THE PORTUGUESE ECONOMY IN 2000

1. INTRODUCTION

According to estimates of *Banco de Portugal* disclosed in this issue of the *Economic Bulletin* (EB) (Table 1.1), Gross Domestic Product (GDP) recorded a real growth of 3.2 per cent in 2000, compared with 3.4 per cent in 1999. In the euro area, conversely to the situation in Portugal, there was an acceleration of economic activity (from 2.5 to 3.4 per cent). As a result, the positive growth differential recorded in the past years, which was of 1.4 percentage points (p.p.) per year on average in the period 1997-1999, disappeared in 2000.

Estimates of economic growth for 2000 are within the forecast range of the September 2000 issue of the EB (Table 1.2). However, the recomposition of economic growth was more marked than the one forecast on that occasion; according to current estimates, domestic demand is expected to record a more moderate growth and the contribution of net external demand to the growth of output will improve sizeably. As a result of the deceleration of the components of overall demand with a higher import content — consumer durable goods, investment in equipment and transport material — strengthened by a reduction in changes in inventories, imports slowed down strongly. With respect to goods and services exports, there was an acceleration far lower than forecast, due to the behaviour of merchandise exports, leading to a loss in market share of around 4 per cent. This loss in market share was accounted for by the behaviour of merchandise exports, given that services exports showed a favourable development reflecting the good performance of tourism receipts.

The volume growth rate of Portuguese merchandise exports increased only slightly in 2000, despite the strong acceleration in the relevant ex-

Table 1.1

MAIN ECONOMIC INDICATORS

Percentage rates of change

	1998	1999	2000
Private consumption	7.2	5.2	2.8
Public consumption	3.2	4.9	3.6
GFCF	9.1	5.2	4.0
Change in inventories [(a)]	0.1	0.1	-0.3
Domestic demand	7.0	5.2	2.9
Exports	8.9	4.6	6.9
Overall demand	7.4	5.1	3.8
Imports	14.4	9.1	5.3
GDP	4.7	3.4	3.2
Current account + capital account (% of GDP)	-4.7	-6.2	-8.5

Note:

(a) Contribution to GDP growth in percentage points.

Table 1.2

RECENT ESTIMATES *VERSUS* SEPTEMBER 2000 *ECONOMIC BULLETIN* FORECASTS

Percentage rates of change

	2000 EB September 2000	2000 EB March 2001
Private consumption	2.75-3.25	2.8
Public consumption	3.2	3.6
GFCF	5.25 - 5.75	4.0
Domestic demand	3.25 - 3.75	2.9
Exports	8.25 - 8.75	6.9
Overall demand	4.25 - 4.75	3.8
Imports	8 - 8.5	5.3
GDP	2.75 - 3.25	3.2
Current account + capital account (% of GDP)	-10 ; -9	-8.5

ternal markets. Thus, there was a further loss in market shares for Portuguese merchandise exporters, estimated at around 5 per cent. Data currently available point to a loss in the annual average market share of approximately 3.5 per cent in the period 1997-2000. The analysis of exports by groups of products shows that this evolution was due to the clothing and footwear export industries and in the past two years also to the transport material industry. With respect to the latter, occasional disturbances in production are the main explanatory factor, while the major factors behind the performance of the former are probably of a structural nature. Indeed, the export volume of the clothing and footwear industries in the period 1997-2000, recorded a cumulative drop of around 11 per cent, compared with a real growth of total Portuguese merchandise exports of around 29 per cent. This trend reflects the lower competitiveness of Portuguese exports of this type of goods, against the background of more favourable access conditions of third countries to the European Union (EU) markets and the progressive change in the comparative advantage of the Portuguese economy.

The combined deficit of the current and capital account reached 8.5 per cent of GDP in 2000, i.e. 2.3 p.p. more than in the previous year, although around 1 p.p. below the central value of the forecast range published in EB of September 2000. The widening of the deficit resulted mainly from lower public transfers from the EU and from a further deterioration of the merchandise account (by 1.0 and 1.4 p.p., respectively). The higher deficit of the merchandise balance resulted chiefly from the sharp rise in external trade deflators (the so-called price effect) and from the deterioration in terms of trade, associated with the rise in the world price of oil. Taken together, these two effects accounted for almost 80 per cent of the total increase in the merchandise deficit in 2000. Therefore, in 2000 the contribution from the changes in import and export volumes, conversely to past years, was not the main factor behind the deterioration of the merchandise balance.

The unemployment rate showed a declining pattern throughout 2000, reaching the lowest levels observed in the current business cycle. In annual average terms it stood at 4.0 per cent, i.e. clearly below the current forecasts for the natural unemployment rate. The change in labour cost indicators — either compensation per employee or unit labour costs per employee — continued to be clearly above the figure recorded in the remaining euro area countries. Wages continued to record very significant rises in the private but, particularly in the public sector. For the economy as a whole, nominal wages per employee (excluding the State subsidy for the *Caixa Geral de Aposentações)* increased by 5.6 per cent, i.e. 0.4 p.p. more than in the previous year. Growth was smaller in the private sector, standing at 5.2 per cent, i.e. 0.3 p.p. more than in the previous year. As in past years, this figure exceeded collective pay agreements, in line with the pro-cyclical performance of the wage drift.(1) The rise in real wages continued to be higher than the growth of productivity by approximately 1 p.p., for the third consecutive year.

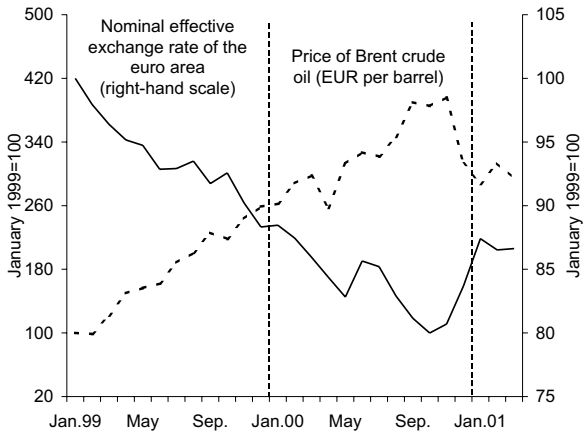
Inflation measured by the annual average change in the Consumer Price Index (CPI) increased from 2.3 per cent, in 1999, to 2.9 per cent, in 2000, and to 3.6 per cent in the year ended in March 2001. The intra-annual pattern of acceleration of the CPI was more marked, with the year-on-year rate of change rising from 1.8 per cent in the first quarter of 2000 to 3.7 per cent in the fourth quarter and 4.8 per cent in the first quarter of 2001. The trend measures of inflation used by Banco de Portugal also reveal a rise, albeit more moderate. The stronger acceleration of the CPI, compared with that of the trend measure of inflation, reflects the significant rise in the prices of non-processed food and the effects of the fuel consumer price rises observed at the end of March 2000 and at the beginning of January 2001.

The inflation differential vis-à-vis the euro area as a whole has widened significantly since the end of 1999, chiefly reflecting the differentiated process of setting fuel consumer prices in Portugal vis-à-vis the remaining euro area countries. The widening of the differential also mirrored the more unfavourable trend of food prices in Portugal than that recorded in the remaining countries, both due to larger base effects (i.e. smaller relative growth in 1999) and to more adverse weather conditions, as well as to the fact that these goods have a stronger weight in the structure of the Portuguese CPI. Ex-

(1) Defined as the difference between the increase in compensation per employee and the increase in collective pay agreements.

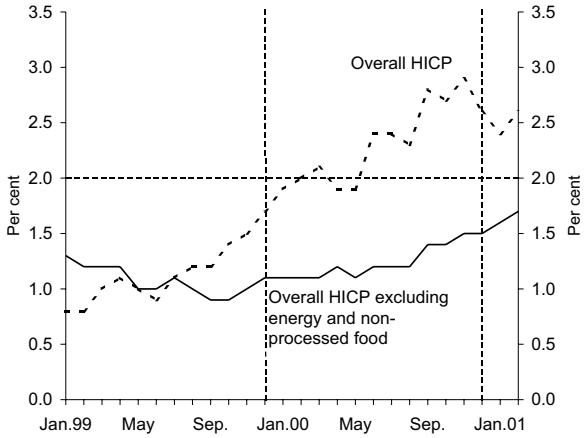
cluding energy and non-processed food, the inflation differential has remained relatively stable since the fourth quarter of 1999, at around 1.5 p.p. Therefore, excluding fuel and non-processed food, the upward trend of consumer prices in Portugal is due to have been similar to that recorded in the remaining euro area countries, albeit at a higher inflation level. This differential will partly result from structural factors, which are reinforced by cyclical factors reflected, *inter alia*, in a tighter labour market than in the euro area as a whole. It should be noted that in the case of service prices, which are particularly sensitive to wage developments, the differential vis-à-vis the euro area has ranged between 2 and 3 p.p. since the second quarter of 2000.

Chart 2.1
OIL PRICE AND EURO EXCHANGE RATE[a]



Sources: ECB and Datastream.
Note:
(a) An increase corresponds to an effective appreciation of the euro.

Chart 2.2
HICP IN THE EURO AREA
Year-on-year rate of change



Source: Eurostat.

2. MONETARY POLICY OF THE EUROSYSTEM AND MONETARY CONDITIONS IN THE PORTUGUESE ECONOMY

2.1. Monetary policy

Monetary policy decisions of the Eurosystem in 2000 can be broken down into two periods. In the first, up to October, there was a predominance of risks that inflation in the euro area might record in the medium term higher levels than those consistent with the definition of price stability of the Eurosystem. In the second period, which covered the last two months of 2000 and the beginning of 2001, risks to price stability in the medium term became progressively more balanced.

The strengthening of the euro depreciation trend and the price rise of oil in the first nine months of 2000 brought about, in a context of robust economic growth in the euro area, increasing risks of a spillover to wages and, hence, to most consumer prices (Charts 2.1. and 2.2.).[2] In this context, and continuing the 50 basis points rise decided on 4 November 1999, the Governing Council of the ECB decided to raise, on six occasions between February and October 2000, the official interest rates, to a total of 175 basis points. After the last rise in October, the interest rate on the main refinancing operations[3] was set at 4.75 per cent, while the interest rates on the marginal lending facility and on the deposit facility were raised to 5.75 and 3.75 per cent respectively (Table 2.1).

(2) The levels reached by the euro exchange rate in the course of 2000, raised concerns at the Governing Council of the ECB, since they did not reflect the economic conditions in the euro area and due to their effect on price developments. On 22 September, at the initiative of the ECB, the monetary authorities of the United States, Japan, United Kingdom and Canada joined the ECB in a concerted intervention in foreign exchange markets, due to concerns shared about the potential implications of the recent movements in the exchange rate of the euro for the world economy. The persistence of risks to price stability in the euro area stemming from the exchange rate behaviour led the ECB to make unilateral interventions in foreign exchange markets on 3, 6 and 9 November.

Table 2.1

ECB INTEREST RATES

Per cent

Decision date	Deposit facility	Main refinancing operations	Marginal lending facility
1998			
22 Dec.	2.00[a]	3.00	4.50[a]
1999			
8 Apr.	1.50	2.50	3.50
4 Nov.	2.00	3.00	4.00
2000			
3 Feb.	2.25	3.25	4.25
16 Mar.	2.50	3.50	4.50
27 Apr.	2.75	3.75	4.75
8 June [b]	3.25	4.25	5.25
31 Aug. [b]	3.50	4.50	5.50
5 Oct. [b]	3.75	4.75	5.75

Source: EBC.

Notes:

(a) In the period between 4 and 21 January 1999 the interest rates for the marginal lending facility and the deposit facility stood respectively at 3.25 per cent and 2.75 per cent.

(b) Minimum bid rate in variable rate tenders.

In the last months of 2000 and at the beginning of 2001, the rise in uncertainty as to external developments — in particular regarding the economic slowdown in the United States — in parallel with the reduction of the oil price and the effective appreciation of the euro, made the risks to price stability progressively more balanced, justifying the maintenance of the interest rates by the ECB, at the levels fixed at the beginning of October. The economic activity in the euro area remained buoyant, showing however some signs of moderation, which had started to be recorded in summer.

(3) The interest rate on the main refinancing operations up to 28 June corresponds to the interest rate of the fixed rate tender procedures and from that date onwards to the minimum bid rate accepted in variable rate tenders. It should be recalled that in the ECB Governing Council meeting of 8 June it was decided that, starting from the operation to be settled on 28 June 2000, the main refinancing operations of the Eurosystem would be conducted as variable rate tenders, replacing the fixed rate tenders used since the beginning of 1999. Furthermore, the Governing Council of the ECB also decided to set a minimum bid rate for these operations, with the purpose of clearly signalling the monetary policy stance, which used to be indicated by the rate applied to fixed rate tenders. The new tender mechanism was a response to the overbidding which had developed in the context of the fixed rate tender procedure and was not intended as a change in the monetary policy stance of the Eurosystem.

Chart 2.3

STOCK PRICE INDICES

In national currencies

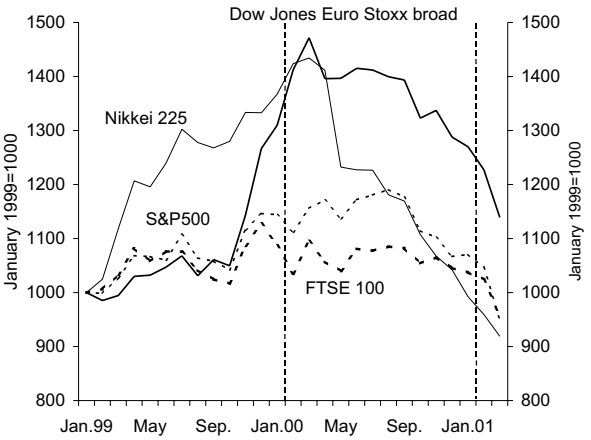
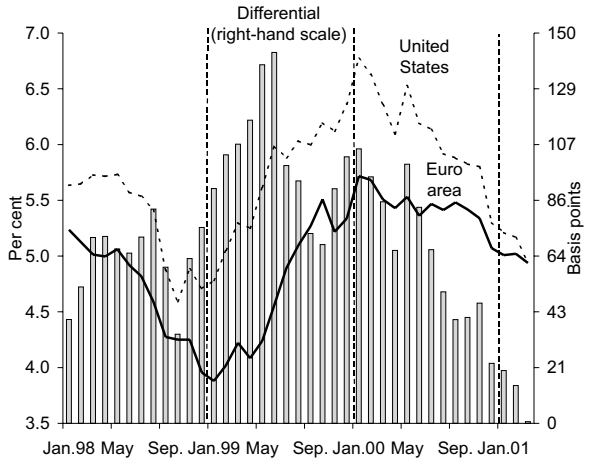


Chart 2.4

10-YEAR GOVERNMENT BOND YIELDS

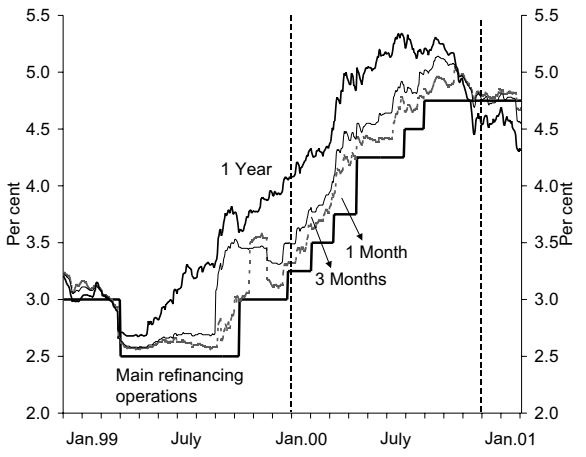


Source: ECB.

In parallel with the deterioration of prospects for world growth, from the third quarter of 2000 onwards the trend of downward correction of the price level of shares in the main economies became more marked and the volatility of the stock price indices increased (Chart 2.3). On average, between September 2000 and March 2001, the main stock price indices of the euro area and US markets[4] fell by approximately 18 per cent. At the same time, there was a fall in the yields on 10-year government debt bonds in the United States and in the

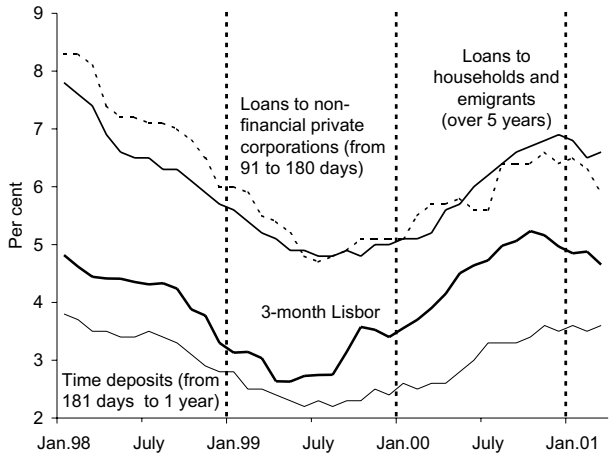
(4) The Dow Jones Euro Stock broad and the Standard and Poors 500 were used as representative indices of the stock markets of the euro area and the United States, respectively.

Chart 2.5
EURO AREA MONEY MARKET RATES



Source: ECB.

Chart 2.6
BANK INTEREST RATES AND LISBOR



euro area (Chart 2.4). Between October 2000 and March 2001, these rates declined by approximately 88 basis points in the United States and by around 48 basis points in the euro area.(5)

The behaviour of money market interest rates throughout the year reflected expectations of a rise in official interest rates by the Governing Council of the ECB (Chart 2.5). With the exception of the decision taken on 8 June, when the 50 basis points rise in official interest rates seems to have surprised the market due to its magnitude, the remaining rises in the official interest rates in 2000 were anticipated by the markets, resulting only in small adjustments of money market interest rates after the announcements of the decisions. The money market yield curve continued to have a positive slope, shifting upwards up to October. In a context of increased uncertainty as to the monetary policy decisions, from end-October onwards money market interest rates started to fall, more markedly at the longer maturities, giving rise to a reversal in the slope of the yield curve towards maturities over one month, from the beginning of December onwards.

2.2. Monetary conditions in the Portuguese economy

Bank lending rates in Portugal, in the context of high competition between monetary financial institutions, have a very close relationship with money market interest rates, given that most of these rates are index-linked to money market rates, both for short and long-term operations(6) (Chart 2.6). However, the existence of lags in the transmission of changes in money market rates to bank interest rates, led the latter to show a clearly upward trend during the whole of 2000, only declining at the beginning of 2001.

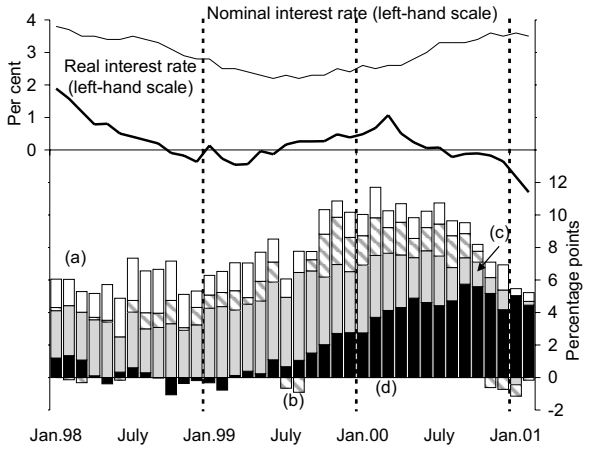
In March 2001, the interest rate on new loans to households (with a maturity of over 5 years) stood at 6.6 per cent, compared with 6.9 per cent in December 2000 and 5.0 per cent in December 1999. The interest rates on new loans to non-financial corporations with a maturity from 91 up to 180 days stood at 5.9 per cent and with a maturity from 181 days up to 1 year at 6.4 per cent (compared with 6.4 and 6.3 per cent respectively in December 2000 and 5.1 and 4.8 per cent in December 1999). In turn, the interest rate on time deposits (with a maturity from 181 days up to 1 year) stood at 3.6 per cent, i.e. 0.1 and 1.2 p.p. above the figures recorded in December 2000 and December 1999, respectively.

(5) In the third and fourth weeks of March 2001, the yields on US 10-year government debt bonds were for the first time since November 1996 at a lower level than in the euro area.

(6) In some euro area countries, in particular in the countries which traditionally have a low inflation record, long-term lending rates are fixed, being related to long-term interest rates.

Chart 2.7

INTEREST RATES ON TIME DEPOSITS (181 DAYS UP TO 1 YEAR) AND CONTRIBUTIONS TO THE RATE OF CHANGE OF DEPOSITS AND DEPOSIT LIKE INSTRUMENTS OF THE NON-FINANCIAL PRIVATE SECTOR



Notes:
(a) Transferable deposits - non-financial corporations.
(b) Notice and time deposits and deposit instruments - non-financial corporations.
(c) Transferable deposits - Households.
(d) Notice and time deposits and deposit like instruments - Households.

The trend of the spread between bank and interbank interest rates largely reflected the above mentioned lags. In addition, the available data suggest that the relations between the two types of interest rates have changed with the start of the participation in the euro area and with the rise of interest rates. This change was translated into a narrowing of the equilibrium spread(7) between lending rates and interbank rates and into a widening of the equilibrium differential between interbank rates and deposit rates.(8)

In the credit market, this trend has likely reflected an increasing competition. Indeed, in the context of the rise in interest rates, monetary financial institutions competed actively on the credit market, both in the granting of new loans and in the renegotiation of already existing contracts, progressively tightening their margins in this segment.

In the deposit-taking market, the trend of deposit rates can be associated with two factors. First, the possibility that credit institutions have of accessing to an ample supply of funds without incurring in exchange rate risk, given their participation in the euro area, which has likely reduced the domestic competitive pressure on deposit-taking. Second, the reduced marginal benefit of an interest rate differentiation, which reduces the incentive to raise deposit rates in a context of relatively low private savings in Portugal.

The trend of bank interest rates conditioned the evolution of monetary and credit aggregates in the course of 2000 and in early 2001. Throughout the year, the year-on-year rate of change in total deposits and equivalent of the private non-financial sector declined progressively, falling from an average figure of 10.7 per cent, in the first quarter to 6.9 per cent in the last (Chart 2.7). This trend was chiefly marked in the last quarter of 2000, being maintained in the first two months of 2001. The pattern of the rate of change of deposits broadly moved in line with the real interest rate, which became negative in the second half of 2000.

