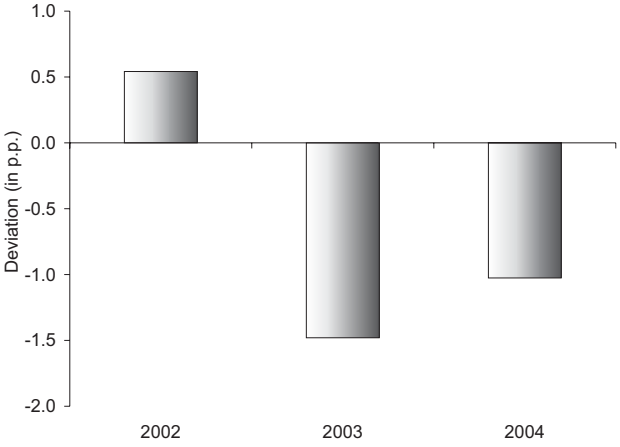
Effective exchange rate of the euro



Short -term interest rate



External demand
Growth rate



Oil price
In USD/barrel

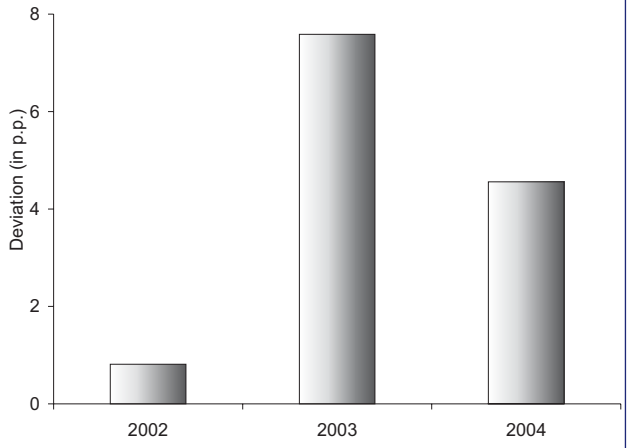
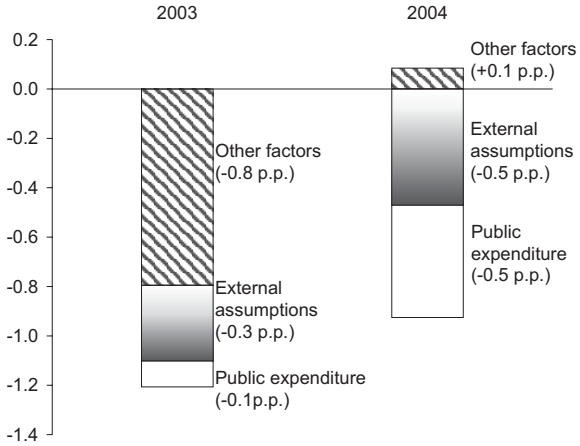


Chart 3

CONTRIBUTION TO THE REVISION OF THE GDP GROWTH PROJECTION COMPARED WITH THE DECEMBER 2002 ISSUE OF THE *ECONOMIC BULLETIN*



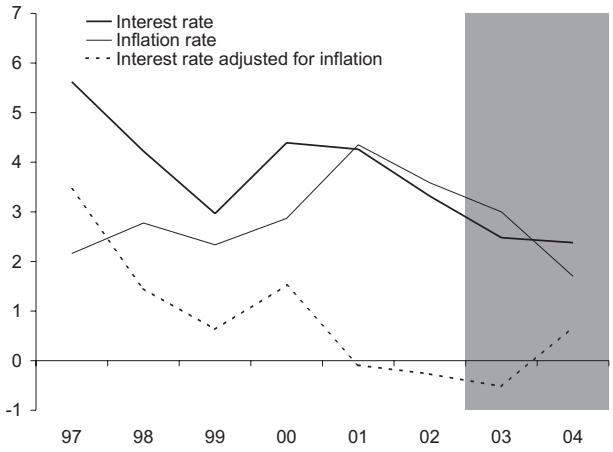
Box 2: CONTRIBUTION OF MONETARY CONDITIONS TO INFLATION AND TO THE GDP GROWTH RATE

The calculation of a Monetary Conditions Index (MCI) usually aims at obtaining a synthetic indicator to assess the effects of changes in short-term interest rates and in exchange rates on developments in the main economic variables, particularly on the inflation rate and on the GDP growth rate. Although the monetary policy is defined for the whole euro area, the interest in developing MCIs for Portugal has not decreased, as it continues to be relevant to access how monetary conditions influence the behaviour of the Portuguese economy. To this purpose, the present issue of the Economic Bulletin (see article entitled "Monetary Conditions Indicator for Portugal", by P. Esteves) presents a set of MCIs based on dynamic aggregation weights obtained from the simulation of the annual macroeconomic model used by the Banco de Portugal as one of the main medium-term forecasting instruments of the Portuguese economy[1]. In the particular context of the Eurosystem's projections, these indicators allow for the quantification of the effect of changes (past and assumed for the future) in interest rates and exchange rates on the projections of GDP growth and inflation.

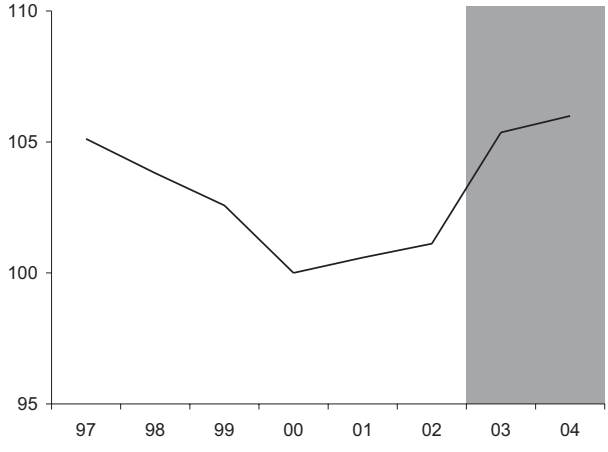
Chart 1 shows developments, from 1997 onwards, in the short-term interest rate (3-month money market rate) and in the effective exchange rate index, in nominal terms. The values considered for these variables, for 2003 and 2004, correspond to the technical assumptions made in the Eurosystem's exercise. In turn, Chart 2 shows the results obtained from the MCIs mentioned above (future values for GDP growth rate and for the inflation rate correspond to the mid-point of the projection ranges), considering the developments in interest rates and exchange rates illustrated in Chart 1. Both MCIs are nominal and take into account the first three years of transmission of changes in interest rates and exchange rates.

Chart 1
SHORT-TERM INTEREST RATES AND EFFECTIVE EXCHANGE RATE

Short-term interest rate
(3-month money market rate)



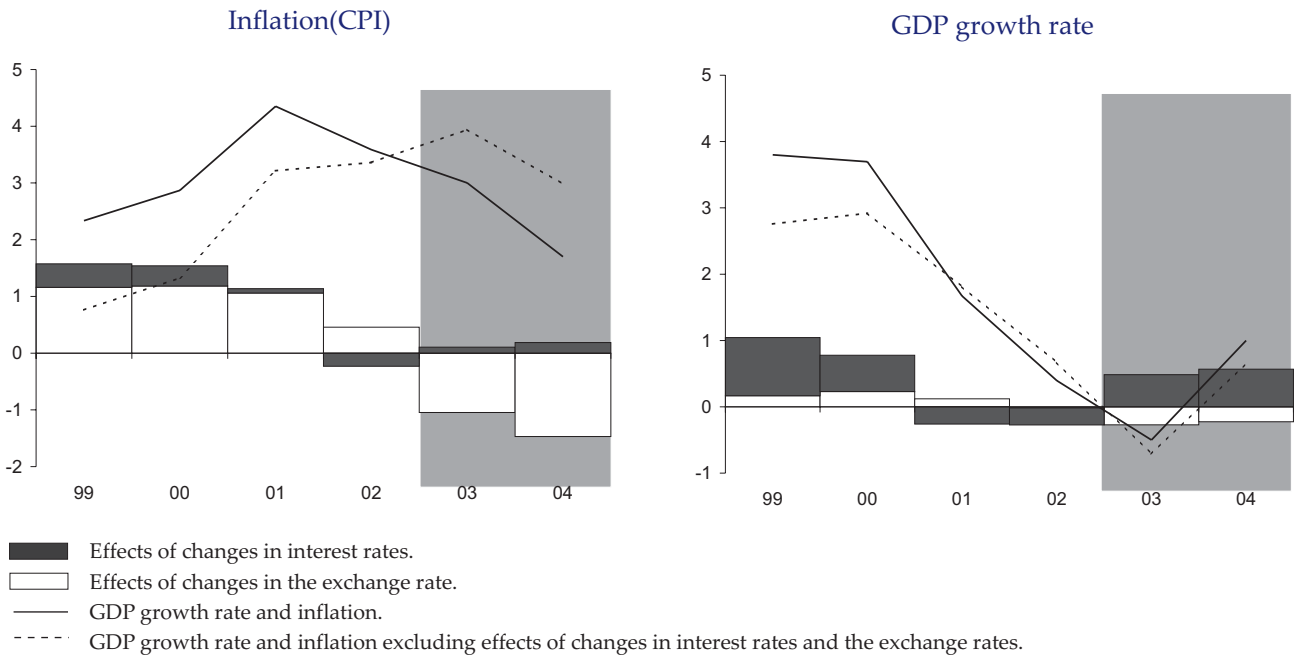
Effective exchange rate index relevant
for the economy (2000=100)(a)



Note:
(a) An increase (decrease) represents an appreciation (depreciation). The real exchange rate compares the evolution of consumer prices in Portugal and in our main trade partners converted to the same currency unit.

(1) The dynamic version of weights takes into account the lagged effects of changes in interest rates and exchange rates, given that aggregation coefficients represent their differentiated impact over the transmission horizon. Moreover, the aggregation coefficients are considered in absolute terms and are not standardised so that they add up to one. The dynamic MCI aims at quantifying the effects of changes in interest rates and exchange rates instead of only providing a qualitative analysis of the monetary conditions. However, considering the usual uncertainties associated with the construction and estimation of economic models, the results of this type of analysis should be interpreted with special caution.

Chart 2
CONTRIBUTION OF THE MONETARY CONDITIONS



From the analysis of Chart 2 it can be concluded that developments in the exchange rate play an important role in the reduction projected for the inflation rate. The depreciation of the effective exchange rate relevant for the Portuguese economy seems to have contributed around 1 percentage point to the annual inflation rate between 1999 and 2001. With the appreciation of the euro recorded since then, this contribution seems to have decreased to around ½ percentage point in 2002. The assumption that the euro exchange rate will remain unchanged at the current levels contributes to the reduction of around 1 percentage point in the expected annual inflation rate, both in 2003 and 2004.

It can also be concluded from the analysis of Chart 2 that developments in the interest rate have a positive effect on the economic activity, preventing a higher fall in GDP in 2003 and positively contributing to the recovery projected for 2004. Taking into account the fast decrease in interest rates during the nominal convergence process of the Portuguese economy, this contribution to the annual growth rate of GDP is likely to have stood between ¾ and 1 p.p. in 1999-2000, subsequently decreasing to virtually zero in 2001-02. According to the MCI, the assumption that the interest rates will remain unchanged at the most recent levels (representing a decrease of around 1 and 2 percentage points compared with 2002 and 2001 respectively) positively contributes around ½ percentage point to the current projections for the annual GDP growth rate.

Box 3: RECESSION PROJECTED FOR 2003 – SOME DIFFERENCES BETWEEN 1993 AND 2003

Current projections for the Portuguese economy envisage a contraction of economic activity in 2003 which, however, assumes some specific characteristics in comparison with former periods of recession of the Portuguese economy. This box aims at illustrating these differences, taking as a reference 1993, i.e. the last year in which the Portuguese economy also recorded a real decline in GDP.

Charts 1A and 1B show developments in GDP and domestic demand in these two periods of recession. In the horizontal axis of the charts, year t represents the year with a negative change of GDP in each episode: 1993 and 2003. Thus, for example, the years identified with t+1 represent 1994 and 2004 respectively. Given that there are no national accounts estimates for 2003 and 2004, the values for these years correspond to the mid points of the projection ranges disclosed in this issue of the "Economic bulletin".

The analysis of the charts leads to the conclusion that the current economic slowdown was more gradual than in 1993, when the growth rate of economic activity declined abruptly. In fact, in the previous episode, the GDP growth rate declined from 3.1 per cent in 1992 to -0.7 per cent in 1993. Domestic demand also decelerated markedly in 1993, compared with a more protracted and less abrupt slowdown in recent years.

This different dynamics of domestic demand is mainly associated with the behaviour of the components of this aggregate that traditionally show a higher sensitivity to the business cycle, such as private investment and the private consumption of durable goods. Taken together, these components fell by over 10 per cent in 1993 (having increased by around 8 per cent in the previous year). In 2003, the behaviour of these variables is not expected to change so abruptly and intensely, as can be seen from Chart 1C, with a projected reduction of around 5 per cent. However, given that these components have shown negative changes since 2001, the cumulative correction of the level at the end of the three years up to 2003 is likely to reach a value close to that seen in 1993.

It should also be noted that in the previous recession, in 1993, the decrease in GDP in Portugal was in line with that seen in all the countries currently comprising the euro area. Only in 1994 did GDP have a

Chart 1A
GDP
Percentage rates of change

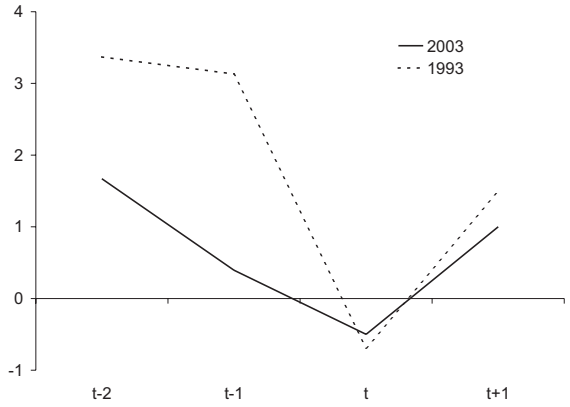


Chart 1B
DOMESTIC DEMAND
Percentage rates of change

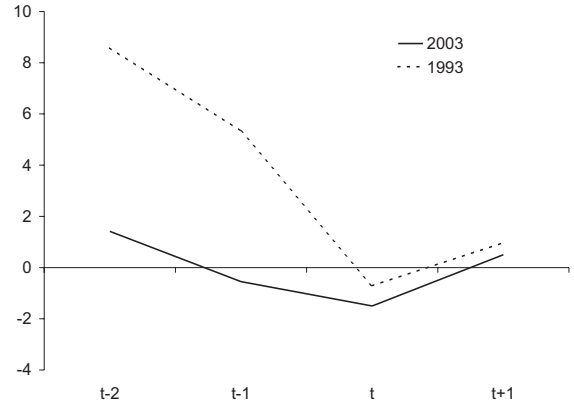


Chart 1C
PRIVATE INVESTMENT + PRIVATE CONSUMPTION OF DURABLE GOODS
Percentage rates of change

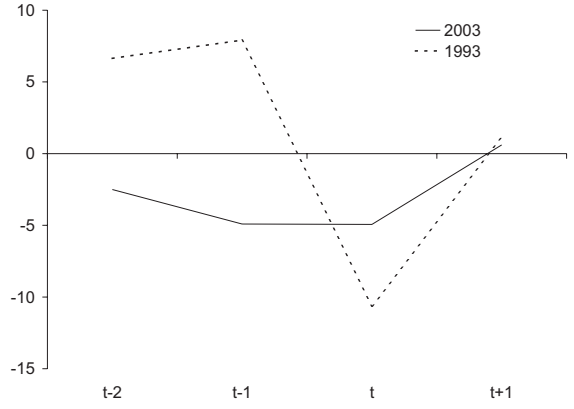


Chart 2
GDP
Percentage rates of change

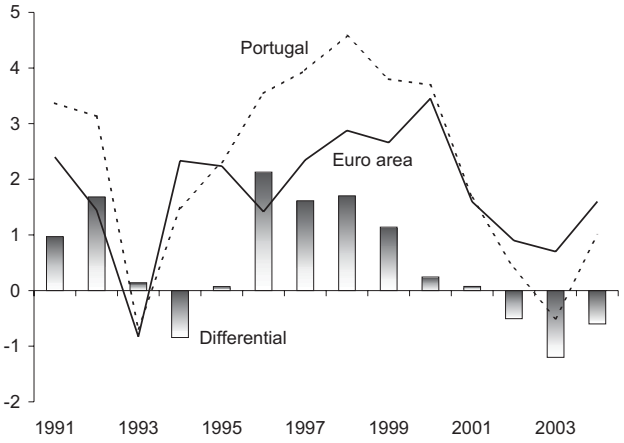


Chart 3A
EXPORTS
Percentage rates of change

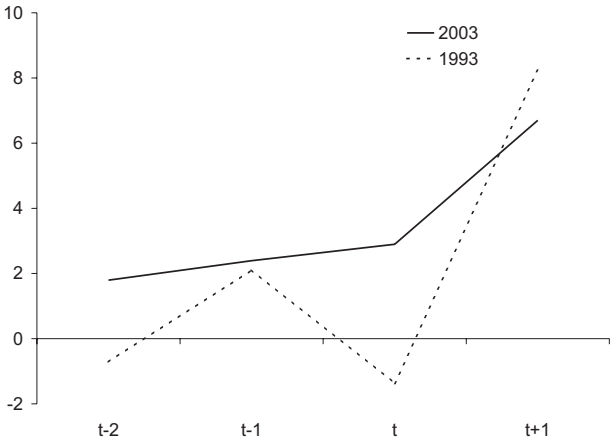


Chart 3B
IMPORTS
Percentage rates of change

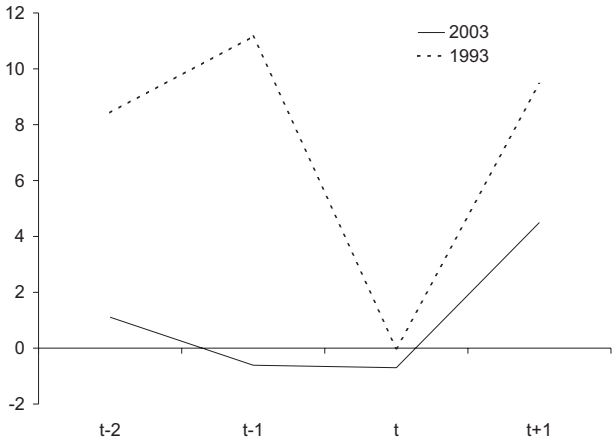
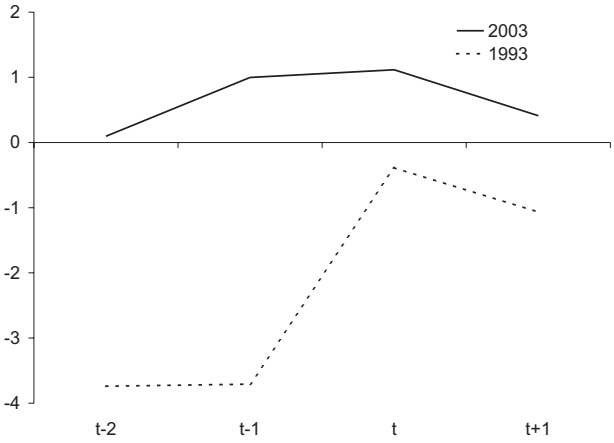


Chart 3C
EXPORTS NET OF IMPORTS
Contributions to GDP growth, in p.p.



growth rate below that recorded in those countries as a whole (Chart 2). By contrast, in the current stage, the growth differential vis-à-vis the euro area became nil already in 2001. It became negative in 2002, and is expected to remain negative at least until 2004 (taking into account, for the purposes of this calculation, the mid points of the Eurosystem's projection ranges for the euro area as a whole).