In terms of contributions and coinciding with the rise in nominal interest rates, there was a shift by households away from transferable deposits to notice and time deposits. In terms of average quarterly figures, the year-on-year rate of change of transferable deposits declined from 19.0 per cent in the last quarter of 1999 to 5.3 per cent in the last quarter of 2000. In turn, over the same period, the rate of change of notice and time deposits increased from 4.0 to 8.5 per cent. This shift ceased to be observed from the end of the last quarter of 2000 onwards, when both aggregates decelerated (with the respective rates of change standing at 1.0 and 7.6 per cent in February 2001).

In the beginning of 2000, in a context of positive real interest rates and of a rise in nominal interest rates, non-financial corporations increased their contribution to the growth of deposits and deposit-like instruments through a strong increase in notice and time deposits. From the last quarter of 2000 onwards, this contribution became negative.

(7) The equilibrium spread corresponds to the difference between the rates in a context in which both of them are stable, after completion of the transmission of past changes in money market interest rates.

(8) These changes did not bring about a significant change in the financial margin (spread between lending and deposit rates for the same maturity), which has remained relatively stable since mid-1999.

Chart 2.8
DOMESTIC BANK CREDIT
Year-on-year rate of change

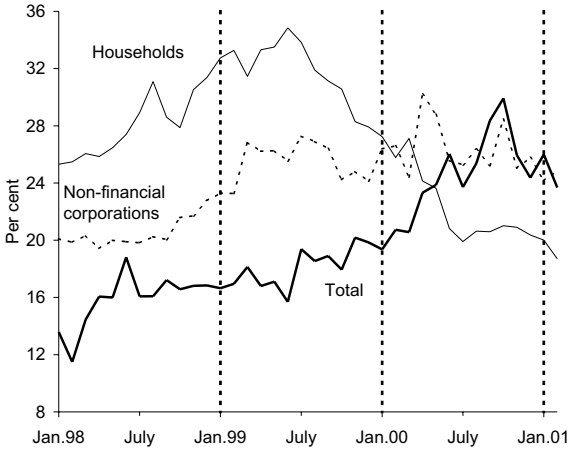


Chart 2.9
REAL BANK INTEREST RATES

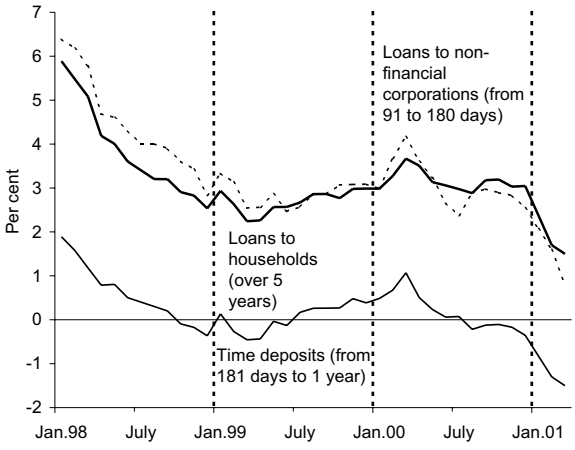
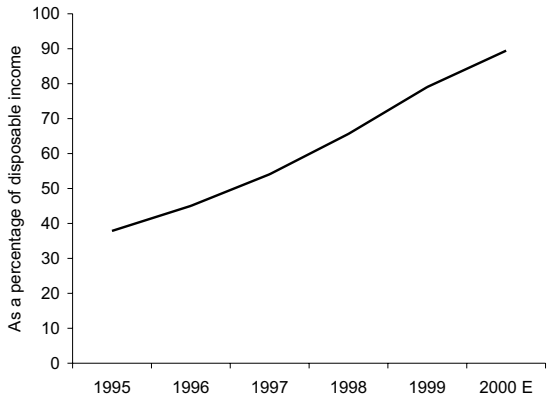


Chart 2.10
HOUSEHOLD INDEBTEDNESS



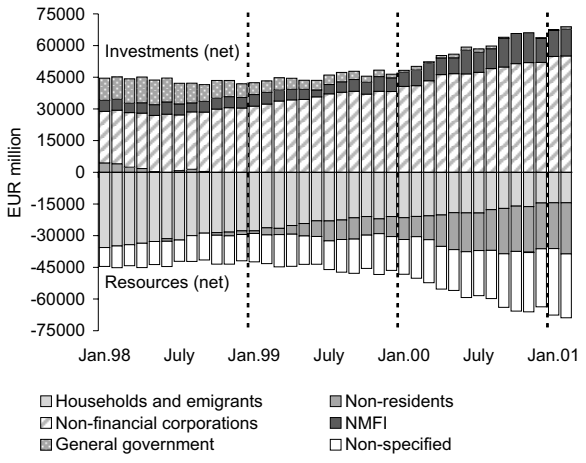
Following the reversal in the trend decline in interest rates, credit to the non-financial private sector showed a progressive deceleration, moving from a maximum year-on-year rate of change of 30.5 per cent in July 1999 to 21.8 per cent in February 2001 (Chart 2.8). This deceleration reflected different trends in its components. In February 2001 credit to households recorded a year-on-year rate of change of 18.7 per cent (falling from 27.9 per cent in December 1999 and 20.4 per cent in December 2000). In turn, the rate of change of credit to non-financial corporations stood at 24.9 per cent in February 2001, i.e. a similar level to that recorded (on average) in the past two years.

This different trend is likely to have partly reflected the different importance that real interest rates assume for these two institutional sectors. In fact, the level and the trend of real lending rates in both sectors were very similar in the past years (Chart 2.9). In early 2001, real lending rates were at historically low levels, reaching levels clearly below 2 per cent (during 1999 and 2000 these rates stood at around 3 per cent).

As referred to above, as far as credit to non-financial corporations is concerned, the maintenance of high rates of change is partly related to the trend of the real interest rate described above. Indeed, in a context of accelerating prices the increased level of nominal interest rates was not a very active restraint to borrowing.(9) On the other hand, credit to non-financial corporations is likely to have also been sustained by the carrying out of investment operations abroad and by the increase in borrowing requirements by this sector, resulting from the restructuring of resident economic groups. In line with this background, the indebt-

(9) In this regard it should be mentioned that exchange rate developments in 2000 enabled to globally accommodate the differential between the changes in unit labour costs in Portugal and those of its main trading partners. Therefore, in real terms, the effective exchange rate index for Portugal stood virtually unchanged (based on the unit labour costs for the total of the economy, excluding the government subsidy to *Caixa Geral de Aposentações*), having depreciated by 2.5 per cent in nominal terms. It should however be noted, that the value for the whole economy reflects on the one hand a real appreciation against the euro area trading partners (Portuguese exports to this area represent 63.5 per cent of the total in 2000) and on the other a very significant real depreciation against extra-euro area partners.

Chart 2.11
NET POSITION OF OTHER MONETARY FINANCIAL INSTITUTIONS VIS-À-VIS THE DIFFERENT INSTITUTIONAL SECTORS



edness of non-financial corporations has increased sizeably over the past years, reaching approximately 83.5 per cent of GDP in 2000 (70.3 per cent of GDP in 1999).(10)

With respect to households, the deceleration of borrowing is likely associated with the rise in nominal interest rates, which brought about an increase in the cost of new borrowing and also a larger financial effort associated with previous borrowing. This second effect is due to have been particularly important in so far as the degree of household indebtedness increased strongly in the past years (Chart 2.10). At the end of 2000, this indicator stood at around 90 per cent of the household disposable income, which compares with 79 per cent a year earlier. This increase has brought about a significant rise in the total debt burden of households, measured by the ratio between debt servicing costs (interest payments and principal repayments) and disposable income leading to some strains in their liquidity restrictions. Note, however, that interest payments in 2000 amounted to close to 4 per cent of disposable income, a level similar to the one observed in 1995.

Despite the deceleration recorded, the rates of change of loans to households remain at high levels, non-sustainable over time since they would imply a sharp rise in the total debt burden.

Although recording clearly higher rates of change, credit developments in Portugal find some parallel in those of the euro area. Given the common context of rising nominal interest rates and relatively low real interest rates, loans to non-financial corporations and households in the euro area continued to have high growth rates in the course of 2000. In addition, an acceleration of loans to non-financial corporations and a deceleration of loans to households (particularly in the housing sector) was observed, similarly to the situation in Portugal.

In sum, during the past years, monetary conditions of the Portuguese economy were strongly determined by an environment of low interest rates. Reflecting the upward pattern of the year-on-year rate of change of prices, there was an increasing divergence between nominal and real interest rates from April 2000 onwards. The rise in the former added to the deceleration of loans to households, in a context of historically high indebtedness levels. The relative stabilisation of the latter added, on the one hand, to the maintenance of the growth of loans to non-financial corporations and, on the other, to a deceleration of deposits and deposit-like instruments of the non-financial private sector.

2.3. Developments in the monetary survey

Developments in deposits and in loans to the non-financial private sector had clear implications on the consolidated balance sheet of monetary financial institutions (MFIs), which comprise the monetary authority and the other MFIs (the so-called banks). The combination of the strong credit growth with a (relatively) moderate change in non-financial private sector deposits implied the strengthening of the net debtor position of this sector vis-à-vis the banking sector(11) (Chart 2.11). In February 2001, the net debtor position of the non-financial private sector vis-à-vis MFIs reached a maximum of approximately EUR 41 billion (which compares with EUR 38 billion in December 2000 and EUR 17 billion in December 1999) (Table 2.2).

(10) This estimate resulted from the application to the 1999 indebtedness level of the rate of change of bank loans to non-financial corporations in 2000.

(11) The net position of each institutional sector is defined as the difference between applications with MFIs (credit) and resources granted to them (deposits). Therefore, a positive value corresponds to a debtor position of the institutional sector vis-à-vis the MFIs sector.

Table 2.2

CONSOLIDATED BALANCE-SHEET OF MONETARY FINANCIAL INSTITUTIONS

EUR million

	Balance	Changes	
	Feb. 2001	Feb. 2001 / Dec. 2000	Dec. 2000 / Dec. 1999
Net foreign assets	-9 620	-2 917	-15 852
Banco de Portugal	14 588	-398	-3 638
Other monetary financial institutions	-24 208	-2 519	-12 215
Of which: denominated in euro	-21 977	-2 690	-8 700
Credit to general government	8 643	158	-279
Domestic credit (except credit to general government)	163 541	2 548	31 388
Households	68 850	192	11 617
Non-financial corporations	73 189	2 084	14 578
Non-monetary financial institutions (NMFI)	21 503	272	5 193
Currency in circulation	5 047	-345	-229
Deposits and deposit-like instruments - Total	117 535	-2 591	5 591
NMFI	8 849	-1 012	304
General government	7 503	-696	-672
Non-financial corporations and households	101 183	-883	5 960
Securities other than capital	18 928	1 438	4 173
Money market fund units	124	9	115
Capital and reserves	25 983	1 406	3 730
Sundry items (net)	-5 053	-128	1876

With regard to banks, these developments have implied a gradual increase in the importance of recourse to external borrowings against the raising of domestic resources. Given the small size of the Portuguese economy, the participation in the euro area provided resident banks almost unlimited access to funds of banks in other euro area countries at the money market interest rate (clearly lower than that of the domestic market). Thus, the (net) foreign debtor position of banks has been increasing progressively, reaching an historical high of around EUR 24 billion in February 2001 (EUR 22 billion in December 2000 and EUR 9 billion in December 1999).(12) In terms of the breakdown by currency, external liabilities of banks are mostly denominated in euro, which reflects the fact that borrowing is mostly obtained from euro area banks.

It should be mentioned that, apart from the increase in net foreign liabilities, the balance of the balance sheet of MFIs has also resulted, albeit to a lower degree, from a decline in (net) credit to general government, an increase in (net) credit to non-monetary financial institutions, and a strengthening in equities, bonds and other medium and long-term liabilities of MFIs.

3. BUDGETARY POLICY

In 2000, the Portuguese General Government recorded a deficit amounting to 1.4 per cent of GDP, on a National Account basis. This value is in line with the target envisaged in the Stability Programme for 2000 (1.5 per cent of GDP) and accounts for a decrease in the deficit of 0.7 p.p. of GDP vis-à-vis 1999. The primary balance increased by 0.6 p.p. of GDP in 2000, reaching 1.7 per cent of GDP. This result was partly due to the proceeds of the auction of third-generation mobile telephone licences (UMTS) not foreseen in the Budget, that reached approximately EUR 400 million. Excluding these one-off proceeds, the total deficit and the primary surplus would have reached 1.7 and 1.4 per cent of GDP, respectively, in 2000(13) (Table 3.1). In the remaining text, capital expenditure, total expenditure and fiscal balances exclude UMTS receipts.

(12) Developments described are also observed in other euro area countries, albeit less markedly, being reflected in the combination of strong credit growth and in a more moderate change in deposits, associated with recourse to borrowing with non-resident banks.

Table 3.1

GENERAL GOVERNMENT ACCOUNTS

	As a percentage of GDP				Growth rates		
	1997	1998	1999	2000	1998	1999	2000
Total revenue	41.7	41.2	42.1	42.2	8.1	9.1	6.4
Current revenue	39.4	39.7	40.3	40.7	10.2	8.7	7.2
Taxes on income and wealth	10.1	9.8	10.2	10.7	5.8	11.2	11.4
Taxes on production and imports	14.2	14.4	14.8	14.5	10.9	9.6	4.5
Social contributions	11.1	11.3	11.3	11.7	10.7	7.5	9.6
Other current revenue	4.0	4.3	4.1	3.8	16.8	2.6	-0.4
Capital revenue	2.3	1.6	1.8	1.5	-26.9	21.5	-10.9
Total expenditure	44.4	43.5	44.2	43.9	7.2	8.5	5.5
Current expenditure	38.4	37.9	38.4	38.9	7.6	8.3	7.5
Compensation of employees	13.8	13.9	14.2	14.7	9.8	9.3	9.6
Intermediate consumption	3.9	3.8	3.9	4.0	5.8	9.3	10.1
Transfers to households	13.3	13.3	13.5	13.9	9.2	8.6	9.6
Interest on public debt	4.2	3.4	3.2	3.1	-11.4	-1.4	4.0
Other current expenditure	3.2	3.5	3.7	3.2	19.6	11.0	-8.5
Capital expenditure (excluding UMTS)	5.9	5.7	5.8	5.1	4.2	9.8	-7.1
Overall balance (excluding UMTS) [a]	-2.7	-2.3	-2.1	-1.7			
Memo items:							
Primary balance (excluding UMTS)	1.6	1.1	1.1	1.4			
Cyclically-adjusted primary balance (excluding UMTS)	2.5	1.2	0.5	0.8			
UMTS proceeds	0.0	0.0	0.0	0.3			
Overall balance (including UMTS)	-2.7	-2.3	-2.1	-1.4			
Public debt	59.1	54.6	54.2	53.2			

Note:

(a) The figures for 1998 and 1999 already reflect the treatment as capital transfers of debts undertaken by the Treasury that up to the notification of the excessive deficit procedure of February 2001 were not included in the deficit (EUR 129.7 and 99.8 millions in 1998 and 1999, respectively).

According to the *Banco de Portugal's* latest estimates[14], the cyclically adjusted deficit decreased by 0.3 p.p. of GDP in 2000. The cyclically adjusted primary balance increased by 0.3 p.p., to reach 0.8 per cent of GDP, after having declined by 1.3 and 0.6 p.p., in 1998 and 1999. This change was influenced by the low rate of capital transfers from the EU. In fact, a decrease in capital transfers from the EU simultaneously affects revenue and capital expenditure but, due to national co-financing, the changes are more significant on the expenditure side than on the revenue side, with a positive effect on the fiscal balance. In 2000, capital expenditure declined by 0.7 p.p. as a percentage of GDP, 0.4 p.p. more than the decrease observed in capital revenue. Part of this differential was due to this non-cyclical but also non-discretionary effect. Apart from this evolution of transfers from the EU, the cyclically adjusted primary balance seems to have remained virtually unchanged in 2000, at a relatively low level, not recovering from the sharp reductions occurred in 1998 and 1999, which were associated with clearly expansionary fiscal policies.

Although the cyclically adjusted primary balance did not deteriorate in 2000, the primary current expenditure (i.e., current expenditure excluding public debt interest payments) continued to grow strongly, as observed in the two previous

(13) According to the decision taken by the Eurostat, the proceeds from the auction of third-generation mobile telephone licences (UMTS) was recorded with a minus sign in the item net acquisition of non-financial and non-produced assets, that is part of capital expenditure.

(14) According to a new methodology under development in the ESCB. One of the major innovations of this methodology consists in taking into account the effects of the composition of demand on the cyclical component of the budget balance.

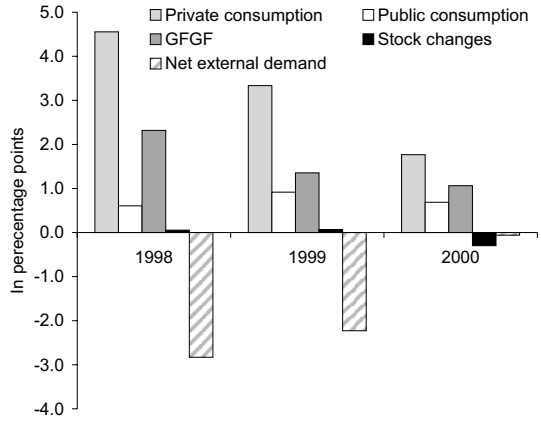
years. The pattern of fiscal developments observed in the last years, featured by a sharp expansion of expenditure and current account was thus confirmed (see Box 1– *General Government deficit and debt in Portugal: recent developments and medium-term prospects*). In 2000, the ratio of primary current expenditure to GDP increased by 0.6 p.p., which was, to a large extent, a result of the evolution of compensation of employees, intermediate consumption and transfers to households, that increased by 9.6, 10.1 and 9.6 per cent, respectively. Current revenue, in turn, increased by 0.4 p.p. of GDP. In 2000, tax revenue increased less than in the previous year (8.0 per cent in 2000, vis-à-vis 9.4 per cent, in 1999), albeit still significantly above nominal GDP growth (6.1 per cent). The trend of tax revenue was negatively affected by the policy of consumer prices of fuels that resulted in an important loss of revenue from the tax on oil products. Revenue from personal income tax, corporate income tax, VAT and social contributions continued to record very strong increases in 2000, standing close to or even exceeding initial forecasts (12.6, 9.7, 11.6 and 9.6 per cent, respectively).

It should also be noted that the general government consolidated gross debt ratio decreased by 1.0 p.p. to 53.2 per cent at the end of 2000, clearly below the 60 per cent reference value. Given that the growth rate of nominal GDP stood very close to the public debt implicit interest rate, actual primary surplus would have accounted for a sharper reduction of the debt ratio. However, similarly to 1999, deficit-debt adjustments consisted in an upward movement of the debt ratio (0.8 p.p. of GDP), particularly due to the fact that Treasury debt settlements not recorded in the year deficit have exceeded privatisation proceeds used for debt redemption.

4. OUTPUT DEVELOPMENTS IN 2000

According to the *Banco de Portugal's* estimates, the Portuguese economy recorded a real growth of 3.2 per cent in 2000, which corresponds to a slight deceleration from the previous year (3.4 per cent) (Table 1.1). This trend stands in clear contrast to that observed for the euro area as a whole, where output accelerated from 2.5 to 3.4 per cent. The positive growth differential observed in previous years has thus not been repeated in 2000.

Chart 4.1
CONTRIBUTION OF EXPENDITURE COMPONENTS TO GDP GROWTH



Although output growth in 2000 has been close to that observed in 1999, the qualitative change in the patterns of that growth has been significantly strengthened: domestic demand decelerated further and the contribution of net external demand to GDP growth was less negative (Chart 4.1). The deceleration of domestic demand between 1999 and 2000 was very sharp (from 5.2 to 2.9 per cent), with all its major components recording a lower increase in 2000. Stress should be laid, however, on the strong deceleration of private consumption, from 5.2 to 2.8 per cent, particularly sharp in some expenditure of consumer durable goods. The slowdown in gross fixed capital formation (GFCF), with growth rates of 5.2 and 4.0 per cent in 1999 and 2000, respectively, was the result of the rather different dynamics of its components: GFCF in equipment recorded a strong deceleration which was moderated by a higher growth of GFCF in construction. Public consumption also has lower growth in real terms (3.6 per cent, against 4.9 per cent in 1999), continuing, however, to exceed the increase in real output. Finally, changes in stocks contributed negatively to GDP growth, with -0.3 p.p. of GDP, compared with +0.1 p.p. in 1999.

The marked deceleration of domestic demand, as well as the significant changes in its composition, showed a sharp reduction in the growth of imports of goods and services (from 9.1 per cent in 1999 to 5.1 per cent in 2000). This lower increase, in line with the acceleration of exports of goods and services (from 4.6 per cent in 1999 to 6.9 per

cent in 2000), resulted in a contribution of net external demand to GDP growth close to zero (-0.1 p.p. vis-à-vis -2.2 p.p. in 1999). It should be noted that in 2000 the growth of exports of goods stood below the growth of external demand, with a further significant loss of market share. This trend stands in contrast with that observed for the euro area as a whole, where the market share of exports increased slightly in 2000, after the accumulated falls recorded in the two previous years.

The *Banco de Portugal's* estimates for economic growth in 1998 and 1999 were both reviewed upwards (from 4.2 to 4.7 per cent in 1998 and from 3.0 to 3.4 per cent in 1999) (Table 1.1). On the one hand, these revisions reflect the adoption of a new basis for the annual national accounts made available by the National Institute of Statistics (Portuguese acronym: *INE*) for the period from 1995 to 1997 (in ESA95). These, in turn, implied an upward revision of the output growth in 1996 and 1997 (of 0.4 and 0.1 p.p., respectively, from the previous versions of the national accounts of the *INE* for 1996 and the *Banco de Portugal's* estimates for 1997, presented in the 1999 Annual Report). On the other hand, these revisions resulted also from an improvement of some estimation procedures, made available by the increased detail of those accounts and by the availability of new economic activity indicators.