Charts 3A and 3B allow a better understanding of the nature of the differences between the two recession periods. In the recent period, exports have grown more than in the early 1990s, and projections for 2003 point to much more favourable developments in this variable than in 1993. In turn, import growth has been weak, or even contracted, in the recent period, in contrast to the early 1990s, with the exception of 1993. Chart 3C, which shows the contribution to GDP growth of exports less imports, confirms this difference in behaviour between the two periods. Thus, while the negative change in GDP in 1993 seems to have been basically induced by an external recession, the current period of recession is particularly associated with domestic factors, although aggravated by a weakening of the major world economies.

In the 1997-2000 period, Portuguese domestic demand grew rather strongly, following the decline in interest rates associated with the participation in the euro area, whose effects were amplified by a pro-cyclical fiscal policy. Buoyant domestic demand gave rise to a substantial increase in the economic

agents' borrowing requirements. Thus, the current subdued domestic demand, which underlies the projected negative growth differential vis-à-vis the euro area, is part of an inevitable adjustment process of the Portuguese economy. Until completion of this adjustment process its effects will imply reduced domestic demand growth. Unfortunately, the weak dynamics of the international economy, and in particular of the euro area economy, has caused these developments in domestic demand to translate into rather low growth rates for the Portuguese GDP, which became negative from mid-2002 onwards.

Articles

MONETARY CONDITIONS INDEX FOR PORTUGAL*

*Paulo Soares Esteves***

1. INTRODUCTION

The objective of this paper is to calculate a Monetary Conditions Index (MCI) for the Portuguese economy. MCIs are summary indicators of the effects of monetary variables on economic activity growth and on inflation. The idea is to aggregate monetary variables in a simple way in order to build an overall indicator for the prevailing monetary conditions. The most usual formulation can be stated as

$$MCI_{it} = \alpha_i \left(r_t - r_{t_0} \right) + (1 - \alpha_i) \left(\ln \left(\frac{e_t}{e_{t_0}} \right) \right) \quad (1)$$

where r measures the short-term interest rate, e represents the exchange rate (an increase represents an appreciation), t_0 is the base period and α and $(1-\alpha)$ are the aggregating weights. Sometimes these weights are presented as a ratio $\alpha/(1-\alpha)$, interpreted as the amount of depreciation necessary to balance a change of 100 basis points in the short-term interest rate. The fact that the weights are indexed by i (for GDP growth or inflation) reflects the fact that the relative effects of interest and exchange rates changes depend obviously on the variable that is being considered.

An important caveat of this kind of indicators is that they cannot deliver indications about the adequacy of the monetary policy, since they do not depend on the specific conditions of the economy (ongoing business cycle position, inflation level or fiscal policy stance) and are usually interpreted using rates of change.

2. SOME METHODOLOGICAL ISSUES

This is not the place for a survey of the literature on the MCIs, (see e.g., Costa (2000b)). However some issues are worth clarifying at the outset.

2.1. Additional variables

Some additional variables are sometimes included in the computation of MCI's. The long-term interest rate, the housing prices and the stock prices are the most common examples. However, for several reasons, the only variables considered in the paper are the short-term interest rate and the exchange rate. The role of the long-term interest rate in the Portuguese economy is rather limited, as the relevant interest rates for the private non-financial sector (bank loans and security debt rates) are typically indexed to money market rates. Moreover, there is a high level of uncertainty about the way in which housing prices and stock prices impact on the economy.

2.2. Aggregation coefficients

The choice of the aggregation coefficients is the crucial problem in the construction of MCIs. We shall consider two alternatives, called static and dynamic MCI respectively. In both cases the aggregation coefficients are based on an annual model for the Portuguese economy developed at Banco de Portugal.

(i) The static MCI corresponds to the direct application of equation 1. The interest and the exchange rates are aggregated using fixed weights according to the accumulated impacts of exchange and interest rates on GDP growth and inflation at the end of a 3-year horizon.

* The views expressed in this article are those of the author and not necessarily those of the Banco de Portugal.

** Economic Research Department.

Chart 1
EFFECTIVE EXCHANGE RATE

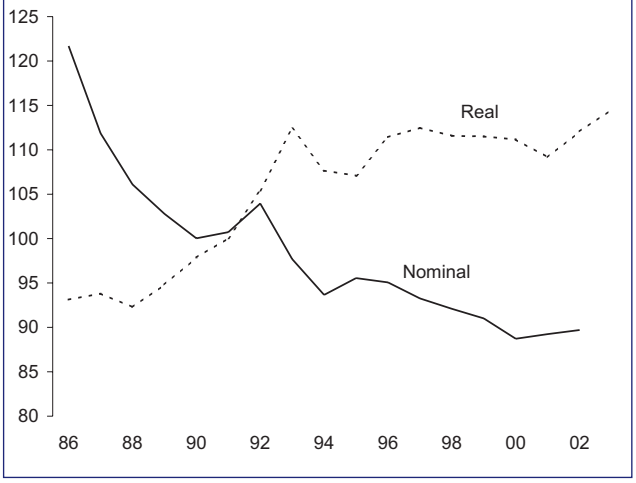
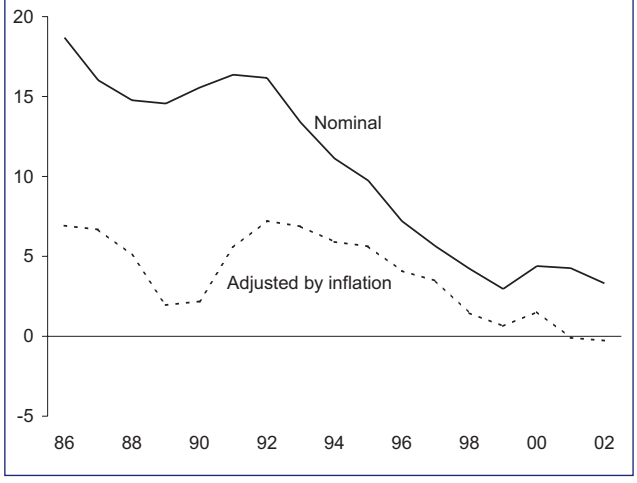


Chart 2
SHORT-TERM INTEREST RATE



(ii) The dynamic MCI follows Batini and Turnbull (2000). Now, the weights are not imposed to sum to one, and represent the impact of each variable on GDP growth or inflation in each period of a 3-year horizon. This indicator tries to quantify the effects of past and present changes of monetary conditions on the current behaviour of the economy rather than just giving a qualitative picture of those conditions. The paper devotes special attention to this dynamic MCI.

2.3. Real vs nominal

Another general discussion surrounding the MCIs for GDP is related to the choice between nominal and real indicators. The paper computes the dynamic MCI both in nominal and real terms. Neither is, however, immune to criticism.

The nominal MCI assumes that the nominal changes in interest and exchange rates are the ones relevant to explain GDP fluctuations. Obviously, this assumption is particularly restrictive and misleading for periods where inflation registered pronounced changes.

The major problem in the MCI in real terms concerns the exchange rate. It is well known that the Balassa-Samuelson type effects explain the coexistence of a high GDP growth and real exchange rate appreciation. Thus, the assumption that any fluctuation of the real exchange rate tends to produce effects on competitiveness and, therefore, on economic activity is particularly strong, specially for an analysis over long time spans.

3. THE PORTUGUESE DATA FOR INTEREST AND EXCHANGE RATES

This section presents the annual data used to construct the MCIs from 1986 onwards(1). The effective exchange rate for the Portuguese economy (Chart 1) is computed considering the most important trade partners, using export and import flows; the short-term interest rate considered(Chart 2) is the 3-months money market rates(2).

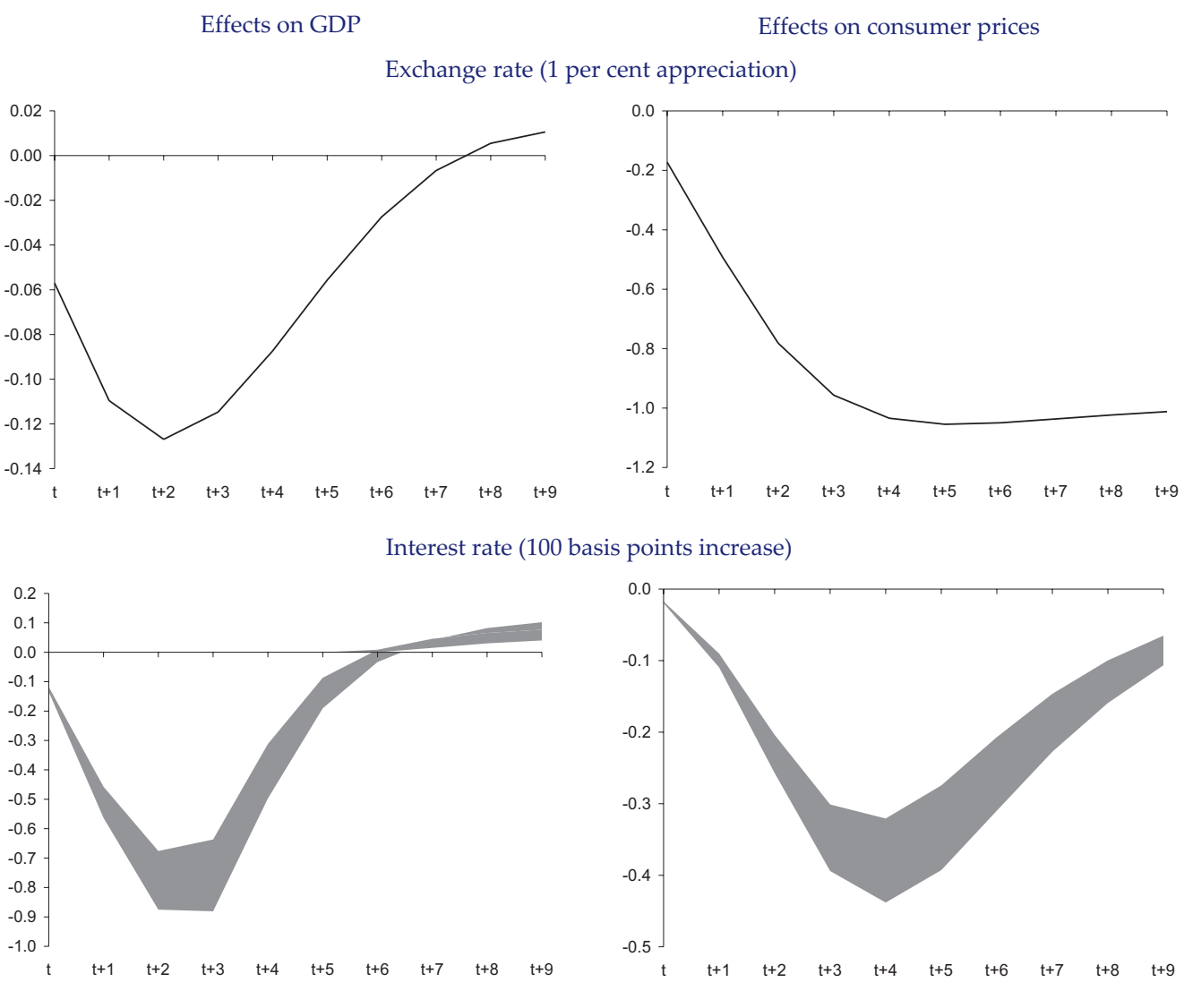
In this period, there was a clear trend of nominal depreciation of the Portuguese escudo that was gradually interrupted during the 90's, reflecting the participation of Portugal in the European Monetary Union. The interest rate, has also registered a downward trend, particularly steep between 1986 and 1988 and, again, between 1993 and 1998.

This evolution is, of course, quite different when the variables are measured in real terms. The decline of the interest rate adjusted for the observed inflation was not as pronounced, and the real exchange rate appreciated until the early 90s.

(1) Before 1986 monetary policy was particularly based on capital controls, credit ceilings and administratively fixed interest, and, therefore, the interest rate probably will not reflect the true monetary conditions. See OECD (1999) for a description of the gradual liberalization process that started in the second half of the 80s

(2) For the second half of the 80s, this series was extended using the banking deposits rate.

Chart 3
ANNUAL MULTIPLIERS
Percentage deviation from the baseline



4. MODEL MULTIPLIERS

This section presents the simulations of a model used in the forecasting exercises at the Banco de Portugal. These outputs were in turn used to compute both the static and dynamic MCI weights for interest and exchange rates.

It is important to remark that this model is of a backward looking nature and is mainly used for short and medium term forecasting. Consequently, it does not account for forward-looking expectations, which may play an important role when economic agents respond to monetary policy changes. Additionally, in the simulations presented, no constraints were imposed in order to assure financial equilibrium of both public and private sectors or to ensure the equilibrium of external accounts. Therefore, the MCI should be considered as an indicator measuring only the short-run effects of the prevailing monetary conditions.

Chart 3 presents the GDP and consumer prices annual multipliers delivered for two kinds of shocks: (i) a permanent appreciation of the Portuguese effective exchange rate of 1 per cent; (ii) an increase of the short-run interest rate of 100 basis points lasting for three years, that is fully transmitted to all the other interest rates.

The appreciation of the exchange rate is transmitted to domestic prices very quickly – more than half of the shock is transmitted to prices after two

years[3]. However, as this transmission is not instantaneous, the real exchange rate suffers a temporary appreciation. This explains a temporary decline of competitiveness both on the import and export fronts, leading to a short-run decline in GDP. As the exchange rate shock gets fully transmitted to prices, those effects on activity start to fade away (after two years).

With regard to the short-run interest rate shock, two initial remarks should be made. First, the shock is temporary. The implementation of a permanent shock on interest rate with all de other variables fixed would produce misleading results. In fact, a permanent shift of interest rate would come about attached with simultaneous changes in other variables (namely exchange rate and inflation expectations). As the models that are normally used are not capable of capturing these features and as the objective is just to measure the short-run effects of interest rate changes, this shock considers that the increase in the interest rate is sustained only during three years[4]. Secondly, as the model reacts not only to the absolute changes but also to the percentage changes of the interest rate, the reactions of GDP and prices depend on the initial level of interest rate. The shadowed area in Chart 3 illustrates this point, considering GDP and consumer prices multipliers for different initial levels of the interest rates (between 2.5 and 5 per cent).

As regards the simulations results, the increase of interest rate tends to produce negative effects on activity, in particular on investment and durable consumption, leading to an increase in unemployment and, consequently, to lower wages. The evolution of the output and labour markets will exert downward pressures on prices.

(3) This indicator is usually known as the "half-life". As the models tend to produce asymptotic adjustment towards their long-run solutions, this sort of indicator is frequently used to measure the speed of adjustment.

(4) This assumption is not important for the construction of the MCIs. In fact, it is assumed that a 3-year horizon is the one relevant to measure the short-run effects of monetary policy.