The economic growth estimate for 2000 stands within the forecast range considered in the September 2000 EB (Table 1.2). However, the recomposition of growth was more significant than anticipated in September 1999, as regards both the deceleration of domestic demand and the reduction of the negative contribution of net external demand for GDP growth. Turning to domestic demand components, it should be noted that the growth of private consumption was closer to the lower limit of the range, with a sharper-than-expected deceleration, particularly in expenditure of durable consumer goods. GFCF in transport equipment and machinery decelerated also more markedly than expected. The contribution of the changes in stocks to growth was also more negative than forecast in September, partly due to special effects (changes introduced in taxes on vehicles, the drop in wine production, the rise in the oil price). In turn, the real growth of public consumption was above expectations. The behaviour of exports was less robust than forecast in the September EB, and the acceleration anticipated for the second half of the year did not occur. As a result of these developments, the increase in overall demand stood below forecasts in the September EB, particularly in its components with more import content, which was also reflected in a growth of imports considerably below that considered in September.

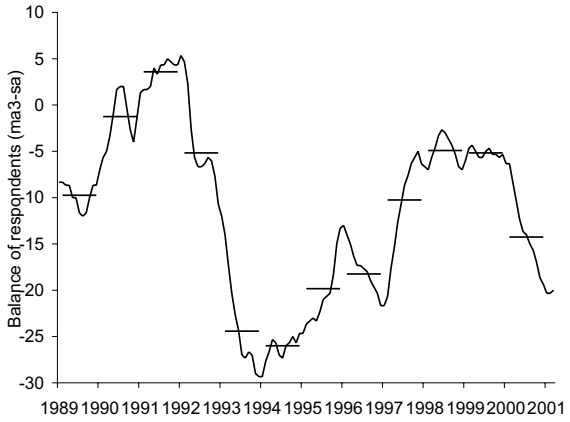
In 2000, private consumption increased by 2.8 per cent, in real terms, which corresponds to a sharp deceleration vis-à-vis the growth recorded in 1999 and 1998 (5.2 and 7.2, respectively). This change is qualitatively important: in 2000, the real growth of private consumption stood below that recorded by output, after a two-year period in which this increase largely exceeded GDP growth. This slowdown of household consumption expenditure occurred in line with a continued strong growth of real available income, which implied a reversal, in 2000, of the declining trend of the savings rate recorded in recent years.

The trend of real available income of households (3.5 per cent increase in 1999 and in 2000)[15] is chiefly explained by the behaviour of employment and real wages, that continued to record high growth rates. On the other hand, corporate income and property recovered in 2000, as a result of a less sharp reduction of net interest received by households. There was an increase in both interest received and interest paid — as a result of the interest rate increase — which continued to be more marked in interest paid, due to the strong increase of household indebtedness in recent years.

The deceleration of private consumption and the increase in the household savings rate in 2000 (of around 0.5 p.p.) may be explained by several factors. In 2000, consumer expectations changed significantly, which was reflected in the sharp reduction of the consumer confidence indicator in the course of 2000 (Chart 4.2). The environment of high international oil prices, albeit only partly transmitted to consumers in fuel prices, may have

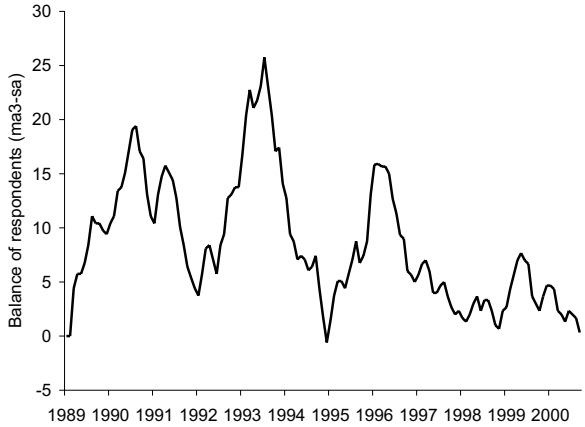
(15) The figures reported refer to the available income after adjustment of the changes in the net participation of households in pension funds. This adjustment represents the adjustment required so that households savings reflect the changes in mathematical reserves over which households have defined rights and that are fed by premiums and contributions entered in the available income as social contributions.

Chart 4.2
CONSUMER CONFIDENCE INDICATOR



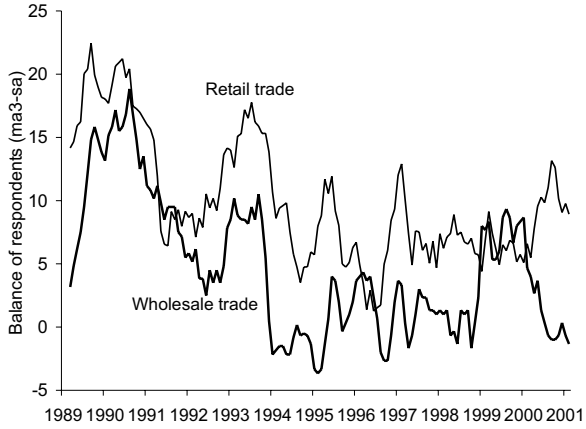
Source: European Commission.

Chart 4.3
ASSESSMENT OF STOCKS IN INDUSTRY



Sources: *INE* "Monthly Manufacturing Industry Survey".

ASSESSMENT OF STOCKS IN RETAIL AND WHOLESALE TRADE



Sources: *INE* "Monthly Trade Survey".

contributed to the deterioration of prospects on overall economic activity. The reversal of the interest rate trend contributed also to the decrease of consumer confidence. The interest rate increase and the high indebtedness levels attained by households led to a rise in household expenditure with both interest payments and loan repayments (see section 2.2). It is important to note that, while interest payments imply a reduction in available income, loan repayments should be financed through savings.(16) These different factors contributed, in particular, to the strong deceleration in consumption of durable goods.

In 2000, public consumption recorded a real growth of 3.6 per cent (4.9 per cent in 1999), 0.4 p.p. above GDP growth. In nominal terms, public consumption grew by 10.6 per cent, after a 9.9 per cent change in 1999. As mentioned in section 3, expenditure with personnel increased again significantly in 2000 (by 9.6 per cent), at a level similar to that recorded in 1999 (9.3 per cent), reflecting a significant increase in the number of government employees and an increase in pay *per capita* highly above the 2.5 per cent contractual wage increase.

Gross capital formation (including GFCF and stock changes) recorded a real growth of 2.8 per cent in 2000, decelerating vis-à-vis 1999 (by 5.3 per cent). This trend was, to a large extent, determined by the stock changes component, whose contribution to GDP growth was markedly negative, contrary to developments in the previous year (-0.3 p.p. in 2000, +0.1 p.p. in 1999). Qualitative surveys to industry and trade point to some decline in stock changes (Chart 4.3). In addition, there may have been stock reductions in some specific sectors (oil refineries, vineyard industry, vehicle retail trade), with a significant impact on overall stock changes.

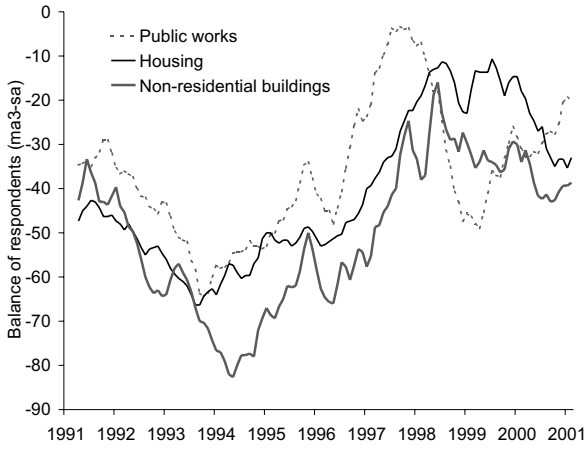
GFCF decelerated also (a 4.0 per cent increase, in real terms, compared with 5.2 per cent in 1999), as a result of the equipment component. This deceleration extended to investment in machinery and transport equipment. It should be noted that,

(16) Note that the assessment of available income of households deducts interest paid (and adds interest received) but not loan repayments.

Chart 4.4
EXPORTS EXPECTATIONS IN THE FORTHCOMING MONTHS-INDUSTRY

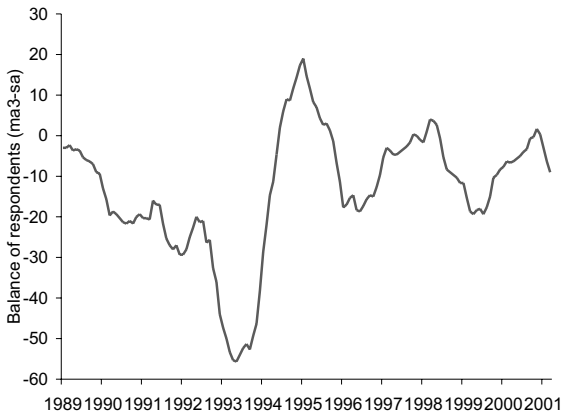
Source: European Commission.

Chart 4.5
ORDER BOOK OF THE CONSTRUCTION AND PUBLIC WORKS SECTOR
Major subsectors



Sources: *INE*, "Construction and Public Works Monthly Survey".

Chart 4.6
ASSESSMENT OF THE LEVEL OF THE ORDER BOOK FOR EXPORTS IN INDUSTRY



Source: European Commission.

in the second case, investment in other transport equipment except motor vehicles was particularly affected. This deceleration of GFCF in equipment was the result of strong increases recorded in previous years and is probably associated with some deterioration of growth prospects for the national and international economy. It is likely that the maintenance of the international prices of raw materials at high levels, particularly oil, has contributed to a higher uncertainty regarding demand prospects, in particular external demand. According to the survey on manufacturing industry, the balance of respondents on the quarterly issue of exports expectations in the forthcoming months pointed to a reduction in the second half of 2000 (Chart 4.4).

Turning to investment in construction, 2000 saw a slight acceleration. There was, however, a mixed behaviour in the public works and building construction sub-sectors, illustrated by the results of the qualitative surveys on construction and public works (Chart 4.5). The acceleration of GFCF in public works was, to a large extent, a result of the significant growth of works promoted in the course of 1999 (94.9 per cent, in value). As regards GFCF in residential construction, the slowdown is suggested by the trend of credit to households for housing purposes that recorded a deceleration (20.0 per cent in December 2000, compared with 29.7 per cent in December 1999). This deceleration of household expenditure is justified by the high indebtedness levels attained, by the interest rate increase[17], and by the changes introduced in the subsidised system for house purchase.

Exports of goods and services accelerated in 2000. In real terms, growth reached 6.9 per cent, compared with 4.6 per cent in 1999. The acceleration was particularly apparent in exports of ser-

(17) The interest rates on lending operations at more than 5 years to households and emigrants recorded average values of 5.0, 6.0 and 6.9 per cent, in December 1999, June and December 2000, respectively.

Chart 4.7

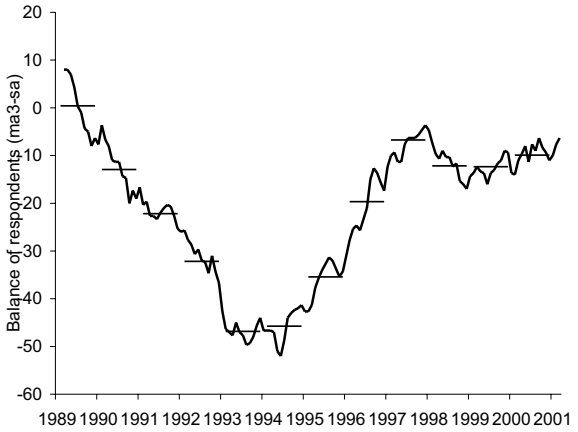
INDUSTRIAL CONFIDENCE INDICATOR

Source: European Commission.

TRADE CONFIDENCE INDICATOR

Sources: *INE* "Monthly Trade Survey".

CONSTRUCTION CONFIDENCE INDICATOR



Source: European Commission.

vices, whose growth rate went up from 2.9 to 9.7 per cent, due to a large extent to the good behaviour of tourism revenue. The real growth of exports of goods was 6.0 per cent, with only a slight deceleration vis-à-vis 1999 (5.5 per cent). In 2000, the euro area economy accelerated strongly, in line with the favourable trend of the external environment. This area concentrates a significant share of Portuguese external trade, wherefore 2000 witnessed a higher growth of external demand for Portuguese products. However, the growth of Portuguese exports was below growth in the relevant market, with an important loss of market share, thus maintaining the trend recently observed (see Box 2 – *Recent behaviour of Portuguese exports)*

The deceleration of growth of overall demand (from 5.1 per cent in 1999 to 3.8 per cent in 2000), as well as the changes in its composition, led the volume growth of imports of goods and services to decline from 9.1 per cent in 1999 to 5.3 per cent in 2000. The deceleration in the consumption of durable goods and investment in transport equipment and other equipment, components of overall demand with a high import content, as well as the strong decline in stock changes, were reflected in a reduction of the elasticity of imports vis-à-vis overall demand.

In sectoral terms, the trend of activity in 2000 was featured by a slight acceleration of construction and industry, with a lower growth in services, particularly wholesale and retail trade (see Chart 4.7). However, the services sector, together with the construction sector, continued to be among the most buoyant sectors. Activity in the agriculture, forestry and fishing sector recorded a marked fall in 2000, after the strong increase observed in 1999.

5. EMPLOYMENT AND WAGES

In 2000, the labour market trend continued to be characterized by a strong growth of total employment and employees, by an increase in the activity rate and by a further reduction of the unemployment rate. As regards wages, real compensation per employee continued to increase significantly.

Total employment increased by 1.7 per cent in 2000 (1.8 per cent in 1999). The major contributions to output growth in 2000 continued to stem from the services sector — including the General Government — and from the construction sector, that

are more labour intensive, thus helping to explain the recent strong growth of employment. On the other hand, the average duration of the working schedule was further reduced in 2000, implying that the number of hours worked recorded again a less significant increase than the change in the number of employees (1.0 per cent in 2000, 0.7 per cent in 1999).

Employees continued to increase more than total employment (2.5 per cent in 2000, after 3.3 per cent in 1999). It should also be noted that the number of employees with permanent contracts increased further (by 0.8 per cent, compared with 1.4 per cent in 1999.

The participation rate of people aged between 15 and 64 increased by 0.5 p.p. in 2000 to 71.1 per cent in annual average terms. In turn, the number of unemployed declined by 7.7 per cent, in annual average terms, in 2000. This increase represents, in part, a cyclical phenomenon but is also explained by the trend increase in the women's participation rate (0.9 p.p. em 2000). Consequently, the unemployment rate continued on a downward path, standing at 4.0 per cent in annual average terms (4.4 per cent in 1999), well below the estimated natural unemployment rate (approximately 5 per cent).

Wage developments continued to increase well above the euro area average. In 2000, the nominal rate of change in compensation per employee in the private sector stood at 5.2 per cent (0.3 p.p. higher than in 1999), clearly above wages agreed in collective bargaining, in line with the conditions prevailing in the labour market. Thus, real wages grew again strongly — by approximately 2.1 per cent (2.4 per cent in 1999) — therefore exceeding the growth of productivity per employee.

As regards 2001, information available on the current trend of wages does not show any signs of moderation. The update of the wage scale of government employees by 3.7 per cent, 1.2 p.p. more than in the previous year, in the wake of a commitment of the authorities to compensate deviations between the actual and expected inflation for the previous year, had clearly unfavourable signalling effects for the private sector. The rather preliminary information on collective bargaining for the first months of 2001 points to continued high nominal wage increases, probably evincing an acceleration vis-à-vis 2000.

6. INFLATION

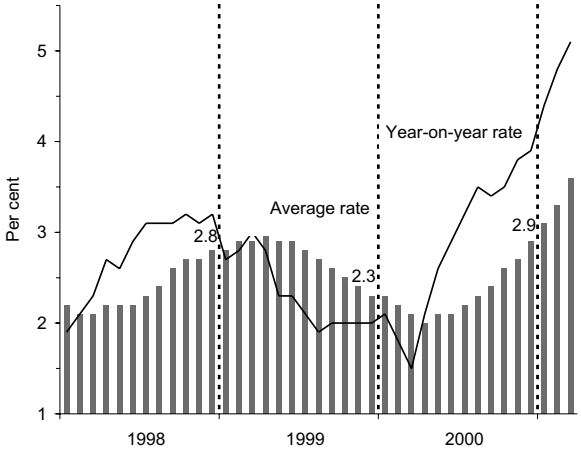
The annual average rate of change of the Consumer Price Index (CPI) rose from 2.3 per cent in 1999, to 2.9 per cent in 2000 (see Chart 6.1), while the annual average rate of change of the Harmonised Index of Consumer Prices (HICP) increased to 2.8 per cent in 2000 from 2.2 per cent in 1999 (see Chart 6.2).[18] At the beginning of 2001, the unfavourable behaviour of consumer prices was more pronounced, with the annual average changes in both indices attaining 3.6 per cent in March.

The rise in the inflation rate corresponded to a gradual acceleration of prices as of April 2000, which became more marked in early 2001. Thus the year-on-year change of the CPI went up from 1.8 per cent in the first quarter of 2000 to 2.5, 3.4, 3.7 and 4.8 per cent, respectively in the second, third and fourth quarters of 2000, and the first quarter of 2001. The inflation trend indicators, usually calculated by the *Banco de Portugal*, increased also from the end of the first quarter of 2000, albeit less markedly than the overall index indicator (Chart 6.3). The stronger acceleration of the CPI, as regards that of trend measures, chiefly reflected the significant growth of the prices of unprocessed food, featured by high volatility, and the increases in fuel consumer prices observed at the end of March 2000 and in early January 2001. Therefore, the year-on-year change of the CPI excluding unprocessed food and energy products, which had been 2.5 per cent in December 1999, stood at 2.8 and 3.4 per cent in December 2000 and March 2001, respectively.

Taking the overall HICP into account, the inflation differential vis-à-vis the euro area as a whole widened from 0.3 p.p. in the fourth quarter of 1999 to 1.0 and 2.2 p.p., in the fourth quarter of 2000 and in the first quarter of 2001, respectively. This significant widening reflected chiefly the different procedure of fixing fuel prices in the consumer in

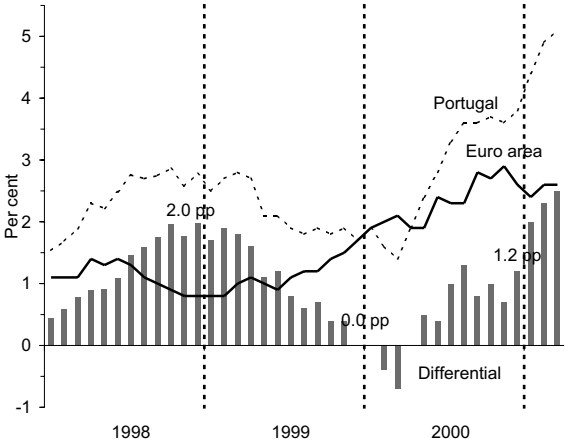
(18) The annual rates of change of the HICP in 2000 are influenced by the methodological changes introduced in this index at the beginning of the year, in particular as regards consumption by non-residents. For this reason, the analysis of prices is chiefly based on the CPI, except for the evolution of the inflation differentials vis-à-vis other countries or the euro area as a whole. In this case, despite the above limitations, the most appropriate measure will still be the HIPC.

Chart 6.1
CONSUMER PRICE INDEX
Year-on-year and average rates of change



Source: *INE*.

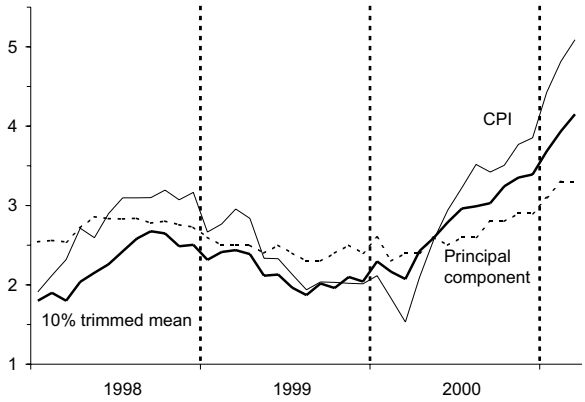
Chart 6.2
HICP IN PORTUGAL AND IN THE EURO AREA AS WHOLE
Year-on-year rate of change and differential



Sources: Eurostat, *INE* and *Banco de Portugal*.
Note: HICP figures for 1997 were adjusted according to the indication appearing in the Box of the 1998 Annual Report: "*Changes to the HICP: Estimate of the revision of the inflation levels for 1998*".

Portugal and in the other countries of the euro area (Chart 6.4). The widening of the differential also reflected the more unfavourable trend of food prices in Portugal, vis-à-vis that recorded in the other countries. This evolution was due both to higher base effects (i.e., lower relative growth in 1999) and to more adverse meteorological conditions.(19)

Chart 6.3
TREND MEASURES
Year-on-year rates of change



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

Excluding energy and unprocessed food products and also annuling the impact of methodological changes introduced in the HICP related with the addition of expenditure by non-residents(20), the inflation differential narrowed from 1.4 p.p. in the fourth quarter of 1999 to 1.1 p.p. in the first quarter of 2000. It subsequently rose to 1.2, 1.5, 1.5 and 1.6 p.p., respectively in the second, third and fourth quarters of 2000 and in the first quarter of 2001. Therefore, excluding fuels and unprocessed food products, the upward trend of consumer prices in Portugal will have been similar to that observed in the other euro area countries, albeit at a higher inflation level. The persisting high differential may partly result from structural factors, but is chiefly due to the tense situation in the labour market, more severe than in the euro area as a whole. It should be noted that in the case of ser-

(19) It should be noted that the effects of these irregular behaviours in the overall development of consumer prices in Portugal is more significant due to the higher weight of unprocessed food in the overall index (12.7 per cent in the HICP in Portugal, compared with 8.2 per cent in the euro area as a whole) — see Box 3 – *Goods and services inflation indicators.*

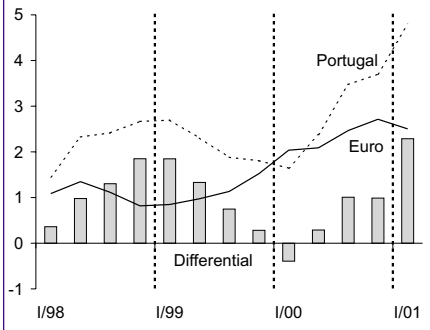
(20) One of the methodological changes introduced in the HICP in January 2000 was the introduction of consumption by non-residents. Since the new index was linked to the previous one by chain rates of change as from December 1999, and due to the strong seasonal nature of prices of accommodation services, the trend of the year-on-year rate of the HICP in 2000 was biased upwards / downwards in the periods of the year with higher / lower tourist flows.

Chart 6.4

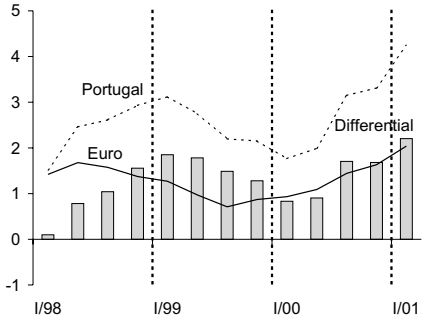
HICP IN PORTUGAL AND IN THE EURO AREA – TOTAL AND AGGREGATES

Year-on-year rates of change and differentials

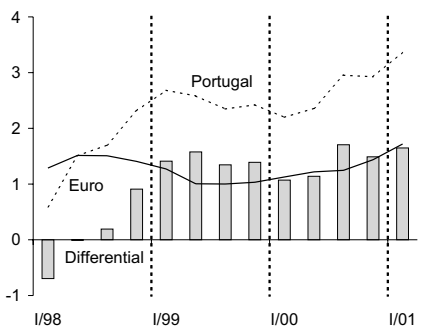
Total



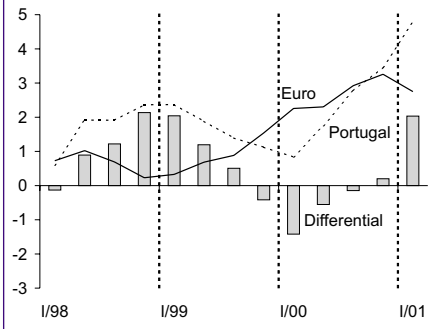
Total excluding energy



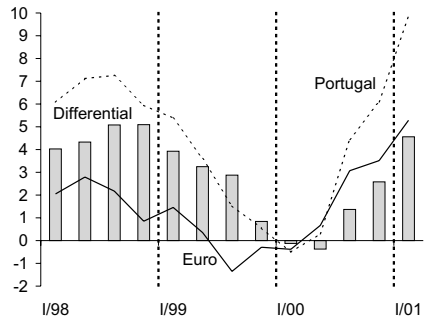
Total excluding energy and unprocessed food



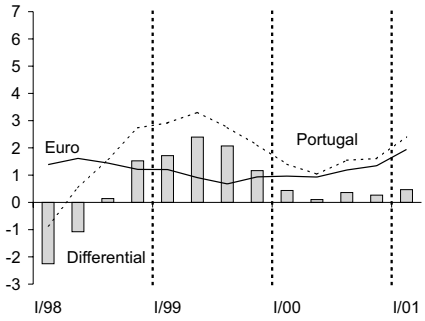
Goods



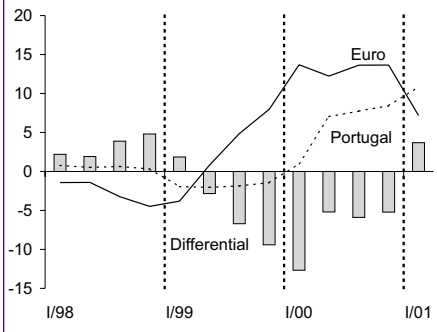
Unprocessed food



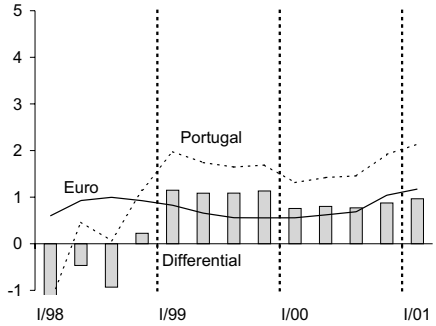
Processed food



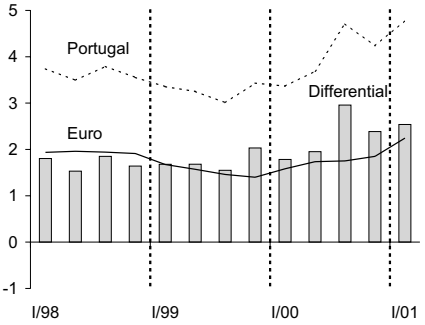
Energy



Non-energy industrial goods



Services



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

Note: HICP figures for 1997 were adjusted according to the indication appearing in the Box of the 1998 Annual Report: "*Changes to the HICP: Estimate of the revision of the inflation levels for 1998*".

vices prices, particularly sensitive to wage developments, the differential vis-à-vis the euro area has stood between 2 and 3 percentage points since the second quarter of 2000.

7. BALANCE OF PAYMENTS

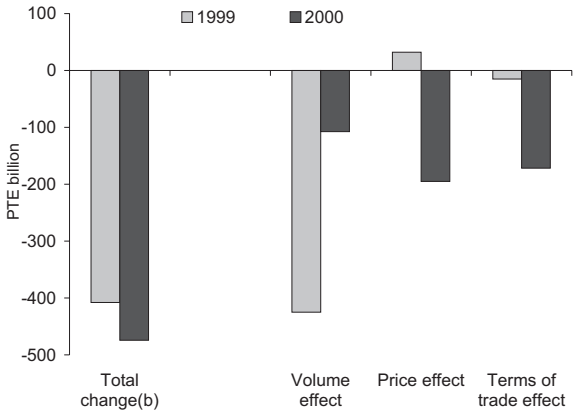
The deficit for the current account and the capital account as a whole attained 8.5 per cent of GDP in 2000, compared with 6.2 per cent in 1999 (Table 7.1; see also Box 4 – *External borrowing requirements of the Portuguese economy*). A significant part of this increase was determined by the behaviour of the goods account, with a deficit equivalent to 13.3 per cent of GDP in 2000, compared with 11.9 per cent in 1999. As can be seen in Chart 7.1, the increase in the goods deficit was chiefly the result of an unfavourable price effect — associated with the strong increase of external trade deflators — and of an also unfavourable effect of the terms of trade (a loss of 2.6 per cent in terms of trade in the trade of goods in 2000) associated with the rise in the international oil price. The volume effect, contrary to the previous year, made a lower contribution to the widening of the goods deficit, due to the strong reduction in imported volumes and to the slight acceleration of exports. The services account posted a surplus increase of approximately 0.2 p.p. of GDP, chiefly due to the strong growth of tourism receipts.

The income account deficit deteriorated — from 1.3 per cent of GDP in 1999 to 1.6 per cent of GDP in 2000 — in line with the increase in the external debtor position of Portuguese economy over recent years, as a result of the accumulation of deficits in the current account and the capital account as a whole.

In 2000, public transfers from the European Union — either current transfers or capital transfers — decreased as a result of delays related with the implementation of the new community support framework, a situation that is expected to be reversed in 2001. As a result, the current transfers balance and, in particular, the capital account balance decreased vis-à-vis 1999 (by 0.2 and 0.7 p.p. of GDP, respectively).

Reflecting the new increase in the recourse of Portuguese economy to external borrowing, the financial account recorded capital inflows equivalent to 10.6 per cent of GDP in 2000 (7.4 per cent of GDP in 1999). These inflows were the result, on the one hand, of an increase in net indebtedness of resident banks, through lending and deposit operations with non-resident banks registered as other investment (10.5 per cent of GDP, compared with 6.8 per cent of GDP in 1999). On the other hand, there were also fund inflows as a result of operations carried out within the scope of the TARGET system, registered as changes in liabilities of Monetary Authorities (4.3 per cent of GDP, compared

Chart 7.1
BREAKDOWN OF THE CHANGE IN THE TRADE BALANCE (GOODS)[(a)]



Notes:
(a) The change in the trade balance can be broken down into:
- volume effect - effect of the change of exported and imported volumes
$[X_{t-1}.Vx_t.(1+Px_t)]-[M_{t-1}.Vm_t.(1+Pm_t)]$
- price effect - effect of the average growth of external trade prices
$(X_{t-1}.P_t)-(M_{t-1}.P_t)$
- Terms of trade effect - effect of the relative change in export and import prices
$[X_{t-1}.(Px_t-P_t)]-[M_{t-1}.(Pm_t-P_t)]$

Where:
X_{t-1} and M_{t-1} – exports and imports in year *t-1*, at current prices
Vx_t and Vm_t – growth of exports and imports, in volume terms, in year *t*
Px_t and Pm_t – growth of export and import prices, in year *t*
P_t – average growth of external trade prices, in year *t* $[(Px_t + Pm_t) / 2]$
Note that the volume effect includes the price-volume cross effect, so that the sum of the three effects adds up to the total change. This cross-effect, however, is not significant.
(b) A negative change means an increase in the trade deficit.

Table 7.1

BALANCE OF PAYMENTS – on a transactions basis

EUR million

	1998			1999			2000	Balance as a % of GDP		
	Balance	Debit	Credit	Balance	Debit	Credit	Balance	1998	1999	2000
Current account	**-6 986.8**	**50 854.1**	**41 816.4**	**-9 037.7**	**58 564.3**	**47 098.6**	**-11 465.7**	**-6.9**	**-8.3**	**-9.9**
Goods	-10 917.8	36 818.1	23 866.8	-12 951.3	42 150.8	26 831.7	-15 319.0	-10.7	-11.9	-13.3
Services	1 726.3	6 507.8	8 152.4	1 644.6	7 214.5	9 168.0	1 953.5	1.7	1.5	1.7
Transports	-263.0	1 900.5	1 370.9	-529.6	2 216.2	1 543.0	-673.1	-0.3	-0.5	-0.6
Travel	2 818.8	2 124.1	4 957.9	2 833.8	2 425.3	5 730.8	3 305.6	2.8	2.6	2.9
Insurance services	-11.6	95.9	65.1	-30.8	92.6	53.0	-39.6	0.0	0.0	0.0
Royalties and licence fees	-234.0	283.6	23.4	-260.1	274.8	22.3	-252.5	-0.2	-0.2	-0.2
Other services	-416.4	1 860.4	1 646.9	-213.4	1 946.0	1 711.8	-234.1	-0.4	-0.2	-0.2
Government services	-167.5	243.4	88.2	-155.2	259.7	107.0	-152.7	-0.2	-0.1	-0.1
Income	-1 465.8	5 519.8	4 119.3	-1 400.5	7 120.6	5 322.3	-1.798.4	-1.4	-1.3	-1.6
Compensation of employees	69.4	119.2	147.1	27.9	135.2	163.9	28.7	0.1	0.0	0.0
Investment income	-1 535.3	5 400.6	3 972.2	-1 428.4	6 985.4	5 158.4	-1 827.0	-1.5	-1.3	-1.6
Current transfers	3 670.6	2 008.3	5 677.9	3 669.6	2 078.4	5 776.6	3 698.2	3.6	3.4	3.2
Official transfers	681.2	1 409.7	1 940.7	531.0	1 420.7	1 619.7	199.1	0.7	0.5	0.2
Private transfers	2 989.3	598.6	3 737.2	3 138.5	657.7	4 156.8	3 499.1	2.9	2.9	3.0
Capital account	**2 248.2**	**172.5**	**2 496.3**	**2 323.8**	**183.8**	**1 851.0**	**1 667.3**	**2.2**	**2.1**	**1.4**
Transfers	2 234.8	124.3	2 456.8	2 332.5	141.3	1 791.0	1 649.7	2.2	2.1	1.4
Official transfers	2 212.9	8.2	2 325.4	2 317.2	23.8	1 673.2	1 649.4	2.2	2.1	1.4
Private transfers	21.9	116.1	131.3	15.2	117.5	117.8	0.3	0.0	0.0	0.0
Acquisition / disposal of non-produced, non-financial assets	13.4	48.2	39.6	-8.7	42.4	60.0	17.6	0.0	0.0	0.0
Current account + capital account	**-4 738.6**	**51 026.6**	**44 312.8**	**-6 713.9**	**58 748.0**	**48 949.6**	**-9 798.4**	**-4.7**	**-6.2**	**-8.5**
Financial account	**5 682.9**	**860 935.5**	**868 933.3**	**7 997.9**	**820 227.7**	**832 410.0**	**12 182.3**	**5.6**	**7.4**	**10.6**
Direct investment	164.7	19 871.6	17 749.1	-2 122.5	28 002.8	26 246.6	-1 756.2	0.2	-2.0	-1.5
Portuguese investment abroad	-2 659.2	8 240.7	5 057.2	-3 183.5	11 117.1	4 751.5	-6 365.6	-2.6	-2.9	-5.5
Foreign investment in Portugal	2 824.0	11 630.9	12 691.9	1 061.0	16 885.7	21 495.1	4 609.4	2.8	1.0	4.0
Portfolio investment	-583.7	184 230.8	187 639.0	3 408.2	134 349.7	133 380.4	-969.3	-0.6	3.1	-0.8
Assets	-5 452.2	113 734.2	107 652.5	-6 081.7	54 300.5	50 495.5	-3 804.9	-5.4	-5.6	-3.3
Liabilities	4 868.4	70 496.6	79 986.4	9 489.9	80 049.2	82 884.8	2 835.7	4.8	8.7	2.5
Financial derivatives	115.2	2 349.3	2 538.4	189.1	3 477.6	3 629.8	152.2	0.1	0.2	0.1
Other investment	6 465.2	614 321.3	621 136.3	6 815.0	597 954.9	613 114.1	15 159.2	6.4	6.3	13.2
Assets	-6 339.5	16 826.7	167 227.3	400.6	196 755.8	185 993.7	-10 762.1	-6.2	0.4	-9.3
Liabilities	12 804.7	447 494.6	453 909.0	6 414.4	401 199.0	427 120.3	25 921.3	12.6	5.9	22.5
Reserve assets	-478.5	40 162.5	39 870.5	-291.9	56 442.7	56 039.2	-403.6	-0.5	-0.3	-0.4
Errors and omissions	**-944.3**			**-1 284.0**			**-2 383.9**	**-0.9**	**-1.2**	**-2.1**

with net outflows equivalent to 0.6 per cent of GDP in 1999). Finally, there were also fund inflows as portfolio investment by non-residents in government bonds of the Portuguese State, albeit to a smaller amount than in the previous year (2.4 and 6.1 per cent of GDP, in 2000 and 1999, respectively). Non-financial corporations and households as well as non-monetary financial institutions were behind net outflows of funds.

8. CONCLUSION

In previous issues of the Economic Bulletin, *Banco de Portugal* has alerted to the need of a deceleration of domestic demand, taking into account, in particular, the high levels attained by external borrowing and indebtedness. The participation of Portugal in the euro area makes it possible to maintain an imbalance between supply and demand during much longer periods than before. However, this does not mean that this imbalance may persist indefinitely. This is all the more so as no structural changes seem to be occurring in the Portuguese productive structure, that might contribute significantly, on the supply side, to the rebalance of the financing of the economy.(21) Therefore, an adjustment in domestic demand is not only desirable, but also inevitable.

Against this background, the present deceleration in domestic demand is welcome. In the light of the estimates presented in this Economic Bulletin, it seems to have been more pronounced than previously forecast. Emphasis should be laid, in particular, on the deceleration of private consumption (namely expenditure in durable consumer goods) and business investment in equipment (machinery and transport equipment). Moreover, public expenditure restraint was chiefly a result of the reduction in investment directly made by the general government, partly associated with delays in the implementation of the new Community Support Framework, given that public consumption, albeit decelerating from 1999, recorded a higher than forecast increase, above that of GDP. Therefore, despite the limited contribution of the fiscal policy, it seems clear that the process of adjustment of domestic demand started in 2000 and was duly reflected on the moderation of import growth.

Against this background, it is worth emphasising the development of the savings rate of households, which reversed the downward trend observed in recent years. This rise of the savings rate is likely associated with the increase in the debt service of households, which resulted from the combined effect of the rise in interest rates and in the indebtedness level, and was, in parallel with the deceleration of investment in housing, an important component of the process of endogenous adjustment of the Portuguese economy.

While the trend of domestic demand in 2000 is in line with the desirable adjustment process, the trend of exports of goods represents a negative finding. In effect, despite the very favourable external framework in 2000, exports of goods accelerated slightly from 1999, with a growth in volume well below forecasts. As a result, there was a further significant loss of market share, in addition to that observed since 1997. Therefore, although the expected recomposition of growth of economic activity did in fact occur, the contribution of exports was lower than expected. Given that the disappointing behaviour of exports of goods seems to reflect, to a large extent, structural factors related with an inadequate sectoral specialisation, it is difficult to foresee compensatory market gains in the near future, particularly if a deceleration of external demand takes place and the increase in unit labour costs are higher than in the major trading partners.

As a result, despite the past decelerations in consumption and investment, and taking into account that external borrowing requirements attained a very high level in 2000, the process of adjustment of domestic demand must proceed in the near future. It is crucial that fiscal policy makes an important contribution to that adjustment, with particular emphasis on the need to contain the growing trend of primary current expenditure. This will also make it possible to sustain the fiscal consolidation process, given the possible deceleration of general government revenue that will result from a lower growth of economic activity and from a composition of growth generating less tax revenue.

(21) Even in a context of favourable structural changes, sustained by increases in the rate of change of productivity, the wealth effects normally associated with it will tend to imply, in a transition stage, a strong expansion of aggregate demand, increasing the vulnerability of the economy to adverse internal and external shocks during this period, despite the increase in the indebtedness capacity of the economy.

Box 1 – GENERAL GOVERNMENT DEFICIT AND DEBT IN PORTUGAL: RECENT DEVELOPMENTS AND MEDIUM-TERM PROSPECTS

According to the European Commission (Spring 2001 Economic Forecasts), in 2000 Portugal recorded the highest general government deficit in the European Union (EU)[(1)] (Chart 1). Despite the downward trend of the deficit observed in recent years, which has enabled Portugal to meet or even exceed the targets set in the successive medium-term programmes, the analysis of the budget outturn in the EU as a whole confirms the deterioration of Portugal's relative position. In fact, in 1998 there were still five countries which recorded deficits equal to or exceeding that of Portugal (Greece, Spain, France, Italy and Austria), which stood relatively close to that of the EU average. It should be noted that this deterioration of the relative position occurred despite the fact that the growth of the Portuguese economy in the period 1998-2000 stood above the European average.

The reason why developments in the fiscal position in Portugal have been substantially different from those observed in the remaining EU Member States may lie on the fiscal consolidation pattern followed in recent years. In the 1995-2000 period Portugal showed an improvement in the overall cyclically adjusted balance, similarly to all other EU Member States. However among the EU countries it is clearly the only one in which this improvement is reached in parallel with an increase in adjusted expenditure, which is more than offset by a very significant increase in adjusted revenue (Chart 2). With regard to the cyclically adjusted primary balance, Portugal is the only EU country that recorded a decrease in this variable over the same period (Chart 3), reflecting a clearly expansionary fiscal policy stance.

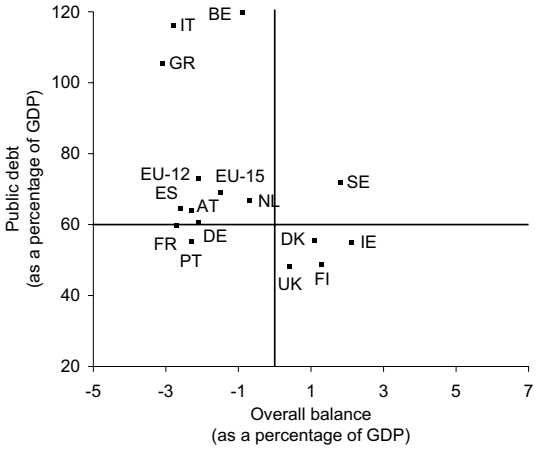
The public debt ratio in Portugal has followed a downward trend in recent years. However, as can be seen in Chart 1, the decline in public debt, as a percentage of GDP, has been less marked than in the remaining EU Member States. This is largely explained by the relatively low level of primary surpluses and by the fact that in 1999 and 2000 the settlement of debts by the Treasury, which were not recorded in the deficit of the respective year, exceeded the proceeds from privatisations allocated to debt redemption.

On 22 January the Portuguese government submitted the updated Stability and Growth Programme. This programme maintains the targets for the general government deficit set in its previous version: 1.1, 0.7, 0.3 and

Chart 1

OVERALL BALANCE AND PUBLIC DEBT IN THE EUROPEAN UNION

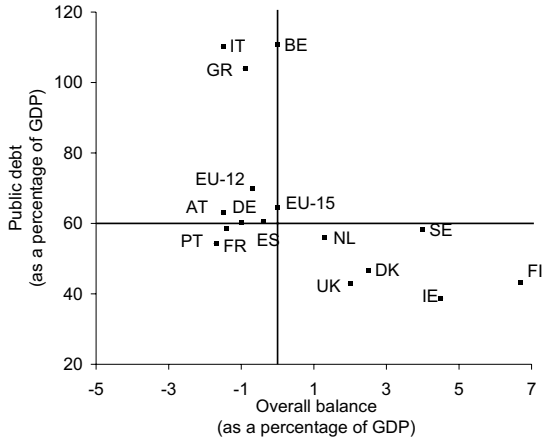
1998



Source: European Commission, Spring 2001.

OVERALL BALANCE AND PUBLIC DEBT IN THE EUROPEAN UNION

2000



Source: European Commission, Spring 2001.