Table 1

MCI WEIGHTS

	GDP		Prices	
	Exchange rate	Interest rate	Exchange rate	Interest rate
Current estimate	0.06	0.94	0.5	0.5
Mayes and Virén (2000)				
Austria	0.40	0.60	0.53	0.47
Belgium	0.29	0.71	0.67	0.33
Finland	0.12	0.88	0.42	0.58
France	0.17	0.83	0.53	0.47
Germany	0.18	0.82	0.27	0.73
Ireland	0.15	0.85	0.71	0.29
Italy	0.13	0.88	0.29	0.71
Netherlands	0.30	0.70	0.45	0.55
Portugal	0.14	0.86	0.24	0.76
Spain	0.30	0.70	0.29	0.71
Average	0.21	0.78	0.44	0.56

5. MONETARY CONDITIONS INDICES

5.1. Static MCI

This approach corresponds to a direct application of equation 1. The weights are based on the accumulated impacts of exchange and interest rates on GDP and prices at the end of a 3-year horizon. Table 1 compares these results with the ones presented in Mayes and Virén (2000) for several euro area countries, including Portugal. In order to increase the comparability between the results, the multipliers of exchange rate are reduced to 1/3, reflecting the maintenance of fixed exchange rates between Portugal and the other euro area countries[5]. The interest rate multipliers correspond to a level of 5 per cent – a value which is close to the historical average for the euro area countries.

The results for Portugal are not very different from the ones presented in Mayes and Virén (2000). The interest rate seems to be more effective in explaining the short-run dynamics of GDP whereas the exchange rate plays the major role in the inflation behaviour. Moreover, the relative importance of the euro exchange rate in explaining GDP is lower in Portugal than in the other euro area countries[6].

The main difference concerns the weights for the inflation indicator. In the results of Mayes and Virén (2000), the exchange rate has an extremely low weight in the indicators for Portugal; in our estimates this weight is above the euro area average but, still, comparable with some other countries.

5.2. Dynamic MCI

For the dynamic MCI the relative coefficients of the interest and exchange rates are not restricted to sum to one and are no longer taken as constant over the horizon. The coefficients represent the differentiated impact of each variable on GDP growth and inflation in each period of the horizon. Therefore, it is possible to account for the different transmission mechanisms to both GDP and prices.

Considering a 3-year horizon, this index can be written as:

$$MCIx_t = \sum_{i=0}^{2} \alpha x_{t-i}\left(r_{t-i} - r_{t-i-1}\right) + \\ + \sum_{i=0}^{2} \beta x_{t-i} \ln\left(\frac{e_{t-i}}{e_{t-i-1}}\right) \qquad x = GDP, \text{ prices} \tag{2}$$

where the αx_{t-i} (βx_{t-i}) were obtained from the simulations presented above (see Chart 3), and measure the impact on the current rate of growth of the variable x triggered by a unit change in the interest rate (exchange in the rate) that took place i periods ago.

(5) Considering the trade shares with the other euro area countries (around 2/3), a unitary change of the euro exchange rate corresponds to 1/3 change in the Portuguese effective exchange rate. Therefore, the reduction of the exchange rate multipliers allows interpreting the weights as measuring the effect of the euro exchange rate.
In Mayes and Virén (2000), the results were derived using the NIGEM model to simulate shocks of the nominal interest rate and the bilateral exchange rate against the US dollar, considering a 3-year horizon.
The comparison with those results is just made for illustrative purposes, as alternative estimations point to very different weights. The structure of each model as well as of the additional assumptions underlying the simulations influence substantially the results (see Costa (2000) for a set of alternative estimates).

(6) As commodities prices are traditionally fixed in USD, a depreciation of the euro represents also a negative shock on the terms of trade, which tends to reduce the effect on activity related to the increase on competitiveness.

Table 2

CONTEMPORANEOUS CORRELATIONS (1986-2002)

	Overall correlations		Partial correlations	
	GDP growth	Inflation	GDP growth	Inflation
Dynamic MCI (nominal)	0.47	0.59	0.68	0.89
Dynamic MCI (real)	0.30	-	0.49	

The dynamic MCI for GDP was computed both in nominal and real terms. The main difference is the benchmark chosen to compare the prevailing monetary conditions: the nominal (real) index measures the contribution to GDP growth and inflation against a benchmark where the nominal (real) interest and exchange rates were held constant at the level observed in the previous year.

Table 2 presents the correlations between these indicators and the evolution of GDP and inflation. The partial correlations are also presented, using equations where additional key variables that affect both GDP and prices are considered as well(7).

From the results presented in Table 2, two conclusions emerge. Firstly, the MCIs are more important in explaining inflation fluctuations than GDP developments. Secondly, the use of the real MCI does not seem to improve the results. The reasons underlying the differences between nominal and real MCIs for GDP are presented in the next section that assesses the contribution of monetary conditions for GDP growth and inflation in the Portuguese economy since 1986.

(7) Those partial correlations are based on the regressions for GDP (y) and prices (p), on the external demand (dx), on the public expenditure in consumption and investment, in real terms, (g), on the foreign prices (p^*) and on the MCIs:

$$\Delta y_t = \alpha_0 + \alpha_1 \Delta dx_t + \alpha_2 \Delta dx_{t-1} + \alpha_3 \Delta g_t + \alpha_4 \Delta g_{t-1} - \phi \Delta MCIy_t$$

$$\Delta p_t = \beta_0 + \beta_1 \Delta p^*_t + \beta_2 \Delta p^*_{t-1} - \phi \Delta MCIp_t$$

Chart 4
MONETARY CONDITIONS EFFECTS
Inflation

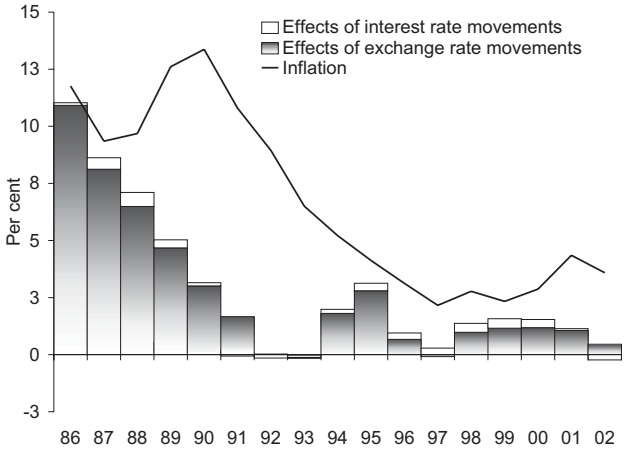
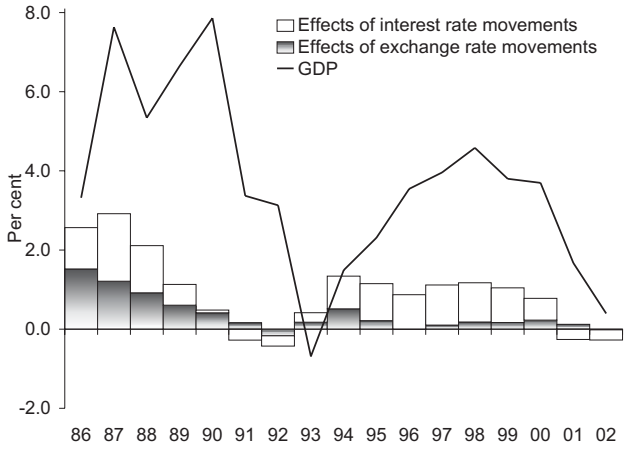
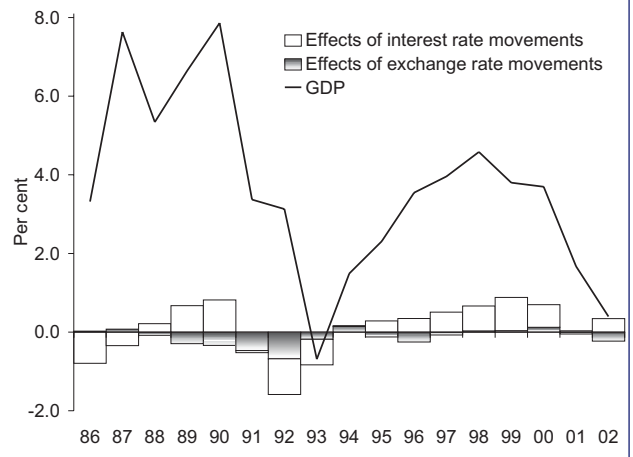


Chart 5
MONETARY CONDITIONS EFFECTS
GDP
Nominal MCI



Real MCI



6. MONETARY CONDITIONS SINCE 1986

As already mentioned, the dynamic MCI has the important feature of allowing for the estimation of the short-run effects of monetary conditions on GDP growth and inflation. Charts 4 and 5 describe these effects, presenting estimates of the short-run contributions of monetary conditions both for GDP growth and inflation since 1986. For a detailed analysis of the Portuguese monetary policy during this period see Abreu (2001).

The role played by the exchange rate in the behaviour of inflation in Portugal is clear. In 1986, the high inflation was supported by a depreciation of the Portuguese currency (Chart 4). Those effects, however, declined remarkably during the second half of the 80s, reflecting the lower pace of depreciation registered then. The reduction of the exchange rate contribution to inflation became particularly evident after the end of the crawling peg in 1990 and the increasing stability of the Portuguese currency due to its participation in the European Monetary Union. The contribution of the exchange rate to the annual inflation rate decreased from 7.5 percentage points in the second half of the 80s, to 1.1 percentage points in the 90s and to 0.9 percentage points in the last three years.

For GDP (Chart 5), the results depend crucially on using the MCI in nominal or real terms. As expected, the real version points to a lower contribution of monetary conditions to GDP growth, because the expansionary effects associated with the decline of the interest rate were balanced by the reduction of the inflation rate. Also, given the persistence of higher inflation rates in Portugal, the exchange rate depreciation did not avoid a real appreciation (see Charts 1 and 2).

The real indicator suggests a contribution of monetary conditions to GDP growth close to zero (on average) in the second half of the 80s and a negative one in the early 90s. On the other hand, for the same periods the nominal MCI indicates respectively a very strong and a negligible contribution. However, since 1997, given the stability of the inflation rate, the nominal and real indicators produce very similar indications.

As already mentioned, both the nominal and the real versions are not immune to criticism. The

nominal indicator overestimates the impact on the GDP, since the changes in the nominal interest and exchange rates were partially offset by inflation rate developments. But the effects captured by the real MCI are underestimated. First, the real appreciation of the Portuguese currency should not be necessarily considered as a deterioration of competitiveness, because part of this appreciation is related to the economic growth process itself, (Brito and Correia (2000) and Costa (2000a)). Second, the effects of the decline of the interest rate are probably higher than the ones implied by considering the evolution of the interest rate adjusted by the observed inflation. Indeed, the nominal interest rate may produce direct effects on real economic activity, namely through the financial constraints faced by firms and households. Moreover, the downward path of the inflation rate in Portugal was probably anticipated given the necessary nominal convergence required for the Portuguese participation in the European Monetary Union. Thus, the use of a medium-run inflation expectation instead of the observed inflation rate would produce a more pronounced decline of the real interest rate.

In this sense, the true contribution of monetary conditions to short-run GDP growth was probably somewhere between the bounds provided by these two indicators. Fortunately, these limitations seem to be less relevant today.

7. MAIN CONCLUSIONS

Despite all the simplifying assumptions underlying its construction, the dynamic versions of the Monetary Conditions Index may be helpful in explaining the contribution of monetary conditions to the evolution of the Portuguese economy especially in the more recent past.

These indicators can also play another important role. As they can be easily extended into the near future assuming scenarios for interest and exchange rates, they may be useful for forecasting and simulation purposes. An application of these features is considered in the text presenting the projections for the Portuguese economy in 2003 and 2004. The text includes a box that presents the estimated contribution of the monetary conditions to GDP and inflation developments both in the recent years and over the projection horizon.

REFERENCES

Abreu, Marta (2001), "From EC Accession to EMU Participation: The Portuguese Disinflation Experience in the period 1984-1998", Banco de Portugal, *Economic Bulletin*, Vol. 7, No. 4, December.

Batini, Nicoletta and Kenny Turnbull (2000), "Monetary Conditions Indices for the UK: a survey", Bank of England, External MPC Unit, *Discussion Paper* No.1.

Brito, Paulo and Isabel Correia (2000), "Inflation Differential and Real Convergence in Portugal", Banco de Portugal, *Economic Bulletin*, Vol. 6, No. 2, June.

Costa, Sónia (2000a), "Inflation Differential between Portugal and Germany", Banco de Portugal, *Economic Bulletin*, Vol. 6, No. 2, June.

Costa, Sónia (2000b), "Monetary Conditions Index", Banco de Portugal, *Economic Bulletin*, Vol. 6, No. 3, September.

Mayes, David and Matti Virén (2000), The Exchange Rate and Monetary Conditions in Euro Area, *Review of World Economics*, 136(2).

OECD (1999), *OECD Economic Surveys*, Portugal, October.

THE EFFECT OF DEMOGRAPHIC AND SOCIOECONOMIC FACTORS ON HOUSEHOLDS' INDEBTEDNESS*

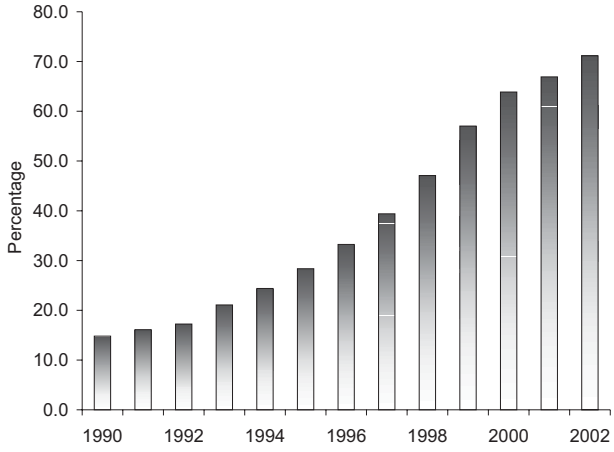
*Luísa Farinha***

1. INTRODUCTION

During the 1990s, in particular in the second half of the decade, the indebtedness of Portuguese households increased significantly. The ratio of households' debt to GDP rose from nearly 15 per cent in 1990 to 24 per cent in 1994, reaching 64 per cent in 2000 (Chart 1). In the context of the euro area, only the corresponding ratios in Germany and the Netherlands were higher in 2000 (Table 1). These developments largely reflected the decline in both nominal and real interest rates that has encouraged credit demand. At the same time, reflecting the increase in bank competition, the banking system offered a wider range of financial products, particularly in the segment of household credit. In addition, the growth of household debt also reflected the subsidised housing credit programmes that significantly eased households' access to the credit market. As a matter of fact, in the period 1997-99 subsidised loans accounted for nearly 60 per cent of new loans in the housing credit market.

This trend in households' indebtedness could not be maintained indefinitely since each economic agent is subject to an intertemporal budget constraint, implying that its borrowing capacity in the present depends on its future income flows. So, in the context of an adjustment process of some of the imbalances of the Portuguese economy, credit to households started to decelerate in mid-1999. In 2000 and 2001 the increase in households' indebtedness was slower than in the previous years. In 2002, some specific factors led to an interruption of this deceleration. In that year the households' indebtedness peaked at 71 percent of GDP (103 percent of annual disposable income).

Chart 1
HOUSEHOLDS' INDEBTEDNESS
As a percentage of GDP



The households' indebtedness level is one of the issues analysts look at when they evaluate the stability of the financial system. The importance of this issue arises from the fact that it is expected that the sensitivity of the households' financial position to changes in unemployment and interest rates increases with the level of their indebtedness. This is particularly relevant when interest rates are indexed to a short-term rate in the money market, as is the case in Portugal.

The consequences to financial stability of a high level of households' debt are also expected to depend on some of the socioeconomic characteristics

* The views expressed in this article are those of the author and not necessarily those of the Banco de Portugal.

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Table 1

HOUSEHOLDS' INDEBTEDNESS
EURO AREA COMPARISON (2000)

	Total credit % of GDP	Housing credit % of total	Consumption credit % of total
Austria	40.0	46.7	42.9
Belgium	39.8	67.1	10.4
Germany	73.4	61.8	13.7
Spain	47.4	63.3	17.5
Finland	33.4	70.3	8.8
France	45.7	57.1	21.2
Italy	22.9	-	-
The Netherlands	92.0	93.3	4.8
Portugal	64.0	73.7	11.9

Source: Report on Financial Structures, ECB, 2002.

of the indebted households, such as their education level, income, labour market situation etc. Richer households, those whose head has a stable job or is more educated give, *ceteris paribus*, a smaller contribution to risk.

The availability of microdata on households' debt, income, age, education level, etc. is vital when analysing these issues. With microdata it is possible to control for the individual heterogeneity that is expected to affect the financial behaviour of different households. If a model of debt is estimated using aggregated data this heterogeneity is not taken into account. Consequently, these estimates can be misleading in terms of both the magnitude and the significance of the parameters. In the Portuguese case, the data collected by the statistical office (*Instituto Nacional de Estatística, INE*) in 1994 and 2000 through a survey on wealth and debt of households may be very useful in the study of households' financial behaviour.

The objective of this study is to evaluate the effect of some characteristics of households on their indebtedness level. Two models of both total and mortgage debt were estimated using anonymous microdata from the survey on households' wealth and debt. Data from 1994 and 2000 were pooled so that it was possible to test the equality between the effects of households' characteristics on debt in the two years. Given the nature of the dependent variable, which is always zero or positive, the formulation and estimation of a *tobit* model was thought to be more adequate than ordinary least squares.

In section 2 data are presented and section 3 takes a look at a set of summary statistics based on the 2000 sample. In section 4 the estimation results are presented and the main conclusions are given in section 5.