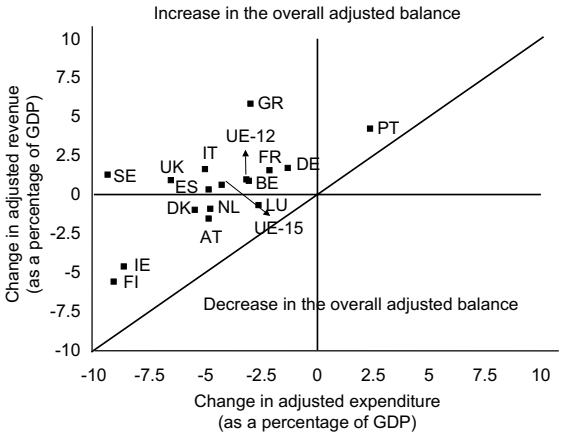
Note: The total balance excludes proceeds from the sale of UMTS licences.

(1) *Excluding proceeds from the sale of UMTS licences.*

Chart 2

CHANGE IN OVERALL ADJUSTED BALANCE

1995-2000

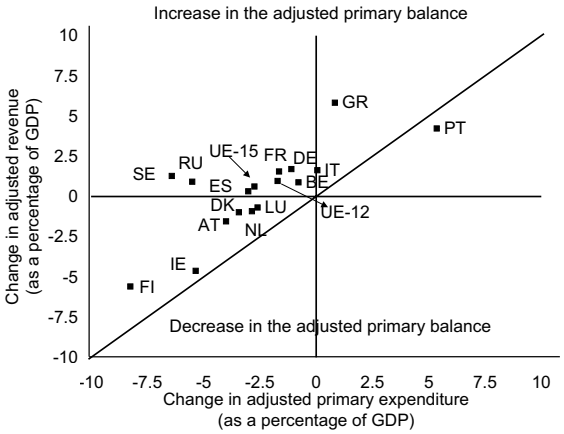


Source: European Commission, October 2000.

Chart 3

CHANGE IN ADJUSTED PRIMARY BALANCE

1995-2000

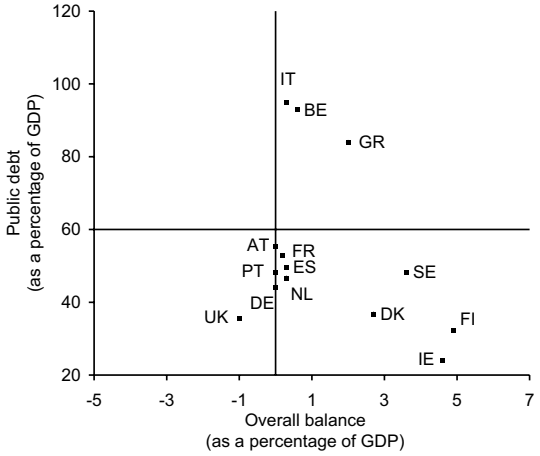


Source: European Commission, October 2000.

Chart 4

OVERALL BALANCE AND PUBLIC DEBT IN THE EUROPEAN UNION

2004



Sources: Updated Stability and Convergence Programmes.
Note: The figures for Ireland and Sweden refer to 2003.

0.0 per cent of GDP in 2001, 2002, 2003 and 2004 respectively. In this programme the current revenue to GDP ratio is forecast to increase by 1.7 percentage points (p.p.) from 2000 to 2004. In the same period primary current expenditure as a percentage of GDP is forecast to decrease by only 0.6 p.p. It should be noted that the reduction of primary current revenue forecast in the current programme is mostly concentrated in 2001 (-0.5 p.p. of GDP when compared with 2000). The debt ratio is expected to record a gradual decline from 55.6 per cent in 2000, to 48.1 per cent in 2004.

In the last projection year considered in the updated Stability and Convergence Programmes, Portugal is again in the group of countries that will simultaneously record fiscal balances close to balance and debt ratios below 60 per cent (Chart 4). However, it should be noted that a reduction of the deficit mainly based in the increase of current revenue makes more difficult the fulfilment of the targets for the deficit. Thus, the achievement of the Stability Programme target will represent a considerable fiscal consolidation effort, in the period under consideration, in particular if economic growth stands below the Programme forecasts.

Box 2 – RECENT BEHAVIOUR OF PORTUGUESE EXPORTS

Chart 1

EXPORTS, EXTERNAL DEMAND AND MARKET SHARE

Sources: DGREI, *INE*, *Banco de Portugal* and OECD (March 2001 - 23.03.01 Provisional values).

Table 1

EXPORT OF GOODS

Nominal rate of change

	1999	2000
Portugal	3.5	12.5
Spain	-1.9	20.6
Italy	-1.3	19.0
France	6.4	15.5
Germany	5.1	16.9
United Kingdom	4.5	19.3
Netherlands	7.5	20.1
Ireland	16.5	18.3
Austria	8.4	16.6
Belgium-Luxembourg	8.3	18.1
Denmark	7.9	15.0
Finland	1.6	25.7
Sweden	5.3	18.6
Greece	1.5	14.8

Sources: Portugal - *INE* (External Trade). Other countries: Eurostat - COMEXT.

Note: Portugal - For 1999, the rate of change is derived from final reported values for 1999 and 1998. In 2000, it is derived from the first version of 2000 and 1999.

In the past three years, Portuguese exports of goods recorded a growth lower than that of external demand addressed to Portuguese economy - measured as the weighted average of the growth rates, in volume, of imports of manufactured goods in countries of destination(1) — which resulted in losses in market share (Chart 1). This loss amounted to around 5 per cent in 2000 (2.3 per cent in 1999 and 3.7 per cent in 1998).

In 2000, the nominal growth in Portuguese exports of goods was substantially above that observed in the previous year, a behaviour similar to that recorded in all euro area countries which, to a large extent, resulted from a marked acceleration in selling prices abroad (Tables 1 and 2). It should be noted, however, that the nominal rate of change of exports in Portugal was considerably lower than that observed in most euro area countries in 2000. That year the change in export prices in Portugal was comparable to that registered in Spain and in Italy, which implied significantly less favourable changes in volume than in these countries.

An analysis of exports by groups of products, in real terms, suggests that losses in export market share in recent years are, to a large extent, related to the behaviour of exports of "clothing and footwear" (Table 3). Exports of this group of products — whose weight

Table 2

EXPORTS OF GOODS

Rate of change deflators

	1999	2000
Portugal	-1.6	6.2
Spain	-0.9	6.1
Italy	-0.3	5.7
France	-0.9	1.6
Germany	-0.5	3.5

Source: Portugal - *DGREI*. Other countries: Datastream.

Note: Portugal - The rate of 2000 corresponds to the period from January to November 2000.

(1) In the calculation, each market is weighted according to its importance in total Portuguese exports in the previous year.

Table 3

EXPORTS - DEVELOPMENTS BY GROUPS OF PRODUCTS[a]

	1999	1997			1998			1999			2000 Jan.-Nov.		
	Weight	Rates of change			Rates of change			Rates of change			Rates of change		
		Value	Volume	Price	Value	Volume	Price	Value	Volume	Price	Value	Volume	Price
Agricultural products	7.1	10.0	11.1	-1.0	3.0	0.0	3.0	1.6	0.2	1.4	14.0	9.4	4.2
Energy	1.8	11.3	0.1	11.2	-26.8	-10.0	-18.7	19.8	2.8	16.5	69.3	-4.1	76.5
Chemicals	6.8	19.9	18.3	1.3	8.1	14.0	-5.2	7.8	9.0	-1.1	30.4	14.0	14.4
Wood, cork and paper	9.4	14.3	8.1	5.7	4.3	-0.2	4.6	3.2	0.3	2.9	26.6	3.5	22.3
Hides, leather and textiles	7.8	16.7	10.6	5.5	5.9	2.3	3.5	2.2	2.7	-0.5	8.8	4.9	3.7
Clothing and footwear	20.2	5.3	1.7	3.5	0.7	-2.1	2.9	-1.4	-4.0	2.8	-3.2	-7.2	4.3
Minerals and metals	5.9	13.6	12.8	0.7	10.2	10.5	-0.2	7.1	9.1	-1.8	21.6	11.6	9.0
Machinery	19.0	8.9	15.9	-6.0	18.0	25.7	-6.1	11.5	24.5	-10.4	17.1	24.1	-5.7
Transport equipment	15.3	10.0	14.4	-3.8	8.7	8.6	0.1	0.2	2.4	-2.2	6.3	-1.1	7.5
Miscellaneous finished products	6.6	11.4	11.0	0.3	5.7	4.9	0.7	-1.7	-1.1	-0.6	9.4	7.0	2.3
Total	100.0	10.5	10.1	0.4	6.3	6.7	-0.3	3.5	5.2	-1.6	12.8	6.3	6.2
Total excluding clothing and footwear		12.1	12.7	-0.5	8.0	9.2	-1.2	4.8	7.7	-2.7	16.9	9.7	6.6
Total excluding transport equipment		10.6	9.3	1.2	5.9	6.3	-0.4	4.1	5.7	-1.5	14.1	7.7	6.0
Total excluding clothing and footwear and transport equipment		12.7	12.3	0.3	7.8	9.4	-1.5	5.9	9.0	-2.8	19.6	12.4	6.4

Source: *Direcção-Geral das Relações Económicas Internacionais.*

Note:

(a) Final data until 1999. For the period from January to November 2000, the implied nominal change was derived by the *Banco de Portugal* from preliminary reported data in the year vis-à-vis other preliminary data for the corresponding period of the previous year.

has been gradually declining but still corresponded to around 20 per cent of total sales abroad in 1999 — registered growing falls, in volume, over the past three years. It should be mentioned that the relative specialisation of Portuguese exports in this type of products has been disadvantageous for two reasons: on one hand, the European market of these products is characterised by a growth in demand below the average[(2)] and, on the other hand, these products face an increased competition from a significant number of emerging markets and transition economies with low labour costs. This conclusion extends to exports of other groups of so-called traditional products ("hides, leather and textiles" and "wood, cork and paper"), whose recent behaviour has also been marked by growth rates in volume considerably below the average.

In the past two years, the loss in share of Portuguese exporters may also be associated with the behaviour of exports of transport equipment- which not only grew below the average in 1999 but which even declined in 2000. It should be recalled that "transport equipment" contributed significantly — together with "machinery" — to the strong buoyancy of Portuguese exports in the period from the accession to the European Community to mid-1990s, helping to explain gains in market share obtained at that time. During that period there was a gradual change in the specialisation of the Portuguese exporting sector, with a growing weight in products with higher value added and with markets of higher growth potential. This change gave rise, to a large extent, to increases in the export capacity resulting from the implementation of industrial production units associated with direct foreign investment projects.

(2) See box on "Recent developments in Portuguese exports of goods", 1999 Annual Report of the Banco de Portugal.

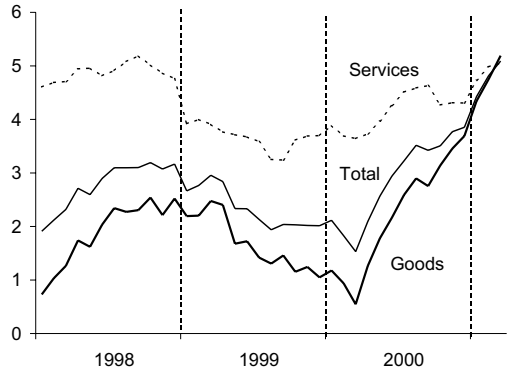
Box 3 – GOODS AND SERVICES INFLATION INDICATORS

The Banco de Portugal has computed several indicators on the basis of the Consumer Price Index (CPI) disclosed by the "Instituto Nacional de Estatística" (INE), with a view to making a deeper analysis of the trend of inflation in the Portuguese economy. With this aim in view, the CPI was broken down in the past into a tradable goods price index and a non-tradable goods and services price index.(1) The non-tradables price index should supply information on the influence of internal factors on inflation. In turn, in a context of increasing liberalisation of the international goods trade, the behaviour of the tradables price index should supply more direct information on the influence of both international price developments and foreign exchange developments on Portuguese inflation.

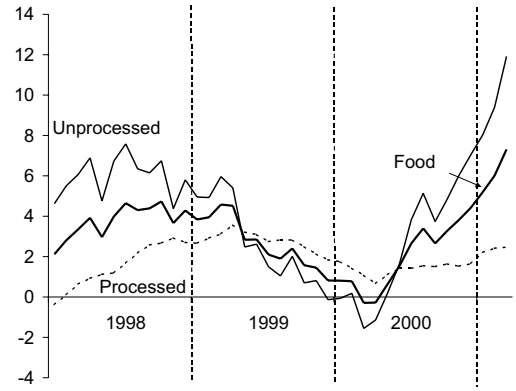
However, operational difficulties, together with considerations of a conceptual nature, led the Banco de Portugal to decide to calculate new aggregates from January 2001 onwards. From the operational point of view, it was difficult to establish a stable boundary between tradables and non-tradables, in particular with regard to a special category within the latter — products with directly or indirectly administratively-fixed prices —, given that the price formation mechanism has been progressively changed, with a reduction of administrative intervention. From the conceptual point of view, a component of consumer tradable goods prices corresponds to the payment of a sale service, which is non-tradable. Moreover, admitting that price formation generally follows a mark-up rule, the profit margins on costs will tend to reflect not only the pressure of external competition, but also the relative cyclical position of the national economy.

Taking into account the previous considerations, the calculation of tradables and non-tradables price indices was discontinued, and replaced by the analysis of the breakdown into different types of goods and services. Thus, based on the 98 sub-indices of the CPI, 1997 basis (corresponding to the most disaggregated level of the overall index published by the INE) four goods aggregates and one services aggregate were calculated and are described in Table 1: unprocessed food, processed food, non-energy industrial

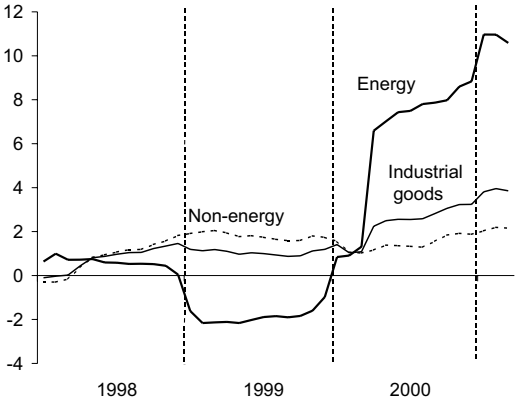
Chart 1
CONSUMER PRICE INDEX
Total, goods and services
Year-on-year rates of change



Total processed and unprocessed food
Year-on-year rates of change



Industrial goods, energy and non-energy
Year-on-year rates of change



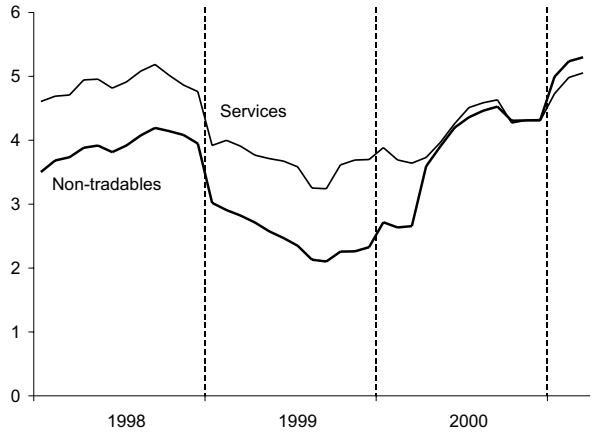
Sources: *INE* and *Banco de Portugal*.

(1) *See T. Nascimento (1990), Indicadores de Inflação, Economic Bulletin of the Banco de Portugal, Volume 12, No. 4, December 1990.*

goods, energy and services. This breakdown was not arbitrary, corresponding, in fact, to the breakdown of the Harmonised Index of Consumer Prices (HICP)[2] made by Eurostat. Thus, the breakdown available for the CPI is of the same type as that already disclosed for the HICP.[3]

The evolution of the five CPI aggregates can be seen in Chart 1. The aggregates aim at capturing behaviours, which can be sizeably different and unidentifiable through the simple analysis of the trend of the overall index. For example, unprocessed food prices can be largely affected by weather conditions and thus tend to be highly volatile. It should also be noted that developments in services prices are necessarily similar to those in the former non-tradables aggregate (Chart 2), as many of the respective sub-indices are common.

Chart 2
CONSUMER PRICE INDEX
Services and non-tradables
Year-on-year rates of change



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

It should be noted that from January 2001 onwards, developments in the CPI and in the respective aggregates started being quite similar to those in HICP, which had not occurred during 2000. It should be remembered that the year-on-year rates of change in the HICP in 2000 were influenced by the methodological changes introduced in this index at the beginning of the year, in particular with regard to consumption by non-residents[4].

(2) With the methodological changes in the HICP in January 2000 the coverage of HICP and CPI products has become identical, while the geographical coverage started to differ regarding consumption by non-residents. In fact, in order to achieve harmonisation of the geographical coverage in all European Union member countries, from early 2000 onwards HICP weights started to reflect the consumption in the national territory. Expenditure by tourists is therefore also considered.

(3) It should be noted that disaggregated CPI data are normally available before those for the HICP, in particular at the time of preparation of the Monthly Economic Indicators of the Banco de Portugal.

(4) The new index has been linked to the former one with chain rates of change since December 1999, and there are not available figures for 1999 consistent with the methodological changes introduced in January 2000. Thus, given the strong seasonality of the consumption of goods and services by non-residents, the evolution of the year-on-year rate of change of the HICP in 2000 was upwards/downwards skewed in the periods in which there was an increase/decrease in the demand for these services.

Table 1

AGGREGATES OF THE CPI

Code	Designation
00.0.0	**CPI (overall index)**
A)	**Unprocessed food**
01.1.2	Meat
01.1.3	Fish
01.1.6	Fruit
01.1.7	Vegetables, leguminous and starches
B)	**Processed food**
01.1.1	Bread and cereals
01.1.4	Milk, cheese and eggs
01.1.5	Oils and fats
01.1.8	Sugar, jam, chocolate and confectionery
01.1.9	Spices, condiments, soups and food products n.e.c.
01.2.1	Coffee, tea and cocoa
01.2.2	Mineral water, soft drinks and juices
02.1.1	Spirits
02.1.2	Wine
02.1.3	Beer
02.2.1	Tobacco
C)	**Non-energy industrial goods**
03.1.1	Clothing materials
03.1.2	Garments
03.1.3	Other articles of clothing and clothing accessories
03.2.1	Footwear
03.2.2	Repair and hire of footwear
04.3.1	Mat. for the maintenance and repair of the dwelling
04.4.3	Water supply
05.1.1	Furniture and furnishings
05.1.2	Carpets and other floor coverings
05.2.1	Household textiles
05.3.1	Major household appliances
05.3.2	Small electric household appliances
05.4.1	Glassware, tableware and other household utensils
05.5.1	Major tools and equipment
05.5.2	Small tools and miscellaneous accessories
05.6.1	Non-durable household goods
06.1.1	Pharmaceutical products
06.1.2	Other medical products
06.1.3	Therapeutic appliances and equipment
07.1.1	Motor cars
07.1.2	Scooters and motor cycles
07.1.3	Bicycles
07.2.1	Spare parts and accessories
09.1.1	Equipment of sound and pictures
09.1.2	Photographic and cinematographic equipment and optical instruments
09.1.3	Information processing equipment
09.1.4	Other durables for recreation and culture
09.1.5	Games, toys and leisure equipment
09.1.6	Recording media
09.1.7	Gardening
09.1.8	Pets
09.3.1	Books (includes dictionaries)
09.3.2	Newspapers and periodicals
09.3.3	Miscellaneous printed matter
09.3.4	Stationery and drawing materials
12.1.2	Appliances and products for personal care
12.2.1	Jewellery, clocks and watches
12.2.2	Other personal effects
D)	**Energy**
04.5.1	Electricity
04.5.2	Gas
04.5.4	Solid fuels
07.2.2	Fuels and lubricants
E)	**Services**
03.1.4	Cleaning, repair and hire of clothing
04.1.1	Actual rentals paid by tenants
04.3.2	Services for the maintenance and repair of the dwellings
04.4.1	Refuse and sewage collection
04.4.4	Other services relating to the dwelling n.e.c.
05.1.3	Repair of furniture, furnishings and floor coverings
05.3.3	Repair of household appliances
05.6.2	Domestic services and household services
06.2.1	Medical services
06.2.2	Dental services
06.2.3	Paramedical services
06.3.1	Services delivered by healthcare institutions with hospitalisation
07.2.3	Maintenance and repair
07.2.4	Other services in respect of personal transport equipment
07.3.1	Passenger transport by railway
07.3.2	Passenger transport by road
07.3.3	Passenger transport by air
07.3.4	Passenger transport by sea and inland waterway
07.3.5	Other transport services
07.3.6	Combined passenger transport
08.1.1	Postal services
08.1.2	Telephone and telefax equipment (includes repair)
08.1.3	Telephone, telegraph and telefax services
09.1.9	Repair of equipment and accessories
09.2.1	Recreational and cultural services - Performances
09.2.2	Other recreational and cultural services
09.2.3	Games of chance
09.4.1	Package holidays
10.1.1	Pre-primary and primary education
10.1.2	Lower-secondary and upper-secondary education
10.1.3	Tertiary education
10.1.4	Other types of education
11.1.1	Restaurants and cafés
11.1.2	Canteens
11.2.1	Accommodation services
12.1.1	Hairdressing salons and personal grooming establishments
12.3.2	Social protection
12.4.2	Insurance connected with the dwelling
12.4.4	Insurance connected with transport
12.5.1	Financial services n.e.c.
12.6.1	Other services n.e.c.
Memorandum items	
F)	**Food (A+B)**
G)	**Industrial goods (C+D)**
H)	**Goods (F+G)**

Box 4 – EXTERNAL BORROWING REQUIREMENTS OF THE PORTUGUESE ECONOMY

The external net lending / net borrowing of an economy is given by the sum of the current and capital account deficits[1], as derived from the basic identities of the national accounting framework.

The current account (CA) of an economy is defined as the difference between goods and services exports (X) and imports (M), plus external net income (R) and external net current transfers (T), i.e.:

$$CA = X - M + R + T$$

It can easily be verified that the current account balance corresponds to the difference between domestically-generated saving and investment of the economy. Let us consider national income (Y) (the expenditure approach) and domestic saving (S), defined as:

$$Y = C + I + G + X - M + R + T$$
$$S = Y - C - G$$

where C represents private consumption, I investment and G government consumption. Thus, we obtain:

$$S - I = (Y - C - G) - I = X - M + R + T = CA$$

as we intended to show.

In the Portuguese economy, the sum of saving of the internal institutional sectors of the economy (households, corporations and general government) has been more and more insufficient to finance investment, giving rise to an increasing saving deficit vis-à-vis abroad. In fact, this deficit has recorded successive rises in the past years, widening from 2.4 per cent of GDP in 1995 to 9.9 per cent of GDP in 2000.

The current account deficit has been partly offset by inflows of capital transfers recorded in the capital account, which in Portugal is basically composed of capital transfers from the European Union (EU). This balance is positive and relatively important to the Portuguese economy, being equivalent to approximately 2 per cent of GDP, on annual average, in the period from 1995 to 2000. This also applies to other EU Member States receiving this type of funds, as is the case of Spain, Greece and Ireland (Table 1 and Chart 1), although it is negligible in most OECD countries.

Table 1

BORROWING REQUIREMENTS IN 1999

As a percentage of GDP

	Current account (1)	Capital account (2)	Sum (1+2)
Portugal	-8.3	2.1	-6.2
Spain	-2.1	1.2	-0.9
Greece[a]	-7.2	3.0	-4.1
Ireland	0.3	0.6	1.0
Germany	-0.9	0.0	-0.9
France	2.6	0.1	2.7
Italy	0.5	0.2	0.7
United Kingdom	-1.2	0.1	-1.1
Belgium	4.7	0.0	4.7
The Netherlands	4.5	-0.1	4.4
Austria	-3.1	-0.1	-3.2
Finland	5.4	0.0	5.4
Denmark	1.2	0.1	1.3
Sweden	2.5	-0.9	1.6
US	-3.6	0.0	-3.6
Japan	2.5	-0.4	2.1

Sources: International Monetary Fund, Bank of Greece and *Banco de Portugal*.

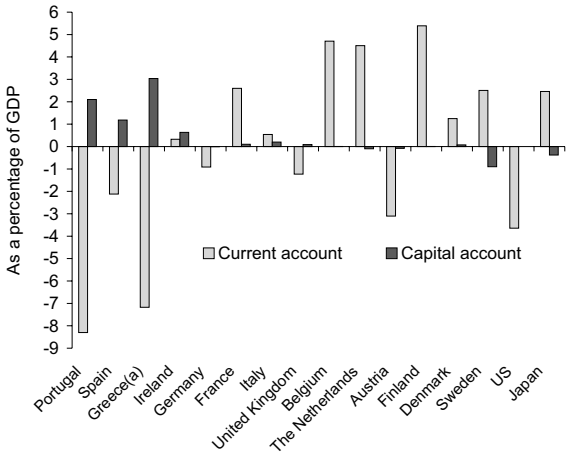
Note:

(a) Data for Greece refer to 1997. Balance of payments statistics do not include the recommendations of the 5th edition of the IMF Balance of Payments Manual. In order to make data comparable with those for the remaining countries, we took as a proxy for the capital account all public transfers received by Greece. Strictly speaking, a share of these transfers corresponds to current transfers, wherefore, to some extent, the capital account is overestimated and the current account underestimated.

Capital transfers, by definition, have a unilateral nature, they do not directly give rise to changes in resident foreign assets and liabilities. In this way, the net lending / borrowing of an economy is given by the sum of the current account plus the capital account and not only by the current account. It should be noted that, through

(1) Before the adoption in 1998 of the recommendations of the 5th edition of the IMF Balance of Payments Manual, the combined current and capital account balances were called current account by the Banco de Portugal. See Box IV.1 – "Changes to the Portuguese Balance of Payments Statistics" in the 1998 Annual Report of the Banco de Portugal.

Chart 1
CURRENT AND CAPITAL ACCOUNT
As a percentage of GDP



Sources: *Banco de Portugal*, Bank of Greece and International Monetary Fund.
Note: See footnote Table 1.

the basic identity of the balance of payments and abstracting from possible statistical discrepancies (the so-called "errors and omissions"), the balance of the financial account[2], which registers financial transactions between residents and non-residents, is symmetrical to the combined balance of the current and capital accounts. It should also be noted that excluding valuation changes and possible debt write-offs, the combined current and capital account is reflected in the change in the international investment position of the total economy vis-à-vis abroad.[3]

In the case of Portugal, in the past years borrowing requirements were reflected in the taking of external funds from non-resident entities — i.e. in financial account surpluses. As a result, the debtor position of the Portuguese economy has been deteriorating in the past years, increasing from a level of around 10 per cent of GDP in 1996 to around 36 per cent of GDP in 2000.

(2) The financial account comprises all operations that, under the balance of payments classification until 1998, were included in the former non-monetary financial account, in the changes in banks' short-term net foreign assets and in the change in net official reserves.

(3) Statistics on the international investment position of an economy are the net stock of all foreign assets and liabilities of this same economy at a given moment in time. The position at the end of a given period, when compared with the position at the beginning of that period, reflects the financial transactions carried out during that period (registered in the financial account), as well as price and exchange rate changes and other adjustments during the period, which affect the level of the stock of foreign assets and liabilities of the economy.

USING THE FIRST PRINCIPAL COMPONENT AS A CORE INFLATION INDICATOR*

*Carlos Robalo Marques***
*Pedro Duarte Neves***
*Afonso Gonçalves da Silva****

1. INTRODUCTION

Coimbra and Neves (1997) introduced a new a core inflation indicator based on the principal components approach. The *Banco de Portugal* has used such indicator, which more specifically corresponds to the first principal component, to analyse price developments, together with other core inflation measures, such as trimmed means. This new indicator, based on the principal components approach, has proved to exhibit some nice properties when evaluated against the conditions proposed in Marques *et al.* (1999, 2000).

The aim of the study is twofold. First, it investigates the consequences of non-stationarity for the computation of principal components. In fact, this technique was initially developed under the assumption that the variables under investigation were stationary. However this is not the case for the large bulk of the year-on-year rate of change of prices indices pertaining to the basic items of the Consumer Price Index (CPI). Second, it tests in a more thorough way, than in Marques *et al.* (1999, 2000) the first principal component against the general conditions required for a core inflation indicator. In fact, in those studies the indicator analysed had been computed using all the available sample information and not, as it should, using only the information available up to and including the corresponding month. This is important, because, in practice, we have to use the indicator computed in real time, and so it matters whether those conditions are still met under these circumstances.

Additionally this study also presents a theoretical model that allows interpreting core inflation as a common stochastic trend for the year-on-year rates of change of the price indices of the basic items included in the CPI.

The first principal component computed taking into account the two above-mentioned aspects, that is, both the consequences of non-stationarity and of using information available only up to and including the corresponding month meets all the proposed conditions for a core inflation indicator. Furthermore it is slightly less volatile than the current version of the first principal component that has been computed by the *Banco de Portugal* for some years now. Thus this new indicator appears as an additional useful tool to be used in the analysis of price developments in Portugal.

This paper is organised as follows. Section 2 discusses the principal components technique and describes the main methodological changes introduced in order to account for non-stationarity. Section 3 presents and analyses a theoretical model for core inflation in the principal components framework. Section 4 analyses the properties of the indicator against the criteria introduced in Marques *et al.* (2000) and section 5 summarises the main conclusions.

* 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. PRINCIPAL COMPONENTS ANALYSIS

The principal components analysis is a statistical technique that transforms the original set of, say, N variables π_i, into a smaller set of linear combinations that account for most of the variance of the original set. For example, in our case, π_i can be thought of as the year-on-year rate of change of the i[th] basic item included in the CPI.

It is well known that principal components analysis is not scale invariant. This is why it is customary to previously standardise the original series in order to get comparable data and then proceed with the principal components analysis on the transformed data.

Let x_{it} stand for the standardised π_i variable. By definition we have

$$x_{it} = \frac{\pi_{it} - \overline{\pi}_i}{s_i} \tag{1}$$

where $\overline{\pi}_i$ is the sample mean of π_i and s_i the corresponding standard-error. Now if X denotes the (TxN) matrix where T is the number of observations (sample period) and N is the number of standardised variables we may write

$$X = \begin{bmatrix} x_{11} & \cdots & x_{N1} \\ \vdots & \ddots & \vdots \\ x_{it} & \cdots & x_{NT} \end{bmatrix} \tag{2}$$

As we shall see below this standardisation is generally a sensible transformation of the data, but there are other possibilities. In practice the transformation to be performed on the original data depends on the very nature of the data (statistical properties) as well as on the purposes of the analysis.

Let us assume, for the time being that X is the matrix with the standardised variables as defined in (1). The principal components analysis aims at finding a new set of variables obtained as linear combinations of the columns of the X matrix, which are orthogonal to each other, and are such that the first accounts for the largest amount of the total variation in the data, the second for the second largest amount of the variation in the data not already accounted for by the first principal component, and so on and so forth. If we let z_{1t} denote the first of these new variables, we may write:

$$z_{1t} = \beta_{11}x_{1t} + \beta_{21}x_{2t} + \cdots + \beta_{N1}x_{Nt} \qquad t = 1, 2, \cdots, T \tag{3}$$

or in matrix form $Z_1 = X\beta_1$. The sum of squares of Z_1 is given by $Z_1'Z_1 = \beta_1'X'X\beta_1$ and the purpose of the analysis is to find out the β_1 vector that maximises $Z_1'Z_1$, subject to the restriction $\beta_1'\beta_1 = 1$, that is, to solve the problem:

$$\begin{aligned} Max\text{: } & Z_1'Z_1 = \beta_1'R\beta_1 \\ s.a. \quad & \beta_1'\beta_1 = 1 \end{aligned} \tag{4}$$

where $R = X'X$. The condition $\beta_1'\beta_1 = 1$ is an identifying restriction that forces a finite solution for the maximum of $Z_1'Z_1$. Otherwise, just by re-scaling the β_1 vector it would be possible to arbitrarily increase the variance of the first principal component. The $R = X'X$ matrix is usually referred to as the input matrix, and if it happens that the entries in the X are the standardised variables as in (2) then R is the sampling correlation coefficients matrix for the π_{it} variables.

One can show that the solution for problem (4) is obtained by taking β_1 equal to the normalised eigenvector corresponding to the largest eigenvalue of the $R = X'X$ matrix. Similarly, the solution for the second principal component is obtained by making β_1 equal to the normalised eigenvector corresponding to the second largest eigenvalue of $R = X'X$ and so on and so forth.

If we let $\hat{\beta}_1$ denote the optimal solution for problem (4) and Z_1^* the first principal component computed using $\hat{\beta}_1$ we have by definition:

$$Z_1^* = X\hat{\beta}_1 \tag{5}$$

The principal components analysis was first developed under the assumption of stationary variables. In case of stationarity standardisation has an immediate statistical interpretation. However, in the Portuguese case, it is possible to show that the year-on-year rates of price changes of most basic CPI items behave as non-stationary variables. Particularly, for most of these series the null of a unit root is not rejected. In such a case, two different questions arise quite naturally. On the one hand the issue of whether the principal components analysis still applies for variables integrated of order one and, on the other, whether the classical standardisation is still to be used given the purpose of building a trend inflation indicator.

The answer to the first question is yes. The principal components analysis is still applicable with non-stationary variables. The so-called principal components estimator with non-stationary variables was first utilised by Stock and Watson (1988). Recently, Harris (1997) showed that this estimator could be used to estimate cointegrating vectors. In this context, the estimator for β_1 that allows minimising the variance of z_{1t} and so obtaining the cointegrating vector that stationarises z_{1t} in (3) is given by the eigenvector corresponding to the smallest eigenvalue of $X'X$ Harris (1997) demonstrated that the estimator for β_1 is superconsistent both as an estimator of a cointegrating vector or as an estimator of a principal component.

Before answering the second question concerning the standardisation it seems useful to stress the idea that the standardisation implicit in the use of $R = X'X$ as the input matrix introduced above for presentation purposes is not unique and that the choice of the input matrix depends on the specific problem at hand.(1) The estimated coefficients of the β_1 vector in (3) can be seen as representing the contribution (weight) of each basic item for the definition of the first principal component. Since we aim at maximising the variance of z_{1t} in (3) the corresponding estimator will attach a larger weight to the components with a larger variance. The common standardisation, which is obtained by subtracting the mean and dividing by the standard error, is adequate when the original variables are stationary. However, when variables are integrated of order one the sampling variance is the larger the larger the change in the average level of the variable during the sample period. Thus, the series exhibiting strong increasing or decreasing trends in the sample will appear as very volatile no matter how smooth they are. In other words, in the case of integrated variables the empirical variance is not a good measure of volatility.

If the purpose is to obtain a core inflation indicator then we should care about the degree of smoothness of the first principal component and thus to look for linear combinations of the year-on-year- variation rates of the basic CPI items with a large signal (variance) and not too much volatility. If we further describe the degree of smoothness of an integrated variable as the variance of the first differences of that variable, we may be able to find a smoother indicator by running the principal components analysis directly on the "standardised" x_{1t} defined as:

$$x_{it} = \frac{\pi_{it} - \overline{\pi}_i}{\sigma_{\Delta i}} \qquad (6)$$

where π_{it} denotes the year-on-year rate of change of the i[th] basic CPI item, $\overline{\pi}_i$ the corresponding sample mean and $\sigma_{\Delta i}$ the standard error of $\Delta\pi_{it}$.(2)

At last, it is also important to address two additional questions that have consequences on the way the indicator is computed, i.e. the need to be computable in real time and to be re-scaled.

It is usually required that a core inflation indicator should be computable in real time.(3) The way to solve this problem is to build a series of first estimates of z_{1t}. In other words the indicator based on the principal components analysis was constructed by picking up, for each period *t*, the figure for the principal component we obtain from (3) by including in the X matrix only the observations available up to period *t*. Of course, this process can only be used after allowing for a long enough period used to compute the first estimate. In our case, given that the sample is very short we decided, for the purpose of analysing the properties of the corresponding indicator, in the terms of section 4, to retain the initial figures even tough, in rigour, they are not first estimates. This way, for the period 1993/7 –1997/12 the indicator is made up of estimates obtained using the data up to 1997/12 and after that it is in fact made up of first estimates computed as explained above. One must notice that this new indicator allows a more rigorous analysis of the first principal component indicator than the one evaluated in Marques *et al.* (1999, 2000).

(1) Sometimes the X matrix is defined with entries $x_{it} = \pi_{it} - \overline{\pi}_i$, i.e. with variables subtracted from their means. In this case, the input matrix $R = X'X$ is the variance-covariance matrix of the original data. The use of the variance-covariance matrix as the input matrix could be acceptable if the original variables do exhibit variances that do not differ much among them. Otherwise the first principal components tend to be dominated by the variables with the largest variances. As the variance is scale dependent the solution to such a case is exactly to use standardised variables. See, for instance, Dillon and Goldstein (1984).

(2) For further details on this alternative specification see Machado *et al.* (2001).

(3) See, for instance, Marques *et al.* (2000).

Let us now address the re-scaling issue. The average level of the principal component in (3), being obtained after "standardising" the original data, is not comparable to the inflation average level during the sample period. To be used as a core inflation indicator it has to be re-scaled so that the two series may exhibit the same average level. Even though there are several alternative procedures the easiest one to implement is to run a regression equation between the inflation rate and the first principal component and to define the re-scaled indicator as the one corresponding to the fitted values of the regression.(4) In our case in order to get an estimator computable in real time, we have decided to estimate successive regressions each time including an additional observation.

The analysis of this indicator made up of first estimates, which we shall denote as PC1 is carried out in section 4. For comparability reasons an indicator, also computed in real time after 1998/1, was constructed, in which the conventional standardisation was performed.(5) This indicator shall be denoted below as PC2.

3. A THEORETICAL MODEL FOR THE TREND OF INFLATION

In this section we show as the principal components analysis may be used to derive a consistent estimate for the trend of inflation. Let us assume that the price change of the ith CPI item can be decomposed as the sum of two distinct components. The first that we shall call the permanent component whose time profile is basically determined by the trend of inflation and the second usually referred to as the temporary component, which basically is the result of the idiosyncratic shocks, specific to the market of the ith good. In generic form we write

$$\pi_{it} = a_i + b_i \pi_t^* + \varepsilon_{it}; \quad i = 1, \ldots, N; \quad t = 1, \ldots, T; \quad (7)$$

where π_{it}, once again, stands for year-on-year price change of the ith item, π_t^* for the trend of inflation and ε_{it} for the temporary component.

Assuming that the π_{it} variables are integrated of order one, it follows that π_t^* is also integrated of order one. In turn, each ε_{it} is, by construction, a zero-mean stationary variable. Thus, equation (7) posits a cointegrating relationship between the change of prices of the ith item and the trend of inflation.(6) We assume at this disaggregation level that there are some CPI items whose price changes, even though determined in the long run by the trend of inflation, do not necessarily exhibit a parallel evolution vis-à-vis the trend of inflation (so that we can have both $a_i \neq 0$ and $b_i \neq 1$).

One should notice that the general formulation suggested in (7) where we may have $a_i \neq 0$ and $b_i \neq 1$ is not incompatible with the usual hypothesis made in the literature, at the aggregate level, which decomposes the economy-wide inflation rate as the sum of the trend of inflation and a transitory component,

$$\pi_t = \pi_t^* + u_t. \quad (8)$$

To see that let us start by noticing that the inflation rate measured by the year-on-year CPI rate of change may be written as $\pi_t = \sum_{i=1}^{N} w_{it} \pi_{it}$, with $w_{it} = \alpha_i \frac{P_{i,t-12}}{P_{t-12}}$, where α_i represents the (fixed) weight of the ith item in the CPI, P_{it} the corresponding price index and P_t the CPI itself. Notice also that we have $\sum_{i=1}^{N} w_{it} = 1$, even tough the w_{it} are time varying.

If you multiply the N equations (7) by the (w_{it}) weights we get

$$\sum_{i=1}^{N} w_{it} \pi_{it} = \sum_{i=1}^{N} w_{it} a_i + \sum_{i=1}^{N} w_{it} b_i . \pi_\tau^* + \sum_{i=1}^{N} w_{it} \varepsilon_{it} \quad (9)$$

that is

$$\pi_t = \phi_{0t} + \phi_{1t} \pi_t^* + \nu_t \quad (10)$$

Now if we have in (10)

$$\begin{cases} E[\phi_{0t}] = E\left[\sum_{i=1}^{N} w_{it} a_i\right] = 0 \\ E[\phi_{1t}] = E\left[\sum_{i=1}^{N} w_{it} b_i\right] = 1 \end{cases} \quad (11)$$

(4) This was the methodology used, for instance, in Coimbra and Neves (1997).

(5) That is, using the standard error of π_{it} and not of $\Delta\pi_{it}$.

(6) Notice however that the method is also applicable even if some π_{it} are stationary, i.e. if some b_i are zero [see Hall *et al.* (1999)].

the relation suggested in (8) will be satisfied.

It may be shown that the principal components analysis may be used in the context of model (7) to obtain a consistent estimate for π_t^*. Under these circumstances the first principal component may be seen at as representing a common stochastic trend for the price changes of the basic CPI items. For the details see Machado *et al.* (2001).

4. ANALYSING THE PROPERTIES OF THE INDICATOR

In this section the properties of the two indicators PC1 e PC2 described in section 2 are evaluated. The evaluation of the trend inflation indicators follows the criteria proposed in Marques *et al.* (1999, 2000). Remember that these criteria are the following:

i) the difference between observed inflation and the trend indicator must be a zero-mean stationary variable;
ii) the trend indicator must behave as an attractor for the rate of inflation, in the sense that it provides a leading indicator of inflation;
iii) the observed inflation should not be an attractor for the trend inflation indicator.

To test these conditions we may proceed in different ways. The verification of condition i) may be carried out by testing for cointegration in the regression equation $\pi_t = \alpha + \beta\pi_t^* + u_t$, with $\beta = 1$ and $\alpha = 0$ where π_t, stands for the year-on-year inflation rate and π_t^* for the trend inflation indicator. In turn, this test can be implemented in two steps. First run the unit root test on the series $d_t = (\pi_t - \pi_t^*)$ with a view to show that d_t is a stationary variable. Second, test the null hypothesis $\alpha = 0$, given that d_t is stationary.

To test the second and third conditions we need to specify dynamic models for both π_t and π_t^*. For the technical details the reader is referred to Marques *et al.* (2000).

Both the PC1 and PC2 indicators meet the three suggested conditions. We note that, by construction, we should expect both indicators to be unbiased estimators, that is, to meet the second part of condition *i*).

Chart 1 shows that both indicators behave very much like what we would expect from a core inflation indicator. Namely, PC1 and PC2 are smother than inflation, and tend to be higher than inflation when this is low and to be below inflation when this is particularly high. Furthermore, under these circumstances, we see that it is the inflation that converges to the indicator and not the other way around. Chart 1 also sows that PC2 is slightly more volatile than PC1[7], so that the theoretical advantages put forward in the previous section, become now apparent.

Let us now compare the weights in the CPI with the corresponding weights in the first principal component, for the different items.

Chart 2 depicts the relation between the weights of each CPI item in the PC1 indicator and the corresponding volatility (evaluated by $\sigma_{\Delta i}$, the standard error of the first differences), both computed with the data available for the whole sample period. It turns out that all the items with a significant weight exhibit a relatively low volatility and that the items with larger volatility have weights close to zero. It thus exists a negative relationship between the weights and the volatility for each item. On the contrary, as we can see in Chart 3, there is no significant relationship between the weight of each item in the CPI index and the corresponding weight in the first principal component.

Chart 4 depicts the CPI weights of 9 CPI aggregates and the corresponding weights in the first principal component.[8] The first two aggregates are basically composed of the items excluded from the traditional "excluding food and energy" indicator. The remaining aggregates are the same as in the CPI. It turns out that the weights of the aggregates "unprocessed food"and "energy" in the first principal component are smaller than their weights in the CPI. This is also true, even though to a lesser extent, for "processed food" and "Transportation and Communications (excluding

(7) The standard error of the PC1 first differences is 0.093 p.p. and the one of PC2 is 0.120 p.p. Both these standard errors are significantly lower than the one of the first differences of the observed rate of inflation, which is 0.297 p.p.