2. THE DATA

The data used in this study came from the Survey of Households' Wealth and Indebtedness (*Inquérito ao Património e Endividamento das Famílias, IPEF*) mentioned in the introduction. This survey was carried out by the *INE* with the support of Banco de Portugal in 1994 and 2000. A separate module on debt and wealth was included in the Employment Survey (*Inquérito ao Emprego, IE*), in the fourth quarter of 1994, collecting data of a sample of 9,086 households. In 2000, the IPEF questionnaire was appended to the Household Income and Expenditure Survey (*Inquérito aos Orçamentos Familiares, IOF*). This year, the IPEF collected information of a subsample of the IOF with 6,640 households. These databases provide information on several households' attributes such as age, education, and labour market situation of the household' head in addition to details on their income, wealth and debt.

For the purpose of this study the two samples have been restricted to the households whose monthly income was equal or exceeded the minimum wage and whose head was more than 20 and less than 65 years old. As a result of this selection a sample of 9,481 observations was obtained, from which 5,712 and 3,769 were taken from the 1994 and 2000 samples, respectively (Table 2). In 2000, 84.1 percent of the households' head are male, 44.2 percent are 51-64 years old, 59.8 percent are employees, 83.4 percent are married and 50.6 percent have only completed 1st cycle of basic schooling. Compared with the results of the 2001 census the households from IPEF samples are relatively old, particularly in 2000, in the sense that the families whose head is older are likely to be over represented and those whose head is younger seem to be under represented[1]. Therefore, an analysis

(1) See "*Censos 2001 – Resultados ,Definitivos*", *INE*, 2002.

Table 2

MAIN CHARACTERISTICS OF THE SAMPLES

	IPEF 1994	IPEF 2000	*Memo*: "*Censos* 2001"
Number of observations	5 712	3 769	2 649 989[a]
As a percentage of the total:			
Gender of the household's head			
Male	85.5	84.1	82.3
Female	14.5	15.9	17.7
Age of the household's head			
Up to 30 years old	8.2	4.7	11.6
31 to 40	24.5	20.1	24.7
41 to 50	30.5	30.9	27.0
51 to 65	36.8	44.2	36.7
Education level of the household's head			
No education	10.7	10.2	10.5[b]
Basic schooling (1st cycle)	46.3	50.6	44.2[b]
Basic schooling (2nd cycle)	10.8	15.4	11.2[b]
Basic schooling (3rd cycle)	11.0	10.7	8.5[b]
Secondary or upper level schooling	14.6	13.1	25.7[b]
Labour market situation of the household's head			
Employee	59.6	59.8	46.3[c]
Self employed	22.1	18.8	12.9[c]
Unemployed or other situations	12.6	7.6	7.4[c]
Student	0.3	0.1	0.5[c]
Retired	2.9	10.5	31.8[c]
Housewife	2.5	3.2	1.1[c]
Marital status of the household's head			
Married	85.9	83.4	79.2
Single	4.7	4.7	9.2
Divorced	3.8	6.9	6.3
Widow	5.6	4.9	5.2

Notes:
(a) Total number of households whose head is between 20 and 64 years old (the total number of households is 3 650 757).
(b) In the case of the breakdown by education level the percentages are referred to the total number of households.
(c) In the case of the breakdown by labour market situation level the percentages are referred to the total number of households.

based only on descriptive statistics may not reflect accurately the Portuguese reality. However, this problem should not invalidate the conclusions based on the econometric analysis because the consistency of the estimated parameters should not be affected by the lack of representativity of the sample.

3. SUMMARY STATISTICS IN 2000

Despite the caveats pointed out in the previous section concerning the sample representativity, in this section a few summary statistics are presented. These statistics were computed only for the 2000 data mainly because the two samples are not comparable. This is especially due to the fact that they have been selected according to different stratification criteria, in line with the objectives of the underlying surveys (the IE in 1994 and the IOF in 2000). The sample weights, which are based only on region and family size, are available only for the 2000 data. Furthermore, the IPEF questionnaire was changed in 2000. Finally, the comparability is affected by the fact that the two surveys have different reference periods.

According to the summary statistics for 2000 that are shown in Table 3, most of households' non-financial wealth is invested in housing. Most of their financial wealth is, in turn, held in the form of deposits and investment fund units.

Table 4 and Table 5 present data on the frequency of debt and the outstanding amount of

Table 3

SUMMARY STATISTICS IN 2000[a]

EUR thousand

	Average	Percentage of total	Standard deviation	Maximum
Non-financial assets				
Total	122.239	100.0	280.919	5 095.221
House	67.803	55.5	99.785	1 496.394
Other buildings	5.370	4.4	98.906	4 987.979
Real estate	9.242	7.6	101.730	3 990.383
Vehicles	8.449	6.9	17.430	399.038
Other valuable goods	24.893	20.4	201.429	3 990.383
Professional goods	6.482	5.3	44.358	997.596
Financial assets				
Total	16.083	100.0	120.530	3 246.676
Currency and demand deposits	1.412	8.8	3.131	24.940
Time and savings deposits	6.450	40.1	28.298	548.678
Investment fund units	5.781	35.9	106.640	3 242.186
Bonds	0.249	1.6	8.324	498.798
Shares and other participations	2.190	13.6	33.710	997.596
Liabilities				
Total debt	6.378	100.0	20.601	488.822
Housing debt	5.100	80.0	15.552	259.375
Durables debt	1.149	18.0	11.512	381.660
Consumption credit	0.128	2.0	0.951	32.961
Net monthly income	1.294	–	0.924	10.725

Note:

(a) The sample has 3679 households from IPEF – 2000 with monthly net income higher than minimum wage (around 320 euros) and whose head is 20-64 years old.

debt (both total and mortgage debt), broken down by gender, age, education, job status, income, etc. These figures provide a first clue to the relation between debt and some relevant households' characteristics, suggesting that the proportion of indebted households and the outstanding amount of their debt holdings increase with their income, wealth and with the level of education of the households' head.

Table 6 presents the average and the standard deviation of the debt ratio (debt on GDP) and the effort ratio (interest and principal payments on income) both for total and mortgage debt. These figures suggest that the debt ratio is larger for richer and younger households while the effort ratio is larger for the youngest and the less rich.

4. ECONOMETRIC ANALYSIS

As it was mentioned in the introduction, the main objective of this study is to analyse the effect of some households' characteristics on their indebtedness and test the hypothesis that those effects were similar in 1994 and 2000.

Therefore, a model in which the variable to explain is the outstanding amount of debt was formulated. This variable presents a "corner solution", in the sense that it is zero with a positive probability and is continuous for strictly positive values[2]. In this case linear regression is not the adequate methodology to estimate the model. The reason is that for some combinations of the explanatory variables and the OLS parameter estimates, the expected value of debt could be negative. In this context, the usual methodology is the estimation of a *tobit* model formulated as follows:

$$\begin{cases} y_i^* = \beta' x_i + \varepsilon_j \\ y_i = \max\left(0, y_i^*\right) \end{cases}$$

where y_i is the variable to explain, x_i is the vector of the explanatory variables, β is the vector of the parameters and ε_i the error term. y_i^* is a "latent" variable so that $E\left(y_i^*\right) = \beta' x_i$. The "latent" variable can take negative values, and in that case y_i is

(2) See Wooldridge, "Econometric Analysis of Cross Section and Panel Data", The MIT Press, 2001.

Table 4

FREQUENCY OF INDEBTED HOUSEHOLDS AND TOTAL DEBT, ACCORDING TO SELECTED HOUSEHOLDS' ATTRIBUTES (2000 SAMPLE) [a]

EUR thousand

	Frequency %	Average	Standard deviation	Minimum	Maximum	Number of observations
Gender of the household's head						
Male	36.9	21.429	34.397	0.005	488.822	973
Female	32.3	18.637	23.798	0.025	99.760	171
Age of the household's head						
Up to 30 years old	41.3	49.900	63.126	0.005	381.660	62
31 to 40	49.0	24.751	35.269	0.005	488.822	316
41 to 50	42.5	20.933	26.171	0.005	219.471	405
51 to 65	25.4	12.864	26.653	0.005	275.835	361
Education level of the household's head						
No education	17.4	12.869	21.689	0.040	122.784	52
Basic schooling (1st cycle)	27.6	14.137	20.617	0.005	219.471	431
Basic schooling (2nd cycle)	46.3	24.783	34.180	0.005	381.660	212
Basic schooling (3rd cycle)	53.6	20.516	22.014	0.005	99.610	197
Secondary or upper level schooling	57.7	31.663	50.643	0.050	488.822	252
Labour market situation of the household's head						
Employee	40.9	22.018	31.648	0.005	381.660	787
Self employed	33.1	24.503	44.844	0.050	488.822	187
Unemployed or other situations	26.1	18.964	27.883	0.060	122.784	61
Student	25.0	37.659	-	37.659	37.659	1
Retired	26.4	7.944	13.074	0.025	82.362	85
Housewife	22.7	11.157	14.762	0.289	52.723	23
Income quartiles						
First quartile	18.8	9.338	13.312	0.040	60.355	121
Second quartile	28.5	16.396	31.114	0.005	381.660	237
Third quartile	41.4	21.542	25.484	0.005	219.471	333
Fourth quartile	53.4	26.154	40.694	0.005	488.822	453
Financial wealth quartiles						
First quartile	32.2	19.486	30.975	0.005	381.660	245
Second quartile	38.6	19.386	22.376	0.025	124.700	287
Third quartile	41.0	20.759	30.813	0.005	275.835	331
Fourth quartile	33.2	24.299	44.419	0.050	488.822	281
Non-financial wealth quartiles						
First quartile	19.5	11.479	40.643	0.025	381.660	167
Second quartile	32.2	16.108	22.366	0.005	219.471	236
Third quartile	44.9	23.002	23.759	0.005	122.784	347
Fourth quartile	48.3	26.236	39.956	0.005	488.822	394
Number of persons in the household						
1 person	28.2	32.072	74.491	0.040	488.822	62
2 persons	28.0	20.494	39.528	0.100	381.660	198
3 persons	37.0	22.778	29.430	0.005	269.351	320
4 persons	42.5	20.115	24.287	0.005	131.413	378
5 or more persons	37.2	16.658	22.063	0.005	122.784	186
Marital status of the household's head						
Married	37.7	20.883	29.471	0.005	381.660	988
Single	25.1	31.498	53.844	0.040	319.330	41
Divorced	24.6	12.690	17.622	0.060	75.119	51
Widow	37.8	22.904	63.049	0.025	488.822	64

Note:

(a) The average, standard deviation, minimum, maximum and number of observations relate only the households with positive debt.

equal to zero. The model is estimated by maximizing the likelihood function.

Applying the model to the analysis of debt, y_i is household i observed outstanding amount of debt, at constant prices (with $y_i \geq 0$), and y_i^* is the "latent", non-observed, debt. The explanatory variables stand for the households' attributes that were considered relevant to the debt decision. In order to get an easier interpretation of the results, the attributes were measured *vis-à-vis* those of a

Table 5

FREQUENCY OF INDEBTED HOUSEHOLDS AND TOTAL DEBT, ACCORDING TO SELECTED HOUSEHOLDS' ATTRIBUTES (2000 SAMPLE)[(a)]

EUR thousand

	Frequency %	Average	Standard deviation	Minimum	Maximum	Number of observations
Gender of the household's head						
Male	25.1	26.350	26.412	0.005	259.375	6260
Female	18.5	29.982	25.159	0.125	99.760	91
Age of the household's head						
Up to 30 years old	30.2	56.690	28.303	0.005	159.615	42
31 to 40	35.6	29.994	23.609	0.005	139.663	215
41 to 50	30.1	25.642	23.447	0.005	124.700	272
51 to 65	13.9	18.187	27.253	0.005	259.375	188
Education level of the household's head						
No education	7.8	19.625	27.434	0.678	122.186	23
Basic schooling (1st cycle)	17.6	17.975	19.344	0.005	99.760	254
Basic schooling (2nd cycle)	33.5	27.988	22.245	0.005	93.774	148
Basic schooling (3rd cycle)	37.0	28.057	21.297	0.005	99.111	130
Secondary or upper level schooling	39.7	39.611	35.559	0.005	259.375	162
Labour market situation of the household's head						
Employee	28.9	27.598	25.539	0.005	259.375	525
Self employed	18.5	31.934	30.383	0.005	139.663	96
Unemployed or other situations	17.1	25.562	31.779	0.349	122.186	38
Student	25.0	37.410	-	37.410	37.410	1
Retired	15.4	11.095	13.790	0.005	64.754	47
Housewife	10.9	13.904	15.396	1.856	47.675	10
Income quartiles						
First quartile	10.6	12.525	15.985	0.005	60.355	64
Second quartile	17.2	20.850	21.905	0.005	93.774	132
Third quartile	28.9	26.931	23.144	0.005	122.186	221
Fourth quartile	37.5	32.394	30.057	0.005	259.375	300
Financial wealth quartiles						
First quartile	22.9	22.393	21.226	0.005	122.186	165
Second quartile	27.3	26.250	23.657	0.005	124.700	188
Third quartile	26.8	26.901	29.304	0.005	259.375	210
Fourth quartile	19.3	32.107	28.969	0.005	159.615	154
Non-financial wealth quartiles						
First quartile	3.6	32.346	37.643	0.170	159.615	29
Second quartile	22.7	18.378	18.072	0.005	87.290	160
Third quartile	37.1	26.755	23.671	0.005	122.186	271
Fourth quartile	32.9	31.496	30.183	0.005	259.375	257
Number of persons in the household						
1 person	15.0	43.112	37.993	1.047	159.615	32
2 persons	18.2	23.957	24.503	0.005	99.760	120
3 persons	25.5	29.038	27.666	0.005	259.375	207
4 persons	29.5	25.313	23.881	0.005	124.700	254
5 or more persons	22.9	24.316	24.953	0.005	122.186	104
Marital status of the household's head						
Married	25.7	26.254	25.510	0.005	259.375	637
Single	13.4	51.151	35.600	4.988	159.615	20
Divorced	11.9	21.187	21.578	0.170	74.820	23
Widow	23.8	26.749	30.289	0.125	139.663	37

Note:

(a) The average, standard deviation, minimum, maximum and number of observations relate only the households with positive debt.

reference household. The selected explanatory variables were then the following:

- Income – net monthly income minus the average sample income (1,230 euros), measured at constant prices.
- Family size – number of persons in the family minus two.
- Age – age of the households' head minus 40.
- Income*Age – interaction variable, resulting from the product of income and age (it was

Table 6

DEBT TO INCOME RATIO AND EFFORT RATIO (2000 SAMPLE)[(a)]

	Debt to income ratio				Effort ratio			
	Total debt		Housing debt		Total debt		Housing debt	
	Average	Standard deviation	Average	Standard deviation	Average	Standard deviation	Average	Standard deviation
Gender of the household's head								
Male	1.080	1.841	1.280	1.351	0.134	0.157	0.119	0.094
Female	1.142	1.490	1.849	1.639	0.129	0.157	0.139	0.143
Age of the household's head								
Up to 30 years old	3.169	4.891	3.310	1.646	0.174	0.142	0.184	0.134
31 to 40	1.321	1.508	1.612	1.502	0.154	0.147	0.138	0.109
41 to 50	1.013	1.391	1.182	1.149	0.136	0.163	0.117	0.091
51 to 65	0.614	0.981	0.865	1.105	0.107	0.157	0.093	0.087
Education level of the household's head								
No education	0.851	1.394	1.326	1.848	0.117	0.120	0.105	0.088
Basic schooling (1st cycle)	0.875	1.237	1.063	1.099	0.137	0.169	0.112	0.098
Basic schooling (2nd cycle)	1.679	2.956	1.817	1.645	0.159	0.188	0.142	0.089
Basic schooling (3rd cycle)	1.033	1.351	1.394	1.393	0.125	0.120	0.126	0.105
Secondary or upper level schooling	1.053	1.567	1.353	1.421	0.115	0.133	0.113	0.111
Labour market situation of the household's head								
Employee	1.100	1.877	1.342	1.314	0.130	0.132	0.122	0.098
Self employed	1.325	1.826	1.683	1.758	0.177	0.258	0.135	0.133
Unemployed or other situations	1.131	1.654	1.491	1.887	0.123	0.082	0.125	0.070
Student	1.867	-	1.855	-	0.161	-	0.148	-
Retired	0.482	0.774	0.655	0.801	0.083	0.090	0.081	0.076
Housewife	0.904	1.093	1.418	1.232	0.116	0.104	0.101	0.084
Income quartiles								
First quartile	1.268	1.785	1.701	2.110	0.207	0.299	0.149	0.137
Second quartile	1.377	2.868	1.719	1.813	0.162	0.163	0.146	0.129
Third quartile	1.234	1.509	1.527	1.315	0.136	0.126	0.128	0.078
Fourth quartile	0.784	1.072	0.988	0.904	0.099	0.101	0.099	0.088
Financial wealth quartiles								
First quartile	1.446	2.779	1.600	1.674	0.147	0.145	0.124	0.103
Second quartile	1.151	1.354	1.529	1.464	0.143	0.128	0.135	0.104
Third quartile	0.904	1.097	1.129	1.092	0.138	0.188	0.112	0.085
Fourth quartile	0.933	1.707	1.175	1.321	0.105	0.153	0.111	0.113
Non-financial wealth quartiles								
First quartile	0.788	3.105	1.978	1.955	0.116	0.157	0.143	0.170
Second quartile	1.161	1.581	1.350	1.399	0.133	0.119	0.121	0.110
Third quartile	1.227	1.391	1.403	1.427	0.136	0.119	0.123	0.091
Fourth quartile	1.053	1.420	1.230	1.287	0.139	0.203	0.116	0.096
Number of persons in the household								
1 person	1.917	2.563	3.169	2.456	0.144	0.164	0.178	0.173
2 persons	1.198	2.924	1.346	1.421	0.146	0.207	0.124	0.122
3 persons	1.159	1.459	1.422	1.208	0.142	0.138	0.132	0.095
4 persons	0.987	1.284	1.190	1.286	0.128	0.129	0.114	0.092
5 or more persons	0.786	1.089	1.060	1.161	0.118	0.179	0.098	0.074
Marital status of the household's head								
Married	1.061	1.776	1.269	1.287	0.135	0.159	0.119	0.097
Single	2.220	2.733	3.764	2.425	0.168	0.190	0.230	0.205
Divorced	0.823	1.124	1.460	1.326	0.106	0.144	0.110	0.073
Widow	1.012	1.494	1.416	1.511	0.116	0.096	0.118	0.086

Note:

(a) The average, standard deviation, minimum, maximum and number of observations relate only to the households with positive debt.

included in order to capture potential nonlinearities in the effect of income and age).

- Female – dummy variable that takes the value one if the households' head is a woman and zero otherwise.

- Single, widow, divorced – dummy variables that take the value one if the households' head is single, widow, divorced, and zero otherwise.
- No education, basic schooling (1st cycle), basic schooling (2nd cycle), secondary or upper level schooling – dummy variables that take the value one if the households' head has no education, the first cycle of basic schooling, the second cycle of basic schooling, the secondary or upper level schooling, and zero otherwise.
- Self-employed, housewife, retired, unemployed or in other situation – dummy variables that take the value one if the households' head is self-employed, housewife, retired, unemployed or in other situation in the labour market, and zero otherwise.
- D1994 – dummy variable that takes the value one for the observations of the 1994 sample and zero otherwise.
- Income*D1994, Age*D1994, etc. – interaction variables resulting from the product of the dummy D1994 and each of the other explanatory variables (the estimated coefficients associated with these variables and their respective t statistics were used to test the hypothesis that the effect of the households attributes in 1994 and 2000 were equal).

The model was estimated separately for total and mortgage debt, pooling the data from the 1994 and 2000 samples. Note that, unlike in the linear model, in the *tobit* model the expected value of debt is not a linear function of the estimated parameters[3]. These do not give directly the marginal effects of the explanatory variables on the dependent variable. Therefore, the constant cannot be interpreted directly as the expected value of debt in the reference year (2000) for the reference household (composed of two persons earning the average wage, whose head is male, 40 years old, married, with the 3rd cycle of basic schooling and employee)[4] as it would be in the linear model.

Table 7 presents the estimation results of the model for total debt. Column (1) shows the estimated coefficients, $\hat{\beta}$, and columns (2) e (3) show the marginal effects:

$$\partial E(y \mid x, y>0) / \partial x_k,$$
$$\partial P(y>0) / \partial x_k$$

that is, respectively the effect of a change in each explanatory variable on the average debt of an indebted households and on the probability of holding debt[5]. Finally, in column (4) the t statistics of the test of the null hypothesis that the parameters and the marginal effects are equal to zero are presented. The first set of rows shows the results concerning the estimated effects in 2000. In the second set, where the explanatory variables are multiplied by D1994, the results should be interpreted as the difference between the effects in 1994 and 2000.

According to the estimation results, in 2000, the probability that the reference household holds debt is 0.43 and the expected value of outstanding debt is 12,630 euro (the expected value of debt conditioned on being positive is 29,515 euro)[6]. The results also suggest that the households with higher income are more likely to hold debt and have a higher level of debt. In 2000 if the household's income is 1,000 euros higher than the income of the reference household then, *ceteris paribus*, its debt is 4,494 euros higher and its probability of holding debt is 13.5 percentage points higher. The effect of age is negative and significant, that is, households whose head is younger hold more debt and are more likely to be indebted. For instance, if the household's head is 30 years old, that is 10 years younger than the head of the reference household, in 2000 the household's debt is 3,030 euros higher and the probability of holding debt is 9 percentage points higher. The estimated parameter associated with the variable resulting from the product between income and age is negative and significantly different from zero. This result suggests that the effect of income on debt is more important for the households whose head is younger.

(3) In the *tobit* model $E(y|x) = x\beta\Phi(X\beta/\sigma) + \sigma\phi(X\beta/\sigma)$ where Φ and ϕ are respectively the cumulative distribution and density functions of the standardised normal. See for example Wooldridge, "Econometric Analysis of Cross Section and Panel Data" The MIT Press, 2001

(4) In this case the explanatory variables are zero.

(5) The marginal effects were computed using the levels of the explanatory variables of the reference household.

(6) The probability that the reference household is indebted in 2000 is given by:

$$\Phi(-7.292 / 40.138) = 0.43$$

the respective debt level being the following:

$$(-7.292)\Phi(-7.292 / 40.138) + 40.138\phi(-7.292 / 40.138) = 12.630$$

Table 7

ESTIMATION RESULTS OF THE *TOBIT* MODEL FOR TOTAL DEBT

	(1)	(2)	(3)	(4)
	Coefficient	Marginal effect		*t*statistics
		in the expected debt	in the probability	
Constant	-7.292	-2.375	-0.071	-2.73
Income	13.801	4.494	0.135	10.58
Age	-0.932	-0.303	-0.009	-8.93
Income*Age	-0.459	-0.149	-0.004	-4.83
Female	0.901	0.295	0.009	0.27
Single	-12.970	-3.836	-0.121	-2.68
Widow	-1.401	-0.452	-0.014	-0.30
Divorced	2.674	0.889	0.026	0.60
No education	-22.226	-6.149	-0.197	-5.20
Basic schooling (1st cycle)	-15.222	-4.428	-0.140	-5.50
Basic schooling (2nd cycle)	-5.244	-1.642	-0.051	-1.69
Secondary or upper level schooling	-1.078	-0.348	-0.011	-0.34
Self-employed	-0.555	-0.180	-0.005	-0.24
Housewife	-2.426	-0.776	-0.024	-0.40
Retired	-0.694	-0.225	-0.007	-0.21
Unemployed or other situations in the labour market	0.448	0.146	0.004	0.13
Family size	-0.748	-0.244	-0.007	-1.09
D1994	-3.893	-1.231	-0.038	-1.03
Income*D1994	-8.014	-2.610	-0.078	-4.95
Age*D1994	0.182	0.059	0.002	1.38
Income*Age*D1994	0.277	0.090	0.003	2.23
Female*D1994	-0.911	-0.295	-0.009	-0.20
Single*D1994	-4.283	-1.351	-0.041	-0.68
Widow*D1994	1.989	0.658	0.020	0.31
Divorced*D1994	-3.296	-1.047	-0.032	-0.54
No education*D1994	-5.174	-1.621	-0.050	-0.96
Basic schooling (1st cycle)*D1994	-3.667	-1.162	-0.036	-1.09
Basic schooling (2nd cycle)*D1994	-6.628	-2.054	-0.064	-1.65
Secondary or upper level schooling*D1994	3.412	1.140	0.034	0.87
Self-employed*D1994	-2.238	-0.717	-0.022	-0.77
Housewife*D1994	-4.474	-1.409	-0.043	-0.56
Retired*D1994	-7.741	-2.379	-0.074	-1.14
Unemployed or other situation in the labour market*D1994	-5.054	-1.585	-0.049	-1.15
Family size*D1994	0.930	0.303	0.009	1.08
σ	40.138			
Number of uncensored observations	2 690			
Number of censored observations	6 791			

The results also show that singles hold more debt and are more likely to hold debt than households whose head is married (their debt is on average 3,800 euros higher and their probability of holding debt is 12 percentage points higher). The less educated household's heads (which have not completed any schooling level or completed only the first cycle of basic schooling) hold less debt (respectively less 6,149 and 4,428 euros than the reference household) and are less likely to hold debt (their probability of being indebted is 20 and 14 percentage points smaller).

As it was mentioned above, one of the objectives of the analysis was to investigate if the effect on debt of some of the households' attributes was similar in 1994 and 2000. According to the estimation results, the effect of the households' income on debt and on the probability of indebtedness was, *ceteris paribus*, significantly stronger in 2000 than in 1994. For example, in 1994 an increase of

Table 8

ESTIMATION RESULTS OF THE TOBIT MODEL FOR MORTGAGE DEBT

	(1)	(2)	(3)	(4)
	Coefficient	Marginal effect		*t* statistics
		Expected debt	in the probability	
Constant	-12.484	-3.710	-0.126	-4.53
Income	13.167	3.912	0.132	10.07
Age	-0.945	-0.281	-0.010	-8.55
Income*Age	-0.603	-0.179	-0.006	-5.95
Female	1.152	0.346	0.012	0.32
Single	-17.669	-4.568	-0.159	-3.38
Widow	-4.940	-1.411	-0.048	-0.96
Divorced	-2.699	-0.785	-0.027	-0.57
No education	-26.698	-6.450	-0.222	-5.60
Basic schooling (1st cycle)	-16.240	-4.245	-0.148	-5.71
Basic schooling (2nd cycle)	-5.674	-1.611	-0.055	-1.81
Secondary and upper level schooling	-3.198	-0.926	-0.032	-0.98
Self-employed	-6.333	-1.789	-0.062	-2.56
Housewife	-8.055	-2.244	-0.078	-1.14
Retired	-2.123	-0.620	-0.021	-0.58
Unemployed or other situations in the labour market	1.090	0.327	0.011	0.29
Family size	-0.983	-0.292	-0.010	-1.32
D1994	1.761	0.531	0.018	0.46
Income*D1994	-7.675	-2.281	-0.077	-4.79
Age*D1994	0.277	0.082	0.003	2.02
Income*Age*D1994	0.322	0.096	0.003	2.49
Female*D1994	0.485	0.145	0.005	0.10
Single*D1994	-1.044	-0.308	-0.010	-0.16
Widow*D1994	2.103	0.636	0.021	0.31
Divorced*D1994	-0.162	-0.048	-0.002	-0.03
No education*D1994	-8.384	-2.330	-0.081	-1.39
Basic schooling (1st cycle)*D1994	-4.785	-1.368	-0.047	-1.39
Basic schooling (2nd cycle)*D1994	-8.110	-2.259	-0.078	-2.01
Secondary and upper level schooling*D1994	3.927	1.205	0.040	1.00
Self-employed*D1994	-1.700	-0.498	-0.017	-0.55
Housewife*D1994	1.005	0.301	0.010	0.11
Retired*D1994	-13.609	-3.630	-0.126	-1.74
Unemployed or other situations in the labour market*D1994	-4.077	-1.172	-0.040	-0.90
Family size*D1994	0.469	0.139	0.005	0.51
σ	37.517			
Number of uncensored observations	1 877			
Number of censored observations	7 604			

1,000 euros in income vis-à-vis the income of the reference household would be associated with an increase of 1,884 euros in expected debt, which is less than half the increase in 2000. The increase in the probability of holding debt would be 5.7 percentage points in 1994. The effect of age was, in turn, stronger in 2000. For example, if the household head was 30 years old in 1994, the households' outstanding debt would be 2,440 euros higher than the debt of the reference household. This compares with 3,030 euros more in 2000 (however the difference is not significant at the usual significance levels). The results also suggest that the effect of education was less strong in 2000 than in 1994 (the difference between the effects of "2nd cycle of basic schooling" in 1994 and 2000 is significant at 10 per cent). This result implies that, controlling all the other attributes considered, the households that are less educated than the reference household held more debt in 2000 than in 1994.

Table 8 shows the estimation results for the model of mortgage debt. In general, these results confirm and even strengthen the results of the

model for total debt. For example, an increase of 1,000 euros in income is associated with increases of 3,912 euros and 1,631 in expected debt in 2000 and 1994, respectively. Furthermore, the difference between the effects of age in 1994 and 2000 is significant. In 2000 a household whose head is 30 years old held, on average, more 2,807 euros of mortgage debt then the reference household. In 1994, that family would only held more 1,982 euros than the family whose head was 40 years old, controlling for all the other households' attributes. According to the results for mortgage debt, the effect of income is stronger for younger households. The results also suggest that lower levels of education were associated with less mortgage debt both in 1994 and 2000. Furthermore, the estimated effect of education was stronger in 1994. For instance, if the family head only had completed the 2nd cycle of basic schooling, the expected value of mortgage debt for that family was 1,611 euros less than that of the reference family in 2000 and 3,870 euros less in 1994.

5. CONCLUSIONS

This study analyses the effect of a set of demographic and socioeconomic characteristics of households on the probability of holding debt and on the outstanding amount of debt. Two models, for total and mortgage debt, have been estimated, using anonymous microdata from the IPEF, a survey on households' wealth and indebtedness, carried out by the *INE* in 1994 and 2000,

According to the estimation results, controlling for all the other characteristics considered, the households with larger income, and with younger or more educated head are more likely to hold debt and hold a higher outstanding amount of debt. There is also evidence that some of these effects changed between 1994 and 2000. In particular, the effect of income was significantly stronger in 2000. The effect of education was, in turn, less strong than in 1994. Therefore, controlling for all the other households' attributes, the same rise in income was associated with a stronger increase in debt in 2000 than in 1994. The same upgrade in education led to a larger increase in debt in 1994 than in 2000.

The results obtained with the model for total debt were confirmed and in some way reinforced by the results obtained with the model for mortgage debt. In particular it is clearer that the increase in the probability of holding debt and the level of debt associated with lower age was stronger in 2000. This result is in line with the conjecture that the strong increase in mortgage debt during the second half of the 1990s especially concerned younger households.

THE PORTUGUESE ESCUDO IN THE ERM AND THE EFFECTIVENESS OF THE EXCHANGE RATE MANAGEMENT*

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1. INTRODUCTION

The empirical assessment of the effectiveness of exchange rate management has been addressed in the literature. Most papers have studied whether the central banks have achieved smoothness of exchange rates through the use of their two main instruments: interventions in the currency market and the overnight interest rate in the money market. The theoretical support for the empirical analysis is consistently absent. That is not surprising as the theoretical analysis of the optimal exchange rate policy is unable to answer questions like when and how to defend from a speculative attack, and incapable of disentangling autonomous policy action from policy response to market behaviour.

In the current paper, we perform a case study of the Portuguese exchange rate management in the Exchange Rate Mechanism (ERM) period, April 1992 – December 1998. This approach, complementary to existing econometric work, allows a more detailed tracking of the degree of exchange rate pressure and of the instruments used to deal with it. We discuss the behaviour of the Portuguese Escudo (PTE) exchange rate (against the German Mark (DEM)) and the use of instruments by the Banco de Portugal, namely interventions in the foreign exchange market and official interest rates. Our analysis of effectiveness adopts the view that massive sales of foreign reserves, or steep interest rate increases, or both, coupled with observed exchange rate smoothness, meaning absence of large depreciation, should be classified as speculative attacks defended with success. The results suggest that most of the time, even during the ERM crisis, the Banco de Portugal policy was successful. Over the whole period, from April 1992 until December 1998, the central bank did take action in a small percentage of days, most of the time with success. The percentage of days in which the Banco de Portugal did not take action and nevertheless the exchange rate was smooth was above 98 per cent. The vast majority of the days in which the Banco de Portugal decided not to take action and the exchange rate was not smooth corresponded to days located around four episodes, the three realignments of the PTE and the widening of the ERM bands in August 1993. In all these episodes the Portuguese Authorities did not take the initiative of asking for the realignment or for the widening of the band.

The rest of the paper is organized in the following way: section 2 describes the historical context; the PTE experience is laid out in section 3 and section 4 discusses the effectiveness of the exchange rate management by the Banco de Portugal; section 5 provides concluding remarks; an appendix briefly discusses the mechanics of a speculative attack.

* The views expressed in this article are those of the authors and not necessarily those of the Banco de Portugal.

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2. SOME HISTORICAL FACTS ABOUT THE EMS

The European Monetary System (EMS) was created in March of 1979. It was an arrangement established among the members of the 9 European Community countries with the aim of limiting the exchange rate fluctuations of the following currencies: DEM, French Franc (FRF), Dutch Guilder (NLG), Belgian Franc (BEF), Danish Krone (DKK), Irish Pound (IEP) and Italian Lira (ITL). The mechanism in which the currencies were linked was referred to as the ERM. The Luxembourg currency, Luxembourg Franc (LUF), matched the Belgium currency, BEF, since they were already in a currency union. The British Pound (GBP) at the beginning was not in the ERM. All ERM currencies had a symmetric band of fluctuation of 2.25 per cent around the central parity, except for the ITL, which had a band of 6 per cent (narrowed to 2.25 per cent in January 1990). Until 1992 three other currencies joined the ERM: the Spanish Peseta (ESP) in June of 1989, the GBP in October 1990, and the PTE in April 1992, all adopting the 6 per cent band. In September 1992, the ITL and the GBP left the ERM (the ITL would rejoin in November 1996). The currencies of two newcomers to the European Union the Austrian Schilling (ATS) and the Finnish Markka (FIM) joined in January 1996 and October 1996, respectively. The last country to join the ERM was Greek Dracma Greece in March 1998.

The responsibility for maintaining each bilateral exchange rate within the band was formally shared by both countries. Interventions were mandatory on both countries whose currencies hit the respective fluctuation margins. In practice this meant that the strong currency country had to sell its currency and the weak currency country had to buy its currency. Interventions could be carried out in any currency: for example the central bank of the strong currency country could be selling its currency against United States Dollar (USD), DEM (if that central bank was not the Bundesbank), etc. Arrangements for providing credit to weak currency central banks were set. There was a short-term automatic financing facility that provided unlimited credit for 45 days for marginal intervention(1). A central bank could not stop intervening if its parity vis-à-vis another member currency was pressed against one of its limits(2). Other ERM countries could provide help by also intervening in the foreign exchange markets. In special circumstances, i.e. if exchange rates became misaligned, the central rates could be revised with the consent of all concerned. The Single Market Program, which required the removal of capital controls, was implemented since the mid 1980s. Thus, during a certain period in some of the ERM countries there were capital controls that were used to help maintaining the exchange rate inside the band. Since 1990 capital movements including short-term capital and monetary instruments were free(3).