(8) The estimated weights of some basic items in the first principal component have a negative sign. However, most of them appear not to be significantly different from zero and their accumulated weight is rather small (about -1.86 per cent). For this reason we decided to keep them in the figure. We note that the weight of the aggregate "unprocessed food", the most affected by this problem, will be 5.32 per cent instead of 3.78 per cent if those negative weights have been removed.

Chart 1
THE INFLATION RATE AND THE FIRST PRINCIPAL COMPONENT

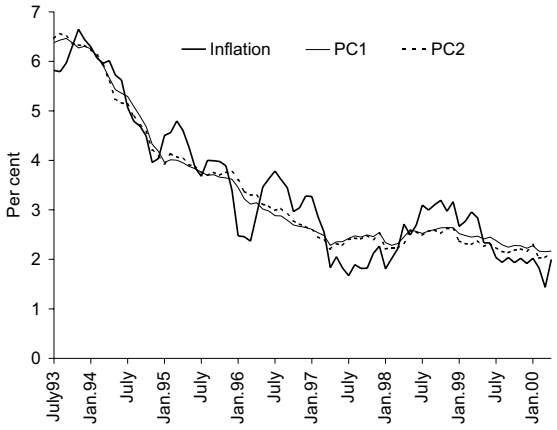


Chart 2
VOLATILITY AND WEIGHTS IN THE FIRST PRINCIPAL COMPONENT

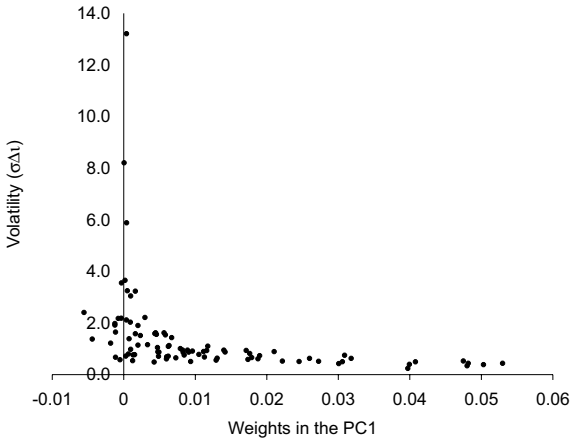


Chart 3
WEIGHTS IN THE CPI AND IN THE FIRST PRINCIPAL COMPONENT

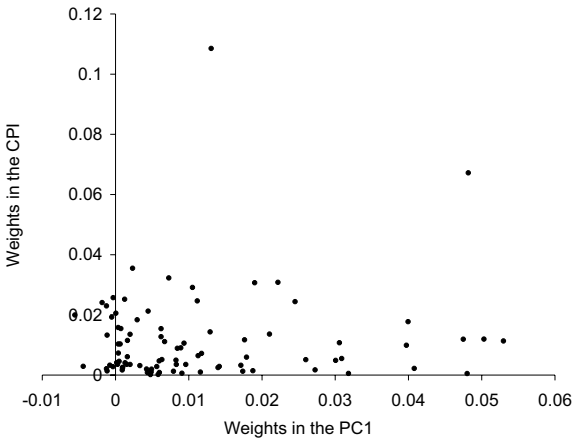
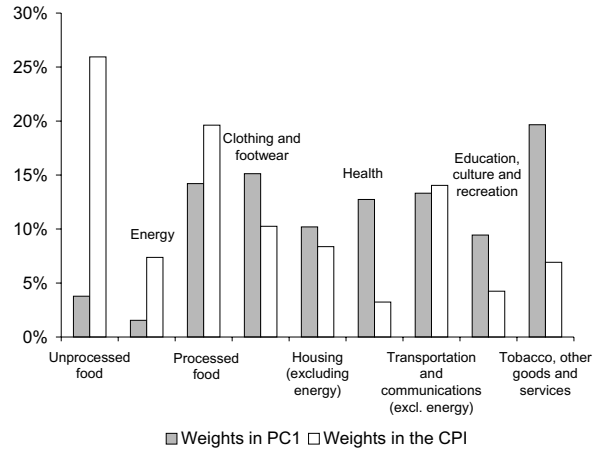


Chart 4
WEIGHTS OF SOME AGGREGATES IN THE CPI AND IN THE FIRST PRINCIPAL COMPONENT



energy)". All the remaining aggregates exhibit a larger weight in the first principal component than in the CPI.

Summing up we may conclude that the most volatile series reduce their weights in the first principal component vis-à-vis the CPI, and vice-versa for the smoothest series. This fact explains why the PC1 indicator is smoother than the observed rate of inflation.

Finally it is important to note that the PC1 indicator, even though it seems to behave rather satisfactorily under normal circumstances, it may nevertheless exhibit stability problems under special circumstances, namely if a change in the number, in the definition or in the data collecting process of the basic CPI items occurs. In this case the use of the first principal component should be complemented with more robust indicators such as some limited influence estimators currently used by the Banco de Portugal.

5. CONCLUDING REMARKS

In this paper we re-estimate and re-evaluate the first principal component as trend inflation indicator. The re-estimation is done so that the indicator is computed in real time and re-evaluation is carried out after allowing for the presence of a unit

root in the generation processes of the price changes series.

The new indicator meets all the properties required for a core inflation indicator. On the one hand it turns out that only the relatively smooth series exhibit significant weights in first principal component, the weights of the volatile series being almost null. In particular the weight of the volatile aggregates "unprocessed food" and "energy" is much smaller in the first principal component than in the consumer price index. This is why the core inflation indicator is much less volatile than recorded inflation. On the other hand recorded inflation tends to converge for the first principal component whenever there is a significant difference between them.

We thus think that this new core inflation indicator may play a useful role in the analysis of price developments in the Portuguese Economy.

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TAX PARAMETERS IN THE PORTUGUESE ECONOMY: PART I – INDIRECT TAXES*

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In the first of two twin papers, we focus on indirect taxes and formally discuss the correspondences between statutory and effective tax rates in the Portuguese economy. These correspondences depend on the details of the Portuguese tax law, on a wealth of data information, and on certain priors about the values of behavioural parameters in the economy. For each of the different tax margins, we choose a specification of the tax base that is standard in tax policy evaluation exercises, albeit necessarily only an approximation to the true tax base. In addition to the general correspondences, we present our own estimates of the effective tax rates at the different tax margins. More importantly, however, using the information in this paper, practitioners of tax policy evaluation can obtain their own estimates of the relevant tax parameters.

1. INTRODUCTION

The objective of this series of two papers is to establish the mapping between statutory and effective tax rates in the Portuguese economy. Ultimately, we address the question of how changes in statutory tax rates induce changes in effective tax rates. This is a critical question from the perspective of tax policy evaluation.

From time to time, the topic of tax reform re-enters the political arena. Tax reform proposals are invariably phrased in terms of changes in the statutory tax rates (see, for example, Cavaco Silva (1999), where the former Portuguese Prime Minister presents a comprehensive tax reform package for Portugal). This is understandable since statutory tax rates are under the direct jurisdiction of the legislative powers. Furthermore, statutory tax rates are easily available and readily understood by the general public.

From the standpoint of the practitioner of tax policy evaluation, the formulation of tax reform proposals in terms of statutory tax rates presents several challenges. In general terms this is because, from the perspective of tax policy evaluation, statutory tax rates are close to irrelevant (see, for example, Primarolo (2000), where the Paymaster General of the UK's Treasury addresses this point in the context of tax harmonization in the EU).

In fact, for the economic analysis of the incentives to work, consume, save and invest that are induced by the tax code what matters most is economic behaviour at the margin. As such, ideally, the proposed tax rate changes should be framed in

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terms of changes in the marginal tax rates. These, however, are notoriously difficult to obtain. Therefore, an approximation that is often used in tax policy evaluation is the effective tax rate.

The relationship between statutory and effective tax rates is a rather complex matter. It depends, first and foremost, on the details of the tax law, which was clearly not written by nor for economists or policy analysts. It also depends on behavioural parameters for the economy that are often difficult to identify and that, at any rate, reflect the priors of the tax policy analyst. Furthermore, it depends on data information which is either not available or comes from varied and not necessarily compatible sources.

The effective tax rate, τ, can be defined simply as the ratio between total tax revenues, T, and the tax base from which they were obtained, B, i.e.,

$$\tau = \frac{T}{B}.$$

Observed tax revenues, however, are the result of a myriad of tax rules. In reality, statutory tax rates, t, along with deductions, D, and tax credits, CR, are the instruments of tax legislation. A highly stylised description of how these three variables come together to determine tax revenues, in general, is

$$T = t(B - D) - CR.$$

Note that only when there are no credits and no deductions are effective and statutory tax rates equal, i.e., $\tau = t$.

In this highly simplified framework, changes in statutory tax rates lead to changes in effective tax rates according to

$$\frac{\partial \tau}{\partial t} = 1 - \frac{D}{B}.$$

Notice how this mapping is independent of the existence of credits. The effective tax rate, however, is not, i.e., $\partial\tau/\partial CR \neq 0$. Note also that, if there are no deductions but credits are non-zero, then the correspondence is one-to-one, even though effective and statutory tax rates differ by CR/B. In that case,

$$\tau = t - \frac{CR}{B}.$$

In addressing the relationship between the statutory tax rate and the effective tax rate from the perspective of tax policy evaluation there is an additional complication. Both the use of analytical instruments and the level of aggregation at which the analysis is done require a degree of abstraction and generalization, which would not be present in a framework of individual tax accounting. This means that many of the finer details of the tax law have to be ignored as the true tax base is approximated using aggregate macroeconomic data. This approach is well suited for mainstream tax policy analysis along the lines of, for example, Auerbach and Kotlikoff (1984, 1987), Ballard, Fullerton, Shoven and Whalley (1985), Bovenberg (1986), Fullerton and Gordon (1983), Goulder and Summers (1989), Goulder and Thalman (1993), Kotlikoff (1995), Pereira (1994, 1999) and Shoven and Whalley (1984).

Finally, a word about data information and data sources. In the computation of the effective tax rate, every attempt was made to use all available information from 1990 to 1998. By using this time frame, we guarantee the use of the most recent tax data available. By using averages for this period, we attempt to capture long-term trends in the economy and thereby avoid business cycle effects and the effects of any other spurious economic events. Also, in the computation of the effective tax rate, it was inevitable to use data from different sources. This posed some compatibility problems between national account and public account data. As a quintessential example of this, there is no readily available data, on a national account basis, for tax revenues at the different tax margins we consider. Such a disaggregation only seems to exist on a public account basis. As such, the strategy we follow consists in using national account data (INE *Contas Nacionais*, several issues, and DGEFA, 1999) for the aggregates, and then using public account data (DGEP, 1999) to approximate the shares of each of the tax margins in total revenues.

In the first of a two part series, we focus on indirect taxes and we explore the relationship between statutory and effective tax rates at the most significant indirect tax margins in the Portuguese economy (Pereira and Rodrigues (2001) focuses on direct taxes). Indeed, value-added and excise taxes are considered in great detail. We present several

tables that document the technical details on the correspondences between statutory and effective tax rates at the different margins. We highlight not only the mathematical mapping but also the data information and the economic parameters necessary to establish such mappings. As such, the accompanying text is essentially a guided tour of the different tables complemented with a detailed reference to sources. For a comprehensive description of the Portuguese tax system, in legal terms, the reader is referred to CEF (1997) and KPMG (1997).

2. VALUE-ADDED AND EXCISE TAXES

2.1. General aspects

In Portugal, from 1990 to 1998, we estimate that value-added and excise tax revenues averaged 14.2% of GDP evaluated at market prices.

Under the Portuguese tax legislation (CIVA), the value-added tax (VAT, hereafter) is designated *imposto sobre o valor acrescentado*. All goods and services marketed and sold, whether produced domestically or imported, are liable to VAT as long as they are purchased for use within Portuguese territory. This implies that exports are, in effect, exempt from VAT.

In general terms, VAT is a tax on the purchase of final goods, and follows the general pattern of value-added taxes in most European countries. Being a value-added tax means that only the value that is added through an entrepreneurial activity to the inputs acquired is liable to this tax. Through a chain method, sellers then collect VAT on the value of the good or service sold, deduct the VAT they paid on their inputs and hand over the difference to the Treasury. It follows that, while the seller is the one that is held accountable to the Treasury for the VAT revenues, the incidence generally lies with the economic agents that purchase these final goods. This is because these goods and services will not be resold or incorporated in a new good or service that will be placed on the market and, as such, no VAT rebate is due on these purchases.

In addition to the VAT, the Portuguese tax system considers excise taxes, i.e., special indirect taxes levied on the consumption of specific goods. That is the case of alcohol and alcoholic beverages (*imposto sobre bebidas alcoólicas e sobre o álcool* or IBAA), on the purchase of new automobiles (*imposto automóvel* or IA), on petroleum products (*imposto sobre produtos petrolíferos* or ISP), and finally, on tobacco (*imposto sobre o tabaco* or IST).

In practice, VAT is levied *ad valorem* as the last surcharge, i.e., the tax base is the total amount (including other taxes) that would be charged to a buyer if no VAT existed. As an example, for imported goods and services this would include import duties, where applicable. Moreover, goods that are subject to excise taxes are liable to VAT on an already engrossed tax base. These are two instances of double taxation in the Portuguese tax code (see Pereira and Rodrigues (2001) for other cases).

In addition to households, firms and the public sector also purchase goods and services that are liable to VAT and, in some cases, to excise taxes. Accordingly, we disaggregate total value-added and excise tax revenues, T_{VATET}, by five macroeconomic aggregates - private consumption, *C*, public consumption, *CG*, private investment, *I*, public investment in infrastructure and in transportation equipment, *IG*, and public investment in education, *IH*. That is,

$$T_{VATET} = T_{VATET,C} + T_{VATET,CG} + T_{VATET,I} + T_{VATET,IG} + T_{VATET,IH}.$$

2.2. Value-added and excise taxes on private consumption spending

We estimate that VAT and excise tax revenues derived from private consumption expenditure activities, $T_{VATET,C}$, totalled 11.416% of GDP evaluated at market prices for the 1990-1998 period.

In Portugal, households consume a wide variety of goods and services, many of which are taxed at different rates. This is for two reasons. First, as referred to above, alcoholic beverages, petroleum products(1), automobiles and tobacco are all liable to specific excise taxes. Second, different categories of goods are effectively subject to different VAT rates.

The general VAT rate, which we denote by $t_{VAT,5}$, is 17%. The tax code considers another four

(1) Even though all petroleum products are subject to some form of excise taxes, we focus only on unleaded gasoline. Henceforth, we use gasoline and petrol interchangeably.

Table 1

VALUE-ADDED AND EXCISE TAXES ON PRIVATE CONSUMPTION

In statutory terms

$$T_{VATET,C} = \left[t_{VAT,1}\tilde{\theta}_{HH,1} + t_{VAT,2}\tilde{\theta}_{HH,2} + t_{VAT,3}\tilde{\theta}_{HH,3} + t_{VAT,4}\tilde{\theta}_{HH,4} + \left(1 + t_{VAT,5}\right)\tau_{alcohol}\tilde{\theta}_{HH,alcohol} + \left(1 + t_{VAT,5}\right). \right.$$
$$\tau_{tobacco}\tilde{\theta}_{HH,tobacco} + \left(1 + t_{VAT,5}\right)\tau_{autos}\tilde{\theta}_{HH,autos} + \left(1 + t_{VAT,5}\right)\tau_{petrol}\tilde{\theta}_{HH,petrol} + t_{VAT,5} \cdot$$
$$\left. \left(\tilde{\theta}_{HH,alcohol} + \tilde{\theta}_{HH,tobacco} + \tilde{\theta}_{HH,autos} + \tilde{\theta}_{HH,petrol} + \tilde{\theta}_{HH,rest.}\right) \right] . \left(C^{MP} - T_{VATET,C}\right) \quad (1)$$

In effective terms

$$T_{VATET,C} = \tau_{VATET,C} C^{FC} \quad (2)$$

$$\tau_{alcohol} = ETR_{alcohol}\left(1 + t_{VAT,5}\right) \Big/ \left[\theta_{HH,alcohol} C^{MP} - \left(1 + t_{VAT,5}\right) ETR_{alcohol}\right] \quad (3)$$

$$\tau_{tobacco} = ETR_{tobacco}\left(1 + t_{VAT,5}\right) \Big/ \left[\theta_{HH,tobacco} C^{MP} - \left(1 + t_{VAT,5}\right) ETR_{tobacco}\right] \quad (4)$$

$$\tau_{autos} = ETR_{autos}\left(1 + t_{VAT,5}\right) \Big/ \left[\left(\theta_{HH,autos} C^{MP} + \theta_{Firms,autos} I^{MP} + \theta_{PS,autos} CG^{MP}\right) - \left(1 + t_{VAT,5}\right) ETR_{autos}\right] \quad (5)$$

$$\tau_{petrol} = ETR_{petrol}\left(1 + t_{VAT,5}\right) / \left[\Big/ \left(\theta_{HH,petrol} C^{MP} + \theta_{Firms,petrol} I^{MP} + \theta_{PS,petrol} CG^{MP}\right) - \left(1 + t_{VAT,5}\right) ETR_{petrol} \right] \quad (6)$$

How a change in the statutory general VAT rate alters the effective tax rate $\tau_{VATET,C}$

$$\frac{\partial \tau_{VATET,C}}{\partial t_{VAT,5}} = \tilde{\theta}_{HH,rest.} + \tilde{\theta}_{HH,autos}\left(1 + \tau_{autos}\right) + \tilde{\theta}_{HH,petrol}\left(1 + \tau_{petrol}\right) + \tilde{\theta}_{HH,alcohol}\left(1 + \tau_{alcohol}\right) + \tilde{\theta}_{HH,tobacco}\left(1 + \tau_{tobacco}\right) \quad (7)$$

Data

$T_{VATET} = 0.142 Y^{MP}, C^{MP} = 0.649 Y^{MP}, T_{VATET,C} = 0.11416 Y^{MP}$,

$ETR_{alcohol} = 0.159\% Y^{MP}$, $ETR_{autos} = 0.8566\% Y^{MP}$, $ETR_{petrol} = 2.752\% Y^{MP}$, $ETR_{tobacco} = 0.7418\% Y^{MP}$

Parameters

$\tilde{\theta}_{HH,1} = 0.08740, \tilde{\theta}_{HH,2} = 0.17595, \tilde{\theta}_{HH,3} = 0.02364, \tilde{\theta}_{HH,4} = 0.11086, \tilde{\theta}_{HH,rest.} = 0.44924$

$\tilde{\theta}_{HH,alcohol} = 0.01239, \tilde{\theta}_{HH,autos} = 0.10436, \tilde{\theta}_{HH,petrol} = 0.02735, \tilde{\theta}_{HH,tobacco} = 0.00687$

See Table 2 for an average household's nominal budget shares.

The calculated effective tax rate

$\tau_{VATET,C} = 0.21345$

See Table 2 for the different effective tax rates for the several categories.

The calculated differential effect for the general VAT rate

$$\frac{\partial \tau_{VATET,C}}{\partial t_{VAT,5}} = 0.674022$$

Sources: DGEP (1999), INE (1997), INE *Contas Nacionais* Authors' calculations.

expenditure categories that benefit from progressively lower value-added tax rates, i.e., $t_{VAT,5} > t_{VAT,4} > t_{VAT,3} > t_{VAT,2} > t_{VAT,1}$. In what follows, we detail the composition of these four additional expenditure categories.

Category 4 encompasses goods like oils, fats, coffee, tea, cocoa, mineral waters, and restaurant tabs that are subject to a rate of $t_{VAT,4} = 12\%$. Also included in this category are general expenditures from Azores and Madeira on goods and services which, if sold on the continent, would pay the general VAT rate, $t_{VAT,5}$ but which enjoy a reduced rate of 12% in these regions. Category 3 is created to accommodate the fact that certain fish, meat, milk and dairy products pay a reduced rate of 5%. Similar products, however, like yoghurts pay 12%, and shellfish pay the general rate of 17%. We assume that the applicable rate for this category is $t_{VAT,3} = 6\%$. In turn, Category 2 is made up of goods and services like fruit, vegetables, grain, potatoes, water, electricity, public transportation, medicine, hotels and cultural shows that pay $t_{VAT,2} = 5\%$. Finally, goods belonging to category 1 pay the lowest VAT rate, Essentially, these are the goods and services that, if sold on the continent, would be liable to a value-added tax rate of $t_{VAT,2}$. This suggests that the islands of Açores and Madeira enjoy yet another special regime.

To proceed, we need to know the fraction of a representative household's budget that is spent on each of nine expenditure categories — five for VAT rates and four for goods subject to excise taxes in addition to the VAT. To retrieve these budget shares, we resort to INE (1997), a 1994 household budget survey, and adjust the information therein to account for business cycle effects, since 1994 was a year of recession. Essentially, we have increased the shares of automobiles, gasoline and tobacco at the expense of foodstuffs. Therefore, the adjusted budget shares, $\theta_{HH,1}$, $\theta_{HH,2}$, $\theta_{HH,3}$, $\theta_{HH,4}$, $\theta_{HH,alcohol}$, $\theta_{HH,petrol}$, $\theta_{HH,tobacco}$, and $\theta_{HH,rest.}$, presented as column five in Table 2 reflect our priors based on the available published information as to the fraction of household consumption expenditure valued at market prices, C^{MP}, that is allocated to each expenditure category.

The information that we have obtained on budget shares, naturally, is defined in terms of market prices. These market prices include, in addition to the factor cost, the excise tax and the VAT payments. This introduces the difference between consumption spending at market prices, C^{MP}, and at factor cost, C^{FC}, or net of tax payments. Dividing a macroeconomic variable, X, evaluated *at market prices*, X^{MP}, by the corresponding *effective* value-added and excise tax rate, $1 + \tau_{VATET,X}$, we obtain the variable evaluated *at factor cost*, X^{FC} (2).