Not only the parity levels within the ERM were adjusted occasionally (see Table 1) but also the width of the bands adopted changed, in 2 August 1993. During the period between 1979 and 1987, realignments were frequent; the central parities changed 11 times. The last realignment in 1987 led to revisions of the EMS arrangements in the Basle-Nyborg agreement of 12 September 1987. The agreement extended the credit facilities to longer periods, and gave weak currency countries up to 75 days of unlimited access to credit from stronger ERM currencies. For the first time it was permitted to draw on credits before a currency reached the limit of its ERM band. Except for Italy, there were no adjustments in the central parity between 1987 and mid-September of 1992. Bands at 2.25 per cent were maintained for those countries that adopted them initially, and the band of fluctuation for the ITL was narrowed to 2.25 per cent in 8 January 1990.

European currency problems of the 1990's were more profound than all the previous ones. In the literature the period September 1992 – July 1993 is identified with a currency crisis period for the ERM. The ITL and GBP floated. The IEP was devalued once, the PTE twice, and the ESP three times. Finally, on the 2nd of August of 1993 it was decided to widen the bands to [-15,+15] per cent(4).

(1) Eichengreen and Ghironi (1996) refer that the Bundesbank objected to the ERM and "Otmar Emminger, the finance minister, conceded it the right to opt out of its intervention obligation if the Government was unable to secure an agreement with its European partners on the need to realign".
(2) Another option was to ask for a realignment.
(3) Ireland, Spain, Portugal and Greece had derogations.
(4) The decision to widen the ERM bands was complemented by a bilateral agreement between the Dutch and German authorities to preserve the former band.

Table 1

PERCENTAGE CHANGES IN CENTRAL PARITIES FROM 1979 UNTIL 1998 FOR THE CURRENCIES PARTICIPATING IN THE ERM

	DEM	FRF	NGL	BEF	PTE	ESP	IEP	DKK	ITL	GBP
24 Sep. 79	2				—	—		-2.9		—
30 Nov. 79					—	—		-4.8		—
23 Mar. 81					—	—			-6	—
05 Oct. 81	5.5	-3	5.5		—	—			-3	—
22 Feb. 82				-8.5	—	—		-3		—
14 Jun. 82	4.25	-5.75	4.25		—	—			-2.75	—
21 Mar. 83	5.5	-2.5	3.5	1.5	—	—	-3.5	2.5	-2.5	—
22 Jul. 85	2	2	2	2	—	—	2	2	-6	—
07 Apr. 86	3	-3	3	1	—	—		1		—
04 Aug. 86					—	—	-8			—
12 Jan. 87	3		3	2	—	—				—
08 Jan. 90					—				-3.7	—
14 Sep. 92	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	-3.5	3.5
17 Sep. 92						-5			—	—
23 Nov. 92					-6	-6			—	—
01 Feb. 93							-10		—	—
13 May 93					-6.5	-8			—	—
06 Mar. 95					-3.5	-7			—	—
16 Mar. 98							3			—

Sources: Gros and Thygesen (1992) and Banco de Portugal *Annual Report* (various editions).
Note: "—" means out of the ERM.

After August 1993 the ERM worked well, maybe because the margin was wide, as low inflation countries usually have exchange rate fluctuations below 30 per cent. Most countries had their currencies fluctuating within their earlier bands for sometime, and later smoothly converging to the European Monetary Union conversion rate(5).

3. THE PTE IN THE ERM

From August 1977 until September 1990 the PTE exchange rate was managed in the context of a crawling peg regime. Since the mid 1980s, the rate of the crawling-peg of the PTE was successively cut down. In October 1990 the exchange rate regime changed. The PTE floated around an unidentified trend for an index that included only the main currencies of the ERM, with particular emphasis in some currencies. This change was made with two objectives, of reducing the degree of predictability surrounding the short-term value of the PTE and of preparing the country for future participation in the ERM. For this reason this regime became known as the shadowing regime(6). In April 1992, the PTE joined the ERM adopting a fluctuation band of 6 per cent.

The Banco de Portugal was active in the foreign exchange market either as a seller or as a buyer of PTE. There were two types of interventions: "strict sense" interventions (in the spot and in the forward markets(7)) and the so-called "re-channeling operations". The "re-channeling operations" were sales of foreign currency that had been bought from the Treasury and had originated from Community transfers or the issuance of foreign currency denominated public debt. In this way, the Banco de Portugal could manage the sale of significant amounts of foreign currency so as to avoid major disturbances to the ongoing exchange rate policy. An index for the interventions including

(5) Exceptions were the ESP and the PTE; in March 1995 both realigned.

(6) For an analysis of the period before ERM membership see Banco de Portugal *Annual Report* (various editions).

(7) Forward interventions, which were minor and mostly concentrated in 1998, were converted into spot interventions according to the formula described in the appendix.

Chart 1A
CUMULATIVE INTERVENTIONS INDEX AND PTE EXCHANGE RATE

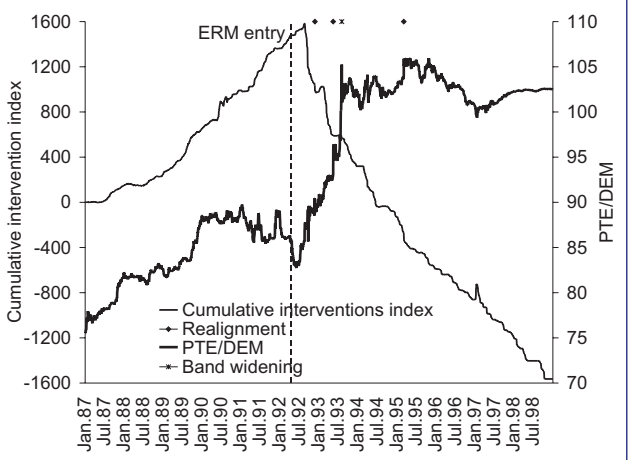


Chart 1B
CUMULATIVE INTERVENTIONS INDEX AND NET FOREIGN ASSETS

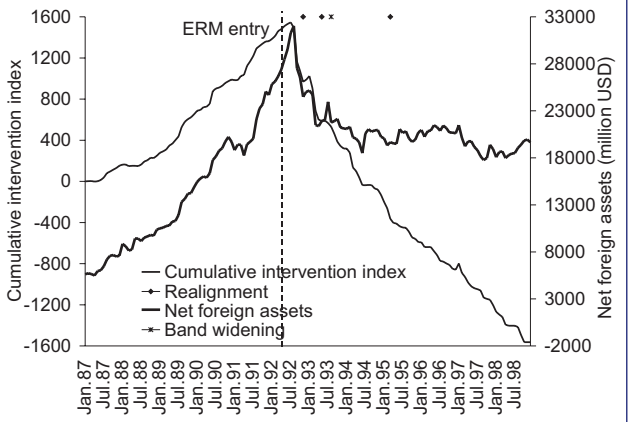
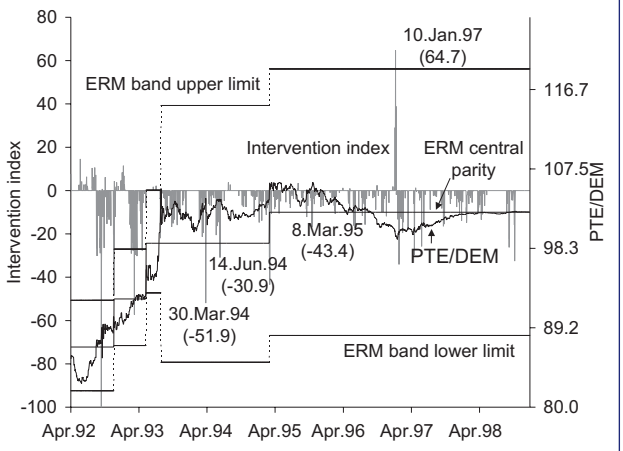


Chart 2
PTE/DEM EXCHANGE RATE AND FOREIGN EXCHANGE INTERVENTION – ERM PERIOD
Daily data

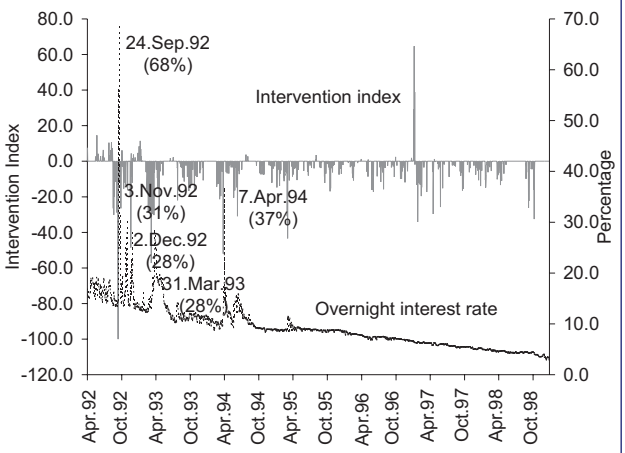


the "re-channelling operations", was built, as well as its cumulative. A negative value for the index corresponds to a purchase of PTE, and a positive value to a sale of PTE. The intervention index is the ratio between the daily intervention and the highest absolute value of the daily intervention in the period of ERM membership times 100. In this paper we concentrate our attention in the total interventions index, which includes all types of interventions. Chart 1A shows the cumulative foreign total interventions index.

Since the late 1980s until August 1992, the Banco de Portugal intervened in the foreign exchange market mainly as a seller of PTE. As Chart 1A shows the cumulative foreign total interventions index achieved its highest value in mid-August. In Chart 1B we observe that the descending behaviour of the cumulative interventions index was not accompanied by an equivalent reduction of net foreign reserves, which showed a fairly stable path from 1993 onwards. This reflects the fact that interventions in this period were to a large extent "re-channeling operations".

The ERM crisis of 1992-93 affected the PTE. The PTE was under continued pressure from 20 of August 1992 till 23 of November 1992, and the cumulative foreign interventions index went from 1583 in August to 987 in November. In September 1992, when the central rate of the ESP was devalued by 5 per cent and the ITL and GBP left the ERM, the PTE was under a speculative attack (see Chart 2). The Banco de Portugal intervened buying a massive amount of PTE (the intervention index achieved its lowest value on the 16th, the day before the ESP was devalued), the overnight interest rate increased to 68 per cent (see Chart 3) and the tomorrow/next interest rate on the euro-escudo market was above 1000 per cent. This action had a momentary effect on the exchange rate as a few days after the PTE appreciated by about 4 per cent. Although the PTE exchange rate was relatively stable, the foreign reserves decreased at a fast pace until the 23rd of November, when the central rate of the PTE and of the ESP were devalued by 6 per cent. On this day the tomorrow/next interest rate exceeded 250 per cent and the Banco de Portugal

Chart 3
OVERNIGHT INTEREST RATE AND FOREIGN EXCHANGE INTERVENTION – ERM PERIOD
Daily data



sold a massive amount of foreign reserves, the foreign intervention index achieved its third lowest value.

The following 3 months were calm; neither the cumulative foreign interventions index nor the exchange rate changed much. But in mid-February 1993, the PTE currency was again under pressure; the Banco de Portugal made sizable purchases of PTE, until the 23rd of April 1993. Between those two dates the cumulative foreign interventions index went from 1024 to 604. The overnight rate was kept for about 3 months, at a very high level; during March the weekly average overnight rate climbed 11 percentage points, which had marked effects on the longer maturity interest rates. On 13th of May 1993, the PTE realigned by 6.5 per cent, while the ESP realigned by 8 per cent. The day after the PTE depreciated 3 per cent. The PTE had not been under particularly strong pressure during the previous 3 weeks. From the 23rd of April 1993 until the 13th of May 1993 there were no peaks in the interventions, or in the overnight interest rates, and the PTE exchange rate remained broadly stable. Nevertheless, in the context of the request by the Spanish authorities to devalue the central rate of the peseta, it was decided by the Portuguese Authorities to realign.

After the May realignment until the 30th of July of 1993, interventions were negligible, and the overnight interest rate was relatively low. During the month of July 1993 most currencies of the ERM were again under tension. The PTE exchange rate depreciated considerably during this month, by about 8 per cent. Just from the 19th of July to the 1st of August of 1993 it depreciated by 6.3 per cent. In the 2nd of August 1993 the ERM fluctuation bands were enlarged and the PTE depreciated 2.3 per cent in just one day(8). This change was temporary as two days after the PTE appreciated 4.2 per cent.

Until July 1994, with the exception of two periods, from the second half of December 1993 until the first week of March of 1994 and during April of 1994 and the first 3 weeks of May of 1994, Banco de Portugal kept buying PTE. The cumulative foreign interventions index was -37 on July 1994. The interest rate had two peaks in April 1994 and June 1994, the more pronounced was on the 7th of April, when the overnight interest rate achieved 36.5 per cent and the PTE appreciated by 3 per cent.

From July 1994 until March 1995, when the PTE experienced its third and last realignment, there were no significant developments in the PTE exchange market. As in the previous realignment, once again the PTE was not under strong pressure until the realignment took place. This was even clearer this time, as during this relatively large period there were almost no changes in the interest rate or in the interventions, and the PTE exchange rate had a smooth behaviour with a depreciation of 0.6 per cent. On the 6th of March 1995 the central parity of the escudo was adjusted by 3.5 per cent and the central rate of the ESP was devalued by 7 per cent. On that day and two days after, the Banco de Portugal was in the market selling foreign currency and the intervention index achieved quite low values, -31 and -43, respectively.

After March 1995 until the second week of January of 1997 interventions were of smaller size. Since March 1995 the PTE appreciated significantly and the Banco de Portugal decided to make a large purchase of foreign currency to avoid a too large appreciation of the currency. During the second week of January the intervention index achieved in 3 nonconsecutive days the values of 29, 65 and 39. Until the end of 1998 there would be a few more sales of foreign currency by the Banco de Portugal. The last intervention was in the third

(8) The Banco de Portugal did not make much use of the larger fluctuation band, as the PTE did not fluctuate outside the "outdated" narrower band.

Chart 4A

PTE/DEM EXCHANGE RATE AND FOREIGN EXCHANGE INTERVENTION – AUG. 92- DEC. 92

Daily data

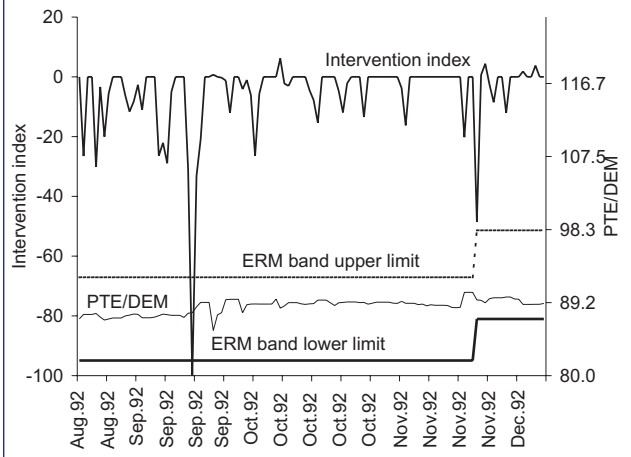


Chart 4B

OVERNIGHT INTEREST RATE AND FOREIGN EXCHANGE INTERVENTION – AUG. 92- DEC. 92

Daily data

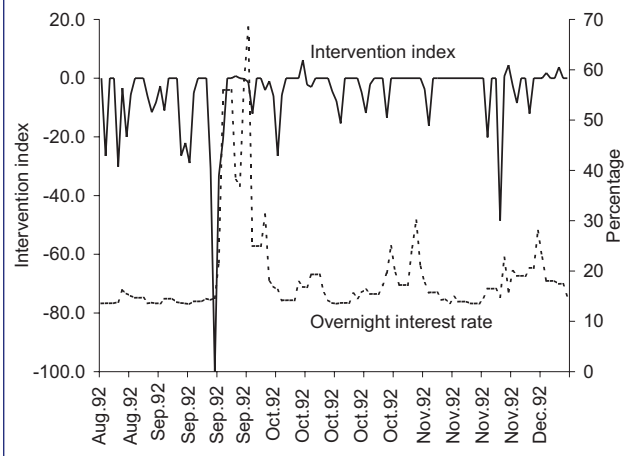


Chart 5A

PTE/DEM EXCHANGE RATE AND FOREIGN EXCHANGE INTERVENTION – FEB. 93- AUG. 93

Daily data

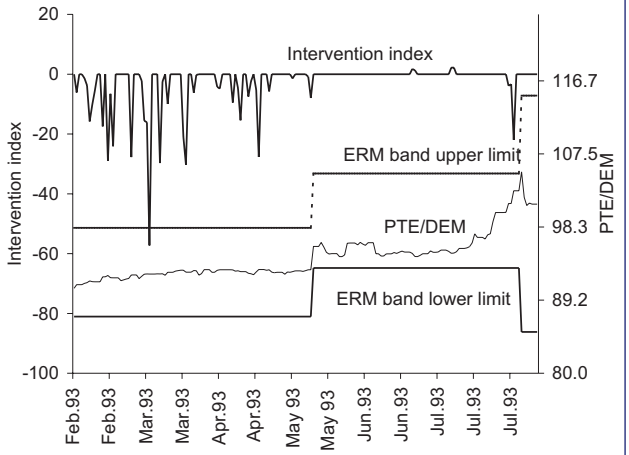
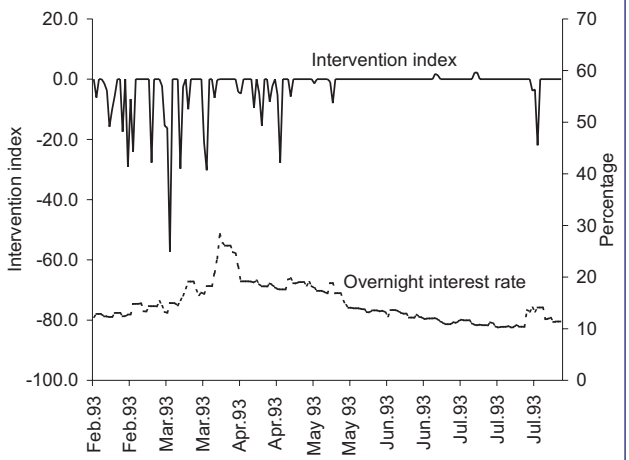


Chart 5B

OVERNIGHT INTEREST RATE AND FOREIGN EXCHANGE INTERVENTION – FEB. 93- AUG. 93

Daily data



week of October 1998 and at that date the cumulative foreign interventions index was -1564.

As we saw, the various episodes of exchange rate pressure were addressed in different manners. In some of these episodes the Banco de Portugal decided to defend the currency strongly, in others it decided, following other central banks, not to defend the currency and instead realign, or widen the band. The first period of tension (see Charts 4A and 4B), around September 1992, was overcome with heavy interventions and interest rate management, without resorting to realignment, as Spain did while GBP and ITL floated. The next period of tension (see Charts 4A and 4B), November 1992, was resolved with interventions and realignment. In this second attack, the Portuguese Authorities decided to follow the Spanish realignment. As the currencies of some of our main trading partners depreciated substantially, the realignment can be seen as a measure to curb competitiveness losses. In the third period of pressure for PTE (see Charts 5A and 5B), February-April of 1993, the attack was defended with interventions and interest rates – actually kept high for a relatively long period– with success as the exchange rate was close to the central parity. The realignment of May 1993 was not closely preceded by pressure on the PTE. It appears as a response to

Chart 6A
PTE/DEM EXCHANGE RATE AND FOREIGN EXCHANGE INTERVENTION – OCT. 94- APR. 95
Daily data

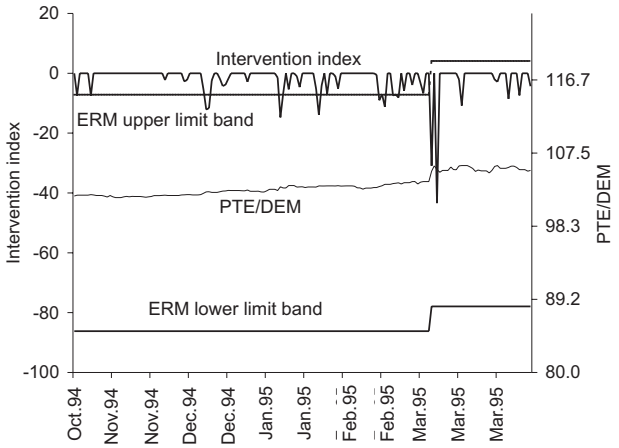
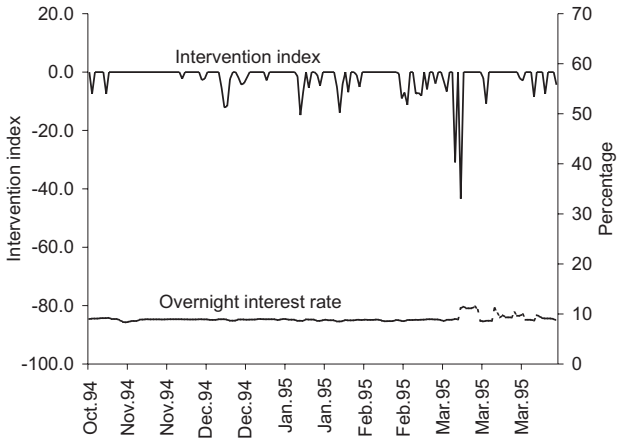


Chart 6B
OVERNIGHT INTEREST RATE AND FOREIGN EXCHANGE INTERVENTION – OCT. 94- APR. 95
Daily data



the ESP realignment. The PTE July-August 1993 tension was partially resolved by the widening of the band. In July the Portuguese Authorities decided to follow the majority of the ERM members by widening the PTE band. The period before the last realignment of the PTE in March 1995 (see Charts 6A and 6B), done together with the ESP once more, was a peaceful period without active policy.

4. EFFECTIVENESS OF EXCHANGE RATE MANAGEMENT

In simple economic monetary models only unsterilized interventions, as they change the relative supply of domestic and foreign money, have effects on the exchange rate. The monetary model needs to be more complex for sterilized intervention to have effects. Namely, the model should allow for a portfolio balance channel and/or a signalling channel. However, in the conduct of exchange rate policy, central banks also use sterilized interventions, and most of the empirical literature considers sterilized interventions.

The assessment of the effectiveness of exchange rate policy instruments considered in the empirical literature is linked to their short run effects on the exchange rate[9]. There is no consensual definition of efficacy in the literature. Fatum (2000) takes, essentially, two criteria, that of Frankel (1994) and that of Humpage (1996). The former considers that the central bank is effective if the national currency appreciates when it sells foreign currency. The latter defines a successful intervention as one where the purchase of the national currency is associated with a smaller depreciation of it relative to the situation before the intervention. Dominguez (2002) also follows the criterion of Frankel (1994). In Braga de Macedo *et al* (2002) and in Brandner *et al* (2001) the sale of foreign currency is effective if the national currency appreciates or/and the volatility of the exchange rate decreases. Stix (2002) defines that an intervention is successful if it is able to decrease the probability of a high volatility state for the exchange rate. Kraay (2003) identifies a failed speculative attack with an event where sharp reserve losses and sharp increases in the nominal interest rates are not followed by a large devaluation.

The evidence on the effectiveness of the exchange rate policy instruments is mixed. Differences in results across studies about that effectiveness depend, among other things, on the definition of efficacy used. Fatum (2000) examines the DEM/USD exchange rate and finds that in the short run interventions affect the probability of success, especially if coordinated and infrequent.

(9) The majority of the studies consider only one of the policy instruments, either interventions or interest rates.

Dominguez (2002) does a case study for the JPY, USD and DEM and finds that interventions are most of the times successful. Braga de Macedo *et al* (2002) study the PTE currency, obtaining mixed results. They consider the time horizon from September 1989 until December 1998 and divide it into three periods. Each period is divided into a low and a high volatility subperiod. Interventions are effective only in some of these subperiods. Brandner *et al* (2001) study several ERM currencies including the PTE and find no evidence of foreign exchange intervention effects either on the exchange rate, or on its volatility. Stix (2002) finds that, for France and Spain, interventions seem to have increased both the probability of realignment and of a speculative attack. Kraay (2003) finds no evidence that high interest rates help in defending the currency for a large sample of developed and developing countries. Finally, Neely (2001) conducts a survey, where several monetary authorities are asked about their intervention practices, obtaining that foreign exchange intervention does affect exchange rates(10). All the respondents believed interventions have effects on the exchange rate. Most said the effects are over the short-run. About 60 per cent of the respondents believed the effects on the exchange rate take less than a day and 28 per cent of the respondents that it they take a few days.

There are relevant difficulties in interpreting the results of the existing empirical work on the effectiveness of the policy instruments. The data analyzed are "treated" data, as they are already the result of market behaviour and intended policy actions, i.e., it is impossible to know how the exchange rate would have behaved if the central bank had not intervened in the market. If the objective of the central bank is to smooth the exchange rate time path, the coefficients of the intervention levels or of the interest rate variations on a regression of the exchange rate variation will be biased towards zero. In this type of analysis there is an endogeneity problem, as the interventions, the interest rate and the exchange rate are determined jointly. Therefore, the analysis of the currency market would require a specification of a more structural model to disentangle the effects of policy from the effects from variations in the net demand of private agents. But this alternative, a multi-equation structural empirical model, is difficult to formalize. Before that can be achieved further progress is necessary in understanding the determinants of the supply and of the demand for currency, especially during periods of high volatility in the exchange rate.

The difficulties just referred in reaching a reasonable definition of effectiveness should be seen as cautionary for the analysis undertaken in this section. It will be assumed that the objective of the central bank is for its currency to have a smooth exchange rate behaviour, and namely to defend it from large fluctuations. A successful exchange rate policy is defined as one for which that objective is accomplished. We define the central bank as being active when either interventions in defence of the PTE are large (that is, large purchases of PTE), or the overnight interest rate increases substantially. The central bank can be successful being either active or passive.

The specific taxonomy of our analysis is the following. We consider the time frame between 6 April 1992 (the PTE ERM entry date) and 31 December 1998 (just before the adoption of the euro). Each trading day t in this period is considered as an event. We select episodes where there were jointly or not: (E1) a cumulative depreciation of the PTE against the DEM from the beginning of day t to the end of day $t+k$, larger than the mean plus x standard deviations; (E2) a cumulative increase in the PTE overnight interest rate from the beginning of day t to the end of day $t+k$, larger than the mean plus y standard deviations; and (E3) cumulative foreign exchange interventions that are purchases of PTE, from the beginning of day t to the end of day $t+k$, larger than the mean plus z standard deviations(11). The number of events is equal to the number of trading days in our time frame (i.e., 1686) minus k.

We did not use the interest rate series in levels because it is not stationary over the sample period. The criterion we used takes into account the change in the interest rate, which is stationary. This approach has a caveat as it implies that many sequential days with high overnight interest rate

(10) This set of countries includes all G7 countries, except for the UK.

(11) The three time series, rate of depreciation, change in the overnight interest rate and interventions, are stationary.

Table 2

UNCONDITIONAL AND CONDITIONAL EMPIRICAL DISTRIBUTIONS

Number of events=1685

Per cent

	Unconditional distribution	Successful	Unsuccessful
	Case 1 $x = y = z$ and $x = 2.5$		
Active	4.4	90.5	9.5
Passive	95.6	98.2	1.8
	Case 2 $x = y = z$ and $x = 3.0$		
Active	3.3	90.9	9.1
Passive	96.7	98.6	1.4
	Case 3 $x = y = z$ and $x = 3.5$		
Active	2.1	91.4	8.6
Passive	97.9	98.8	1.2

are considered as events during which the central bank was not active with that instrument.

Given this taxonomy, we consider a situation where either (E2), (E3), or both, were verified as an event in which the central bank was active. Otherwise the central bank was passive. A successful event is one for which (E1) is not verified[12]. As usually conditional probabilities can be defined. We compute the distribution of success given the central bank's stance. Table 2 presents the conditional and the unconditional probabilities for $k = 1$ and for $x = y = z$ and $x = 2.5, 3, 3.5$. Our results are robust to changes in the definitions of the episodes, i.e. the conclusions were not altered in a meaningful way when we considered cases where $x \neq y \neq z$ or $k \neq 1$. The assumption taken for k is in

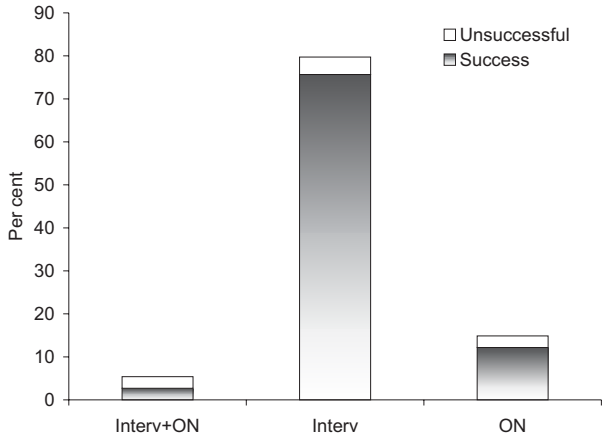
(12) Our definition is closely related with that of Kraay (2003) for a failed speculative attack for the speculator.

Chart 7

EFFECTIVENESS OF BANCO DE PORTUGAL WHEN ACTIVE

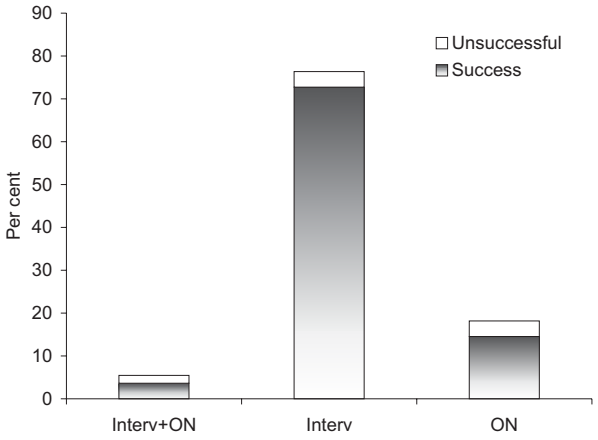
Case 1

$x = y = z$ and $x = 2.5$



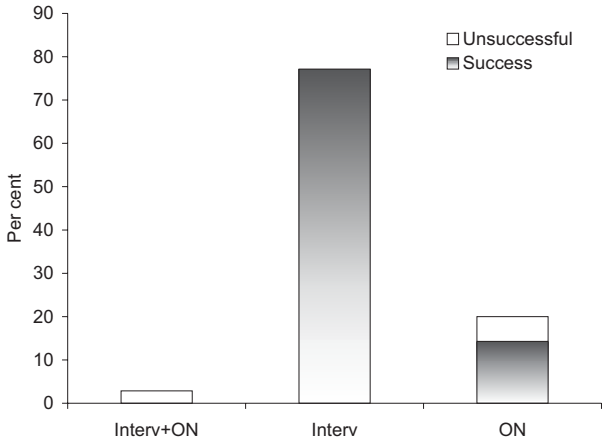
Case 2

$x = y = z$ and $x = 3.0$



Case 3

$x = y = z$ and $x = 3.5$



line with the results reported in Neely (2001), about 90 per cent of the responses were that the full effect of the interventions was felt within a few days.

As Table 2 shows, the share of days in which the Banco de Portugal was active ranges from 2.1 per cent to 4.4 per cent (as expected the number of active days increases as the selected bands shrink). The success of the central bank when it was active was large, varying from 90.5 per cent to 91.4 per cent of the events, (the number of successes declines as the allowed fluctuation band for the exchange rate diminishes). The intervention alone was used about 80 per cent of the time, constituting the main instrument used, being successful more than 70 per cent of time (see Chart 7). The instrument interest rate alone or combined with interventions was less frequently used; less than 20 per cent of the times the central bank was active.

This result should be seen in the context of the caveat mentioned before. The period during which this limitation was more severe was the one between 17 March 1993 and 16 May 1993. In this period the interest rate was always above 16.4 per cent, and nevertheless according to our indicator the instrument interest rate was used only once when y =2.5.

Most of the time, between 95.6 per cent and 97.9 per cent, the Banco de Portugal did not change significantly its policy instruments. This decision of not acting in the markets proved to be successful, as more than 98 per cent of the time the PTE exchange rate did not depreciate substantially. The small fraction of days (less than 2 per cent) in which the Banco de Portugal was passive but, nevertheless, the exchange rate depreciated substantially, can be largely explained by the use of other instruments. About 2/3 of these events correspond to days close to the three realignments of the PTE and to days in July 1993 until the widening of the ERM bands. This behaviour on the part of the Banco de Portugal was deliberate. It was recognized that the best strategy was to let the PTE follow the behaviour of the other ERM currencies under attack. The realignments followed the ESP depreciations, and in July 1993 there was a generalized attack against almost all of the ERM currencies that culminated in the widening of the bands.

When active the Banco de Portugal was not successful 8.6 per cent, 9.1 per cent and 9.5 per cent of the times, which corresponds to just a few events: 3, 5 and 7.

The main conclusion is that the Banco de Portugal exchange rate management, during the ERM period, was successful either when it was active in the market, or when it was not active in the market, as the PTE exchange rate had almost always a smooth behaviour, that is without strong depreciation episodes.

5. FINAL REMARKS

This paper studies whether the Portuguese exchange rate management was successful during the period of ERM membership. Existing empirical studies have focused mostly on assessing the effectiveness of a single exchange rate policy instrument — typically interventions — and have used various kinds of criteria. In this paper, we take into account the possibility of the central bank combining both interventions and interest rate for managing the exchange rate. The criterion used for assessing the effectiveness of the exchange rate management was the absence of large depreciations and an event with central bank action was defined by either massive purchases of PTE by the Banco de Portugal, or large increases of the overnight interest rate.

The results indicate that the Banco de Portugal used massive purchases of PTE or large increases in the interest rates seldom, during the period of the ERM membership, and mostly with success. The most frequent policy choice was interventions alone, and that was also the most successful policy. This result should be seen in the context of the analysis, which considers the change in the interest rate instead of its level. During the period between 17 March 1993 and 16 May 1993 this limitation is particularly strong.

REFERENCES

Banco de Portugal, "*Annual Report* ", Various editions.

Braga de Macedo, J., Catela Nunes, L. and Brites Pereira, 2002, "Central Bank Intervention Under Target Zones: The Portuguese Escudo in the ERM", Universidade Nova de Lisboa, manuscript.

Brandner, P., Grech, H. and Stix, H., 2001, "The Effectiveness of Central bank Intervention in the EMS: The Post 1993 Experience", Oesterreichische NationalBank *Working Paper No. 55*.

Dominguez, K., 2002, "Foreign exchange intervention: did it work in the 1990s? ", University of Michigan, manuscript.