To pursue the calculation of effective tax rates per expenditure category, we need to transform the budget shares, at market prices, into *real* budget shares at factor cost. For alcoholic beverages, for example, the consumer pays an amount of

(2) Note that here we have ignored the subsidies component of the market price value, and thus we somewhat underestimate the true value of the factor cost variable

Table 2

TAX PARAMETERS RELATED TO THE TAXATION OF PRIVATE CONSUMPTION

Category j	τ_j	$t_{VAT,j}$	Budget shares in 1994 (*INE*)	$\theta_{HH,j}$	$\tau_{VATET,j}$
(1)	-	4%	0.07491	0.07491	4.000%
(2)	-	5%	0.16225	0.15225	5.000%
(3)	-	6%	0.02065	0.02065	6.000%
(4)	-	12%	0.13178	0.10232	12.000%
(*Alcohol*)	23.999%	17%	0.01481	0.01481	45.079%
(*Autos*)	12.214%	17%	0.07291	0.11291	31.290%
(*Petrol*)	161.713%	17%	0.02855	0.06900	206.204%
(*Tobacco*)	201.795%	17%	0.01099	0.02000	353.100%
(*Rest*)	-	17%	0.48315	0.43315	17.000%

Sources: DGEP (1999), *INE* (1997), *INE Contas Nacionais,* Authors' calculations.

$\theta_{HH,alcohol}C^{MP}$, which includes both kinds of taxes, but only consumes the equivalent to $\tilde{\theta}_{HH,alcohol}C^{FC}$, where $\tilde{\theta}_{HH.alcohol}$ is the share of *real* consumption, C^{FC}, that is allocated to alcohol.

Furthermore, note that if a household purchases a good valued at *x*, that is subject to an excise tax at an effective rate of τ and a statutory value-added tax rate of *t*, then the total amount paid will be $(1+t)(1+\tau)x$, which will include $[t+(1+\tau)]x$ in consumption taxes. This suggests that we define the effective value-added and excise tax rate as is computed by deflating the respective total expenditure, valued at market prices, as $\tau_{VATET} = t+(1+t)\tau$. Thus, total consumption expenditure, evaluated at factor cost, C^{FC}, is computed by deflating the respective total expenditure, valued at market prices, C^{MP}, by $1+\tau_{VATET,C}$ the *effective* value-added and excise tax rate levied on total consumption expenditure.

Using alcoholic beverages as an example again, with an effective excise tax of $\tau_{alcohol}$ and a general VAT rate of $t_{VAT,5}$, nominal and real budget shares for alcoholic beverages are related according to

$$\theta_{HH,alcohol}C^{MP} = \left(1+t_{VAT,5}\right)\left(1+\tau_{alcohol}\right)\frac{\tilde{\theta}_{HH,alcohol}C^{MP}}{1+\tau_{VATET,C}}.$$

This formula suggests that one can easily determine the real budget share for any expenditure category *j*, $\tilde{\theta}_j$, as

$$\tilde{\theta}_j = \frac{\theta_j\left(1+\tau_{VATET}\right)}{\left(1+\tau_j\right)\left(1+t_{VAT,j}\right)}.$$

The only missing information we still need, relates to the *effective* excise tax rates, the calculation of which we turn to next. Appealing to the definition of the effective tax rate, and using the alcoholic beverages expenditure category as an example once more, the effective excise tax rate, $\tau_{alcohol}$, that is levied on the real consumption of alcohol, $\tilde{\theta}_{HH,alcohol}C^{FC}$, can easily be computed as the ratio between excise tax revenues, ETR, and the relevant tax base, that is

$$\tau_{alcohol} = \frac{ETR_{alcohol}}{\tilde{\theta}_{HH.alcohol}C^{FC}}.$$

Note, however, that because the real budget share depends on the effective excise tax rate, i.e., $\tilde{\theta}_{HH,alcohol}\left(\tau_{alcohol}\right)$, to determine a value for $\tau_{alcohol}$, one must factor out this variable from the above equality. This yields equation (3) in Table 1.

For the remaining three kinds of goods that are subject to excise taxes — petroleum products, automobiles, and tobacco — the effective excise tax rates, τ_{petrol}, τ_{autos} and $\tau_{tobacco}$, respectively, are easily determined using the same procedure. Data on excise tax revenues refer to 1995 and were taken from INE, C*ontas Nacionais.* Note, however, that while we assume that tobacco and alcoholic beverages are only consumed by households, gasoline and new automobiles are also purchased by firms and by the public sector. This fact suggests that, to calculate τ_{autos} and τ_{petrol}, the relevant tax bases must include the economy-wide purchases of each type of good. For new automobiles, in particular,

$$\tau_{autos} = \frac{ETR_{autos}}{\tilde{\theta}_{HH,autos}C^{FC} + \tilde{\theta}_{Firms,autos}I^{FC} + \tilde{\theta}_{PS,autos}IG^{FC}}$$

There is a wide selection of statutory tax rates to choose from when establishing the relationship between changes in statutory and effective tax rates. For illustration purposes, and because it is the most significant indirect tax margin, we choose to determine how a change in the general VAT rate, $t_{VAT,5}$, would induce changes upon the effective value-added and excise tax rate collected on private consumption purchases. The relevant partial derivative, $\partial\tau_{VATET,C}/\partial t_{VAT,5}$, is equation (7) in Table 2.

In obtaining this effect, it should be noted that the real budget shares, and the effective excise tax rates, τ_j, are considered known primitives that do not vary when the general statutory value-added tax rate changes. Furthermore, it is assumed that whatever changes occur in tax rates at the statutory level, the composition of a representative household's consumption bundle, in terms of the nine different expenditure categories, remains unchanged. This means that a change in the statutory tax rate only imparts changes to aggregate consumption through the effect it has upon the effective tax rate. To us, this top-down approach seems the most relevant when evaluating alternative tax policies at an aggregate level.

Table 3

VALUE-ADDED AND EXCISE TAXES ON OTHER SPENDING

In statutory terms

$$T_{VATET,I} = \left(I^{MP} - T_{VATET,I}\right)\left[t_{VAT,5}\left(\rho_I + \tilde{\theta}_{Firms,autos} + \tilde{\theta}_{Firms,petrol}\right) + \tilde{\theta}_{Firms,autos}\left(1 + t_{VAT,5}\right)\tau_{autos} + \right. \quad (8)$$
$$\left. + \tilde{\theta}_{Firms,petrol}\left(1 + t_{VAT,5}\right)\tau_{petrol}\right]$$

$$T_{VATET,CG} = \left(CG^{MP} - T_{VATET,CG}\right)\left[1 - \frac{Wages_{PS,CG}}{CG^{MP}}\left(1 + \tau_{VATET,CG}\right)\right].\left[t_{VAT,5} + \tilde{\theta}_{PS,petrol}\left(1 + t_{VAT,5}\right)\tau_{petrol}\right] \quad (9)$$

$$T_{VATET,IG} = \left(IG^{MP} - T_{VATET,IG}\right)\left[1 - \frac{Wages_{PS,IG}}{IG^{MP}}\left(1 + \tau_{VATET,IG}\right)\right].\left[t_{VAT,5} + \tilde{\theta}_{PS,autos}\left(1 + t_{VAT,5}\right)\tau_{autos}\right] \quad (10)$$

$$T_{VATET,IH} = \left(IH^{MP} - T_{VATET,IH}\right)\left[1 - \frac{Wages_{PS,IH}}{IH^{MP}}\left(1 + \tau_{VATET,IH}\right)\right]t_{VAT,5} \quad (11)$$

In effective terms

$$T_{VATET,I} = \tau_{VATET,I} I^{FC}, \quad T_{VATET,CG} = \tau_{VATET,CG} CG^{FC}, \quad T_{VATET,IG} = \tau_{VATET,IG} IG^{FC}, \; T_{VATET,IH} = \tau_{VATET,IH} IH^{FC} \quad (12,13,14,15)$$

How a change in the statutory general VAT rate alters the effective tax rate

$$\frac{\partial \tau_{VATET,I}}{\partial t_{VAT,5}} = \rho_I + \tilde{\theta}_{Firms,autos}\left(1 + \tau_{autos}\right) + \tilde{\theta}_{Firms,petrol}\left(1 + \tau_{petrol}\right) \quad (16)$$

$$\frac{\partial \tau_{VATET,CG}}{\partial t_{VAT,5}}\left(1 - \frac{Wages_{PS,CG}}{CG^{FC}}\right)\left(1 + \tilde{\theta}_{PS,petrol}\tau_{petrol}\right) \quad (17)$$

$$\frac{\partial \tau_{VATET,IG}}{\partial t_{VAT,5}} = \left(1 - \frac{Wages_{PS,IG}}{IG^{FC}}\right)\left(1 + \tilde{\theta}_{PS,autos}\tau_{autos}\right), \quad \frac{\partial \tau_{VATET,IH}}{\partial t_{VAT,5}} = 1 - \frac{Wages_{PS,IH}}{IH^{FC}} \quad (18,19)$$

Data

$$I^{MP} = 0.215 Y^{MP}, T_{VATET,I} = 0.0184 Y^{MP}, CG^{MP} = 0.111 Y^{MP}, \quad T_{VATET,CG} = 0.00471 Y^{MP},$$

$$IG^{MP} = 0.038 Y^{MP}, \quad T_{VATET,IG} = 0.00380 Y^{MP}, \quad IH^{MP} = 0.065 Y^{MP}, \quad T_{VATET,IH} = 0.00092 Y^{MP},$$

$$\theta_{PS,autos} = 0.10735, \quad \theta_{PS,petrol} = 0.0218, \quad \rho_I = 0.32, \quad \theta_{Firms,autos} = 0.06848, \quad \theta_{Firms,petrol} = 0.02283,$$

$$\frac{Wages_{PS,CG}}{CG^{MP}} = 0.7269, \qquad \frac{Wages_{PS,IG}}{IG^{MP}} = 0.3535, \qquad \frac{Wages_{PS,IH}}{IH^{MP}} = 0.9025$$

Parameters

$\tilde{\theta}_{PS,autos} = 0.0909, \quad \tilde{\theta}_{PS,petrol} = 0.0074, \quad \tilde{\theta}_{Firms,autos} = 0.0570, \quad \tilde{\theta}_{Firms,petrol} = 0.0081$

The calculated effective tax rates

$\tau_{VATET,I} = 0.09365, \quad \tau_{VATET,CG} = 0.04431, \quad \tau_{VATET,IG} = 0.11111, \quad \tau_{VATET,IH} = 0.01438$

The calculated differential effects for the general VAT rate

$\frac{\partial \tau_{VATET,I}}{\partial t_{VAT,5}} = 0.40530, \quad \frac{\partial \tau_{VATET,CG}}{\partial t_{VAT,5}} = 0.24377, \quad \frac{\partial \tau_{VATET,IG}}{\partial t_{VAT,5}} = 0.61396, \quad \frac{\partial \tau_{VATET,IH}}{\partial t_{VAT,5}} = 0.08454$

Sources: AECOPS (1996), DGCP (1997), DGEP (1999), Authors' calculations.

2.3. Value-added and excise taxes on other spending activities

We estimate that VAT and excise tax revenues derived from private investment spending activities, $T_{VATET,I}$, averaged 1.841% of GDP at market prices for the 1990-1998 period.

We assume that all private investment expenditures, with the exception of automobiles, $\tilde{\theta}_{Firms,autos} I^{FC}$, petroleum products, $\tilde{\theta}_{Firms,petrol} I^{FC}$, and building or infrastructure investment, $\rho_I I^{FC}$ (AECOPS, 1996), are exempt from value-added tax (see equation 8 in Table 3). In addition, banks and insurance firms cannot deduct any of the VAT paid on their inputs. Clearly, the classification of petroleum products as private investment could be questioned. We use this approach because it is a particularly convenient way of capturing how an increase in the price of fuel affects production costs.

In turn, we estimate that value-added and excise tax revenues derived from public consumption, $T_{VATET,CG}$, public investment in infrastructure and automobiles, $T_{VATET,IG}$, and public investment in education, $T_{VATET,IH}$, averaged 0.471%, 0.380% and 0.092% of GDP at market prices respectively, for the period 1990-1998.

Looking at equation (9) in Table 3, we see that public consumption expenditures can be decomposed into three categories — public sector wages (excluding wages related to public investment and investment in education activities), petroleum products, and all the rest. The budget shares for these categories were taken from *INE, Contas Nacionais* and DGCP (1997).

Wage expenditure is distinct from the remaining outlays in that it is exempt from value-added and other indirect taxes. Data on public sector wages, decomposed by economic activity, $Wages_{PS,CG}$, $Wages_{PS,IG}$ and $Wages_{PS.IH}$, were obtained residually after plugging in all the known parameters in equations (9-11) of Table 3. These values are broadly in line with those of *INE, Contas Nacionais*.

Consideration of other public spending categories is justified by different excise taxes inciding on such expenditures. These imply differentiated effective tax rates by expenditure category. In terms of public investment in infrastructure and automobiles, and public investment in education, all non-wage related expenditures are assumed to be subject to the general value-added tax rate. Note that, in addition to $t_{VAT,5}$ public spending on new automobiles is surcharged with an excise tax at the effective rate of τ_{autos}.

The mappings between changes in statutory and in effective tax rates are easily determined and result in equations (16-19) in Table 3. To obtain the effective value-added and excise tax on private investment spending, for example, all one must do is equalize expressions (8) and (12), equations for the calculation of total tax revenues in statutory and effective terms respectively. Note that, in calculating the differential effects, we assume that $Wages_{PS,CG} / CG^{FC}$, $Wages_{PS,IG} / IG^{FC}$ and $Wages_{PS,IH} / IH^{FC}$ remain invariant to changes in $t_{VAT,5}$.

3. SOME CONCLUDING REMARKS

In this paper, we focus on indirect taxes and we formally discuss the correspondences between statutory and effective tax rates in the Portuguese economy. Value-added and other indirect taxes are considered in great detail. The correspondences between statutory and effective tax rates depend on the details of the Portuguese tax law and on a wealth of data information, as well as on certain priors about the values of behavioural parameters in the economy. In addition to the general correspondences between statutory and effective tax rates, we present our own estimates of the effective tax rates at the different tax margins. In doing so, a detailed tax information was organized in a systematic way that is particularly useful for tax policy evaluation and the main characteristics of the Portuguese tax system, if not all its accounting details, were sketched and parameterised.

The information in this paper was recently put to good use by Pereira and Rodrigues (2000a, 2000b), in the context of an ongoing research project on tax reform in Portugal. More importantly, however, using the technical information in this paper, practitioners of tax policy evaluation can obtain estimates of the relevant tax parameters to be used in their own work.

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January*

4 January (Instruction no. 1/2001, Official Gazette no. 14, Series II)

Pursuant to the provisions set forth in subparagraphs f) and g) of paragraph no. 1 of article 6 of the Statute of the Public Credit Management Institute, approved by Decree-Law no. 160/96 of 4 September, and in article 11 of Decree-Law no. 280/98 of 17 September, lays down the rules governing the issuance of Treasury bonds as well as the access conditions and the rights and obligations of financial operators in the primary market. Revokes Instruction no. 2-A/98 (Series II) of 17 December, to come into force as from 1 January 2001.

29 January (Circular Letter of the Banco de Portugal no. 2/DMR)

Following Circular Letter no. 347/DMR of 27 October 1999, fixes the rate of return of Deposit Securities, Series B, at 4.77%, for the quarterly interest rate calculation period to start on 4 February 2001.

30 January (Decree-Law no. 19/2001, Official Gazette no. 25, Series I, A)

Introduces changes in the legal framework of mutual guarantee companies, classifying them as credit institutions whose activity is restricted to the carrying out of financial operations and to the provision of related services, on behalf of small and medium-sized companies.

February

2 February (Notice of Banco de Portugal no. 1/2001, Official Gazette no. 34, Series I - B)

Amends Notice no. 1/93, of 8 June, concerning the calculation of the solvency ratio of credit institutions. Introduces changes, namely, in the risk weightings of some assets items (eg. loans secured by mortgages, real estate financial leasing operations and securities collateralised by mortgage loans), as well as in the calculation of the weighted value of off-balance sheet items related to (e.g. swaps, futures and options) contracts on interest rates, exchange rates, equities, precious metals and commodities, which are not traded in a recognised market.

15 February (Instruction of Banco de Portugal no. 1/2001, BNBP no. 2/2001)

Sets forth the procedure regarding the notification to the Banco de Portugal of the sale of credit within the scope of securitisation operations.

15 February (Instruction of Banco de Portugal no. 2/2001, BNBP no. 2/2001)

Amends Instruction no. 4/96 (Chart of Accounts for the Banking System), requiring the publication, in the Notes annexed to the annual accounts, information of securitisation operations.

16 February (Notice of Banco de Portugal no. 2/2001, Official Gazette no. 40, Series I - B)

Considering the drawing closer of the start of the physical circulation of the euro in 1 January 2002, encourages the utilisation of cheques denominated in euro, regulating some aspects concerning their utilisation.

March

2 March (Circular Letter of Banco de Portugal no. 4/01/DSBDR)

Makes known that Instruction no. 6/2001 - amending the scope of account "9203 - Irrevocable credit lines" of the Chart of Accounts for the Banking System - has been approved. In this conformity, within one month from the date of receipt of the above-mentioned Circular Letter, institutions must reclassify the credit lines and communicate to the Banco de Portugal the resulting change in the amount of the provisions for general credit risks.

20 March (Notice of Banco de Portugal no. 3/2001, Official Gazette no. 67, Series I, B)

In accordance with the provisions laid down in no. 4 of article 1 of Decree-Law no. 3/94, of 11 January, as worded by Decree-Law no. 53/2001, of 15 February, establishes the requirements to be complied with by exchange offices wishing to provide cash transfer services to and from abroad.

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

April

3 April (Notice of Banco de Portugal no. 4/2001, Official Gazette no. 79, Series I, B)	Adds no. 9-A and rewords nos. 5 and 8 of Notice no. 12/92, of 22 December, published in Official Gazette no. 299 Series II, 2nd Supplement, of 29 December 1992, which provides for the assets that can be included in the own funds of institutions subject to the supervision of Banco de Portugal and defines their characteristics. In particular, deductions from own funds shall include, for their purchasing price, the amount corresponding to securities, resulting from securitisation operations, held by entities that do not assign the underlying assets, when the latter, due to their characteristics, concentrate the credit risk of the said assets.
3 April (Regulation no. 5/2001 of the Stock Market Commission, Official Gazette no. 79, Series II)	Changes Regulation no. 24/98, of 28 December, with a view to simplifying and making more flexible the procedures regarding the execution of the redenomination methods approved. Rewords articles 11, 18 and 19 and revokes articles 8 and 17 of the above-mentioned Regulation, in which the reference to "*Central de Valores Mobiliários*" is replaced with "*Interbolsa*".
17 April (Decree-Law no. 118/2001, Official Gazette no. 90, Series I, A)	Introduces changes in articles 4, 6, 39, 59, 64 and 65 of the Organic Law of the Banco de Portugal, approved by Law no. 5/98, of 31 January, in force since the date of adoption of the euro. Article no. 64 of the Organic Law, as worded by the mentioned Decree-Law, is effective as of 1 January 2001.
17 April (Decree-Law no 117/2001, Official Gazette no. 90, Series 1, A)	Regulates, on the monetary segment, the period for the double currency circulation from 1 January to 28 February 2001. It shall be incumbent on the Banco de Portugal to establish, by means of a Notice, the rules applicable to any regulation that may be deemed necessary. For a period of 20 years, from 28 February 2002 onwards, the Banco de Portugal shall receive and pay in euro the banknotes mentioned in article 2 submitted to it.
19 April (Notice of the Banco de Portugal no. 5/2001, Official Gazette no. 92, Series I, B)	Introduces changes in sub-section III of section B of the annex VI to Notice no. 7/96, of 24 December, taking into account the changes in the concept of over-the-counter derivative instruments envisaged in Directive no. 93/6/EEC, of 15 March, considering the entry into force of Directive no. 2000/12/EC of the European Parliament and of the Council of 20 March, and considering also the provisions laid down in articles 9 to 11 of Decree-Law no. 250/2000, of 13 October. As a result, the assessment of own fund requirements for the coverage of counterparty risk of any over-the-counter derivative instruments included in the trading portfolio shall be made according to the "mark-to-market" valuation.
23 April (Decision no. 8484/2001, Official Gazette no. 95, Series II)	Approves, pursuant Article no. 63 (1) of the Organic Law of the Banco de Portugal (Law no. 5/98, of 31 January) the adjustments introduced in the Chart of Accounts of the Banco de Portugal, as a reduced version.
23 April (Notice of the Banco de Portugal no. 6/2001, Official Gazette no. 95, Series I, B)	Adds an item c) to article 5 of Notice no. 8/94, of 2 November (which embodies provisions relating to supervision on a consolidated and sub-consolidated basis), widening the scope in which the Banco de Portugal may require supervision on a sub-consolidated basis.
24 April (Decree-Law no. 134/2001, Official Gazette no. 96, Series I, A)	Reviews the personal income tax withholding system. Introduces changes in a number of articles, adds an article 2-A and fully republishes Decree-Law no. 42/91, of 22 January, with the changes introduced by Decree-Laws no. 263/92, of 24 November, 95/94, of 9 April, 18/97, of 21 January, by Law no. 87-B/98, of 31 December, and by the present Decree-Law.
26 April (Regulation of Stock Market Commission no. 2/2001, Official Gazette no. 97, Series II)	Introduces changes in article no. 2 of Regulation no. 10/98, of 5 August, which lays down the rules governing repo operations and security lending, carried out on behalf of transferable securities investment trusts.

30 April (Circular-Letter of the Banco de Portugal no. 7/DMR)

Informs that, in the wake of Circular-Letter no. 347/DMR, of 27 October 99, the rate of return of the Certificates of Deposit, Series B, is fixed at 4,77%, to prevail on the quarter started on 4 May 2001.

May

7 May (Decision no. 9501/2001, Official Gazette no. 105, Series II)

Approves the final plan for the transition of financial administration to the euro, taking into account the proposal submitted by the working group created by Decision no. 15379/2000 of 28 July, and considering the provisions laid down in no. 2 of the Resolution of the Council of Ministers no. 170/2000, of 7 December.

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