Dornbusch, R. (1993) "Mexico: stabilization, reform, and no growth" *Brookings Papers on Economic Activity*.

Eichengreen, B., and F. Ghironi (1996), "European Monetary Unification and International Monetary Cooperation", *manuscript*, University of California, Berkeley.

Fatum, R., 2000, "On the Effectiveness of Sterilized Foreign Exchange Intervention", European Central Bank *Working Paper No. 10*.

Frankel, J., 1994, Comment on Catte, Galli and Rebecchini "Concerted Interventions and the Dollar: An Analysis of Daily Data", in *The International Monetary System in Crisis and Reform: Essays in Memory of Rinaldo Ossola*, edited by P. Kenen, F. Papadia and F. Saccomani, Cambridge University Press.

Gros, D., and Thygesen, N., 1992, *European Monetary Integration, From the European Monetary System to European Monetary Union*, Longman Group UK Limited.

Humpage, O., 1996, "U.S. Intervention: Assessing the Probability of Success", Federal Reserve Bank of Cleveland *Working Paper No. 9608*.

Kraay, A., 2003, "Do high Interest Rates Defend Currencies during Speculative Attacks?", *Journal of International Economics* 59: 297-321.

Neely, C., 2001, "The practice of central bank intervention: looking under the hood", *Review*, Federal Reserve Bank of St. Louis.

Stix, H., 2002, "Does Central bank Intervention influence the Probability of a Speculative Attack? Evidence from the EMS", Oesterreichische NationalBank *Working Paper No. 80*.

APPENDIX

MECHANICS OF A SPECULATIVE ATTACK

This section provides a brief exposition on the behaviour of speculators and currency markets, with special reference to the choices of the central bank on defending an attack. Suppose the currency under attack was the PTE and that the PTE exchange rate in period t is S_t, i.e. each PTE was worth S_t DEM. Speculators could attack the PTE in the spot market or in the forward market. The strategy of using the spot market is the following. The speculator borrows amount Y of PTE at the local interest rate R^*_t, converts the PTE in DEM at the spot exchange rate, S_t, and deposits the DEM at the German money markets at the interest rate R_t. At the end of the period the DEM are converted in PTE. The profit in DEM of such action is: $Y[S_t(1+ R_t) - S_{t+1}(1+ R^*_t)]$. The profit is positive if $S_t(1+ R_t) > S_{t+1}(1+ R^*_t)$. When $R^*_t > R_t$ the speculator only gains if the PTE depreciates.

If $F_{t+1} > S_{t+1}$, where F_{t+1} is the forward exchange rate, then the speculator by selling forward amount X of PTE has a profit in DEM of $X[F_{t+1} - S_{t+1}]$. Since the arbitrage condition $S_t(1+ R_t) = F_{t+1}(1+ R^*_t)$, always holds, speculators make profits in the forward market if and only if profits can be made in the spot market.

If $X=(1+ R^*_t)Y$, the attack in the spot market is equivalent to the attack in the forward market in terms of the PTE that are sold for DEM in the spot market. The bank that buys the PTE forward from the speculators hedges its currency risk. In the spot market trades amount $X/(1+ R^*_t)$ of PTE for DEM and deposits amount $S_t\, X/(1+ R^*_t)$ of DEM in the German money market. The return on the deposit is $(1+ R_t)S_t\, X/(1+ R^*_t)$. Thus, the amount the bank is willing to pay for the X PTE sold forward, $F_{t+1}X= (1+ R_t)S_t\, X/(1+ R^*_t)$. Whether the attack is in the spot market or in the forward market the result is the same, Y PTE are sold in the spot market.

What can a central bank do to defend its currency? It can use moral suasion, selective capital controls and regulation to prevent domestic banks from lending domestic currency to speculators, interventions (sale of foreign reserves) or raise the domestic overnight money market interest rate. Generally, in developed financial markets, instruments like moral suasion do not have important effects and the use of instruments like legislation on capital controls is avoided.

By far, the most commonly used instruments to defend a currency are interventions in the foreign exchange market and the overnight interest rate. The mechanics at work are simple. Speculators sell the domestic currency in the spot market expecting to put downward pressure on the exchange rate and the central bank counters that expectation by buying the domestic currency, through interventions. The central bank increases the overnight interest rate to make unprofitable for the speculators the action of borrowing domestic currency to sell in the spot market.

Chronology of major financial policy measures

January*

15 January (Notice of Banco de Portugal no. 1/2003, Official Gazette no. 12, Series I - B)	Pursuant to the provisions set forth in Article 42 - A and in Article 199-G of the Legal Framework of Credit Institutions and Financial Companies, provides for the regime to be complied with in the establishment of subsidiaries of credit institutions and financial companies in non-EC member countries.
15 January(Notice of Banco de Portugal no. 2/2003, Official Gazette no. 12, Series I - B)	Pursuant to the provisions set forth in Article 43 - A and in paragraph 4 of Article 117 of the Legal Framework of Credit Institutions and Financial Companies, provides for the regime to be complied with in the acquisition by credit institutions of certain types of participations in other credit institutions having their head office abroad or in financial institutions.
15 January (Notice of Banco de Portugal no. 3/2003, Official Gazette no. 12, Series I - B)	Redefines the information particulars that must be submitted together with the communications on qualifying holdings. Rewords the preamble and paragraph 1 and adds paragraph 2 - A to Notice no. 3/94, of 22 June.
15 January (Notice of Banco de Portugal no. 4/2003, Official Gazette no. 12, Series I - B)	Taking into account the changes introduced in the Legal Framework of Credit Institutions and Financial Companies by Decree-Law no. 201/2002, of 26 September, rewords Notice no. 10/94, of 18 November (limits to "large exposures"), redefining the types of credit institutions and financial companies subject to its discipline.
15 January (Notice of Banco de Portugal no. 5/2003, Official Gazette no. 12, Series I - B)	Pursuant to the provisions set forth in Article 113 of the Legal Framework of Credit Institutions and Financial Companies, as amended by Decree-Law no. 201/2002, of 26 September, redefines the limits on the net value of the fixed assets of credit institutions, as well as on the total value of shares or other equity capital that credit institutions may hold.
15 January (Notice of Banco de Portugal no. 6/2003, Official Gazette no. 12, Series I - B)	Pursuant to the provisions set forth in paragraph 3 of Article 115 of the Legal Framework of Credit Institutions and Financial Companies, as amended by Decree-Law no. 201/2002, of 26 September, lays down the terms and conditions and the periodicity of the publication of accounts by institutions subject to the supervision by Banco de Portugal. This Notice shall be applicable to the publication of the 2002 fiscal year accounts.
15 January (Notice of Banco de Portugal no. 7/2003, Official Gazette no. 12, Series I - B)	In accordance with the provisions set forth in paragraph 2 of Article 75 and in Article 195, both of the Legal Framework of Credit Institutions and Financial Companies, amends Notice no. 1/95, of 17 February, adding paragraph 4 - A, on the establishment of value dates related to debit and credit entries in demand deposit accounts, namely for the purpose of interest calculation and withdrawal of credited amounts. This Notice takes effect within 60 days as of the date of its publication.
23 January (Regulation no. 1/2003 of the Stock Market Commission, Official Gazette no. 19, Series II)	Sets the annual rate to be paid by issuing entities to the Stock Market Commission, on account of the supervision of the periodic reporting of financial information. Adds Article 12 - A and revokes subparagraph c) of paragraph 1 of Article 10 of Regulation no. 8/2001 of the Stock Market Commission, of 28 December.
29 January (Circular Letter of Banco de Portugal no. 7/03/DSBDR)	Makes known that the biannual report to be prepared by the institutions' external auditors, referred to in Circular Letter no. 17/2002/DSB, of 14 February, shall be submitted to the Banco de Portugal until the end of the quarter after the reference date of the report. The adoption of this procedure shall start with the information relating to 31 December 2002.
30 January (Decision of the Ministry of Finance no. 1825/2003, Official Gazette no. 25, Series II)	Pursuant to the provisions set forth in paragraph 2 of Article 66 of Law no. 32-B/2002, of 30 December, authorizes the Public Credit Management Institute to intervene in the secondary public debt market as a party to repur-

* The chronology for monetary measures of the Eurosystem can be found in the Monthly Bulletin of the European Central Bank.

chase operations on securities representing the direct public debt quoted in the special public debt market (MEDIP - *mercado especial de dívida pública*).

30 January (Circular Letter of Banco de Portugal no. 1/DMR)

Following Circular Letter no. 347/DMR, of 27 October 1999, fixes at 2.87% the rate of return of Deposit Securities, Series B, for the quarterly interest calculation period to start on 4 February 2003.

31 January (Circular Letter of Banco de Portugal no. 8/03/DSBDR)

Taking into account the provisions set forth in paragraphs 1.2 and 1.3 of the Annex to Notice no. 4/2002, makes known that the Banco de Portugal accepts that in the calculation of capital losses inherent in participations in *Sociedade Interbancária de Serviços*, SA (SIBS, Interbank Services Company), the 'presumable transaction value" shall be based on the price set by SIBS in the last outright sale of shares.

31 January (Circular Letter of Banco de Portugal no. 9/03/DSBDR)

Gives some explanations on Banco de Portugal's interpretation of certain precepts contained in the Legal Framework of Credit Institutions and Financial Companies, as worded by Decree-Law no. 201/2002, of 26 September, related to the registration of the accumulation of posts (Article 33), the registration of the members of the management and auditing boards (Article 69), as well as time limits, supplementary information and certificates (Article 71).

February

8 February (Notice of Banco de Portugal no. 8/2003, Official Gazette no. 33, Series I - B)

Revises the provisioning regime of credit fallen due (according to the type of guarantee and the progressivity principle of minimum provisioning levels), rewords the concept of bad debt (according to the initial maturity of the operations, the likelihood of future default, and from a portfolio perspective) and differentiates among provisions for general credit risks, lending secured by mortgages on owner-occupied housing. Amends paragraphs 3, 4, 5 and 7 of Notice no. 3/95, of 30 June. This Notice takes effect on the last working day of the month in which it is published, save for the alterations introduced in no. 1 of paragraph 4 of the above-mentioned Notice, which takes effect six months after this date.

11 February (Directive 2002/87/EC of the European Parliament and of the Council, Official Journal of the European Union L03000005)

Lays down provisions on the supplementary supervision of credit institutions, insurance undertakings and investment firms in a financial conglomerate and amending Council Directives 73/239/EEC, 79/267/EEC, 92/49/EEC, 92/96/EEC, 93/6/EEC and 93/22/EEC, and Directives 98/78/EC and 2000/12/EC of the European Parliament and of the Council. Member States shall bring into force the laws, regulations and administrative provisions necessary to comply with this Directive before 11 August 2004. They shall forthwith inform the Commission thereof.

17 February (Instruction of the Banco de Portugal no. 3/2003)

Lays down the conditions under which excess metal coins can be deposited with the Banco de Portugal.

19 February (Executive Order no. 160/2003,Official Gazette no. 42, Series I - B)

Under the provisions of paragraph 4, of Article 295 of the Commercial Companies Code, lays down that companies issuing shares listed in regulated markets under the supervision of the Stock Exchange Commission shall not be subject to the provisions set forth in paragraph 2, of article 259 of the Commercial Companies Code as regards reserves set up to the amounts mentioned in subparagraph a) of the afore-mentioned paragraph, when they are intended for the coverage of losses or negative results carried forward.

March

1 March (Regulation of the Instituto de Seguros de Portugal (Portuguese Insurance Institute) no. 12/2003,Official Gazette no. 51, Series II

Pursuant to the provisions set forth in paragraph 2, of Article 10, of Decree-Law no. 158/2002, of 2 July, lays down a set of rules related to the legal framework of savings funds set up as pension funds. Revokes paragraphs 50 to 58 of Rule no. 298/91, of 13 November.

12 March (Circular Letter of the Banco de Portugal No. 21/2003/DSB)	Within the scope of the measures preventing money laundering, recommends that credit institutions and financial companies must examine with particular care the operations negotiated with natural or legal persons residing in some territories. Revokes Circular Letter No. 91/2002/DSB of 6 November and Circular Letter No. 5/2003/DSB of 16 January.
20 March (Circular Letter of the Banco de Portugal No. 25/03/DSBRE)	Explains the understanding of the Directorate-General of Taxes as regards the transfer, without loss of tax benefits, of balances on housing-savings accounts to other credit institutions.
21 March (Notice of the Banco de Portugal No. 9/2003, Official Gazette No. 68, Series) I - B	Introduces changes in Notice No. 3/95 of 30 June, adding subparagraph n), to paragraph 1.1, of paragraph 1, of paragraph 15, so as to include the Mutual Counter-guarantee Fund in the list of entities whose assets are subject to the compulsory setting of provisions for specific and general credit risks.
22 March (Regulation No. 14/2003 of the Instituto de Seguros de Portugal, Official Gazette No. 69, Series III)	Taking into consideration the rules relating to the composition of the assets of pension funds provided for in Rule No. 21/2002 of 28 November, in Decree-Law No. 158/2002 of 2 July, in Executive order No. 1451/2002 of 11 November, and in Decree-Law No. 204/95 of 5 August, lays down the rules to be complied with by pension fund managing companies as regards the reporting of data on the composition of the assets of pension funds managed by them. Revokes Rule No. 10/99-R of 7 September, although keeping in force the data processing Instruction No. 26 annexed to it. This rule is applied for the first time to the reporting of data on the composition of the assets of pension funds as at 31 December 2002.
25 March (Circular Letter of the Banco de Portugal No. 26/03/DSBDR)	Recommends that income declarations for purposes of housing credit must be examined with particular care, given that the Directorate-General of Taxes has drawn attention to the fact that some of them are not in accordance with those submitted at tax offices.
26 March (Regulation No. 2/2003 of the Stock Market Commission, Official Gazette No. 72, Series II)	Amends Article 68 of Regulation No. 12/2000, so as to guarantee that financial intermediaries make available to their clients the value of operations on securities on the day on which settlement takes place. This Regulation takes effect on 1 April 2003.
27 March (Circular Letter of the Banco de Portugal No. 2/DMR)	Makes known the new prices - effective from 1 April 2003 onwards - of services provided by SITEME, replacing the former price list annexed to Circular Letter No. 6/DMR of 10 February 2000.

April

1 de April (Regulation No. 3/2003 of the Stock Market Commission, Official Gazette No. 77, Series II)	Limits the scope of the compulsory opening of individual accounts with financial intermediaries to transferable securities held by collective investment undertakings and pension funds. Rewords Article 35 of Regulation No. 14/2000 of 23 March. This Regulation takes effect on 1 April 2003.
11 April (Executive Order No. 296/2003, Official Gazette No. 86, Series I - B)	In accordance with the provisions of paragraph 3 of Article 1 of Decree-Law No. 88/94, of 2 April, lays down that transferable securities representing the public debt, issued pursuant to the provisions set forth in the Resolution of the Council of Ministers No. 10/2003, of 28 January, shall be added to the list published through Executive Order No. 377-A/94, of 15 June.
17 April (Circular-Letter of the Banco de Portugal No. 31/03/DSBDR)	Discloses guidelines relating to the accounting treatment of *Agrupamentos Complementares de Empresas* (Complementary Company Groupings) with links to credit institutions.
24 April (Decree-Law No. 83/2003, Official Gazette No. 96, Series I - A)	In the use of the legislative powers granted by Law No. 25/2002, of 2 November, introduces changes in Decree-Law No. 454/91, of 28 December, granting access to all credit institutions to the data disclosed by the Banco de Portugal related to cheque risk users.

26 April (Decree-Law No. 86/2003, Official Gazette No. 97, Series I - A)	Establishes the general rules applicable to the intervention of the State in the definition, design, preparation, competition, award, alteration, surveillance and general monitoring of public and private partnerships. Introduces changes in Articles 1, 12 and 18 and revokes Article 4 of Decree-Law No. 185/2002, of 20 August.
30 April (Decree-Law No. 91/2003, Official Gazette No. 100, Series I - A)	Introduces changes in the legal framework of Treasury bills. Rewords Articles 2 and 7 of Decree-Law No. 279/98, of 17 September.

May

3 May (Executive Order No. 530/2003, Official Gazette No. 102, Series II)	Under the provisions of paragraph 1 of Article 173 of the Legal Framework of Credit Institutions and Financial Companies, approved by Decree-Law No. 298/92, of 31 December, introduces changes in the Regulation of the Deposit Guarantee Fund. Revokes subparagraph c), of paragraph 1 of Article 3 and rewords Articles 4, 6, 16, 17 and 19 of the said Regulation, approved by Executive Order No. 285-B/95, of 15 September.
12 May (Circular Letter of the Banco de Portugal No. 33/03/DSB)	Clears doubts on the scope of the subjects on which the supervisory body issues its opinions, so as to ensure a higher harmonisation of the content of the Opinions to be sent to the Banco de Portugal on the internal control system.
15 May (Instruction of the Banco de Portugal No. 9/2003)	Following the regulatory changes introduced in the credit risk provisioning system, lays down that credit institutions and financial companies shall send a provisions' table, duly filled in, within 30 days as of the end of each quarter. Revokes Instruction No. 91/96, published in BNBP No. 1, of 17 June 1996.
19 May (Circular Letter of the Banco de Portugal No. 34/03/DSB)	Recommends that credit institutions, which from a group perspective have a significant involvement in securitisation operations, shall keep their own funds at an adequate level in order to cover the overall risks arising from such operations; as far as new securitisation operations are concerned, releases of own funds shall not be recognised; capital gains resulting from the sale of assets shall be accrued up to the settlement date of such operations.

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