Banco de Portugal

EUROSYSTEM

Financial Stability Report | *2006*

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1. OVERALL ASSESSMENT

The concept of financial stability relates to the ability of the financial system to ensure the intermediation of funds in the economy and to enable risk sharing among economic agents, in both intertemporal and geographical dimensions. The maintenance of financial stability thus assumes that financial imbalances which may arise endogenously as a result of economic agents' decisions or from adverse events of a significant unforeseen magnitude are corrected with no pronounced swings in capital market prices or without abrupt changes in the investors' portfolio composition. This background shapes saving and investment decisions, allowing for an efficient allocation of resources, which underlies long-term sustained economic growth, wealth creation and the improvement of welfare levels in the economy. However, the financial intermediation activity is characterised by the existence of information asymmetries in several domains, which should be mitigated with a regulatory framework that provides for the necessary incentives to the prudent management of the risks assumed and that, in particular, defends the interests of small investors.

The banking system in Portugal accounts for a large share of the financing of the non-financial private sector and, although to a lesser extent, it collects an important share of the financial saving accumulated by the general public. In this context, the maintenance of the resilience of the banking system to cope with significant unexpected shocks that impact their business is a public good that is warranted as a particularly important economic policy objective. In addition, given the degree of financial integration reached at the global level, this type of objective assumes a growing cross-border importance, involving greater coordination efforts among authorities from different jurisdictions and renewed attention from the international financial institutions responsible for monitoring the performance of national economies.

Against this background, in 2006 the International Monetary Fund (IMF) conducted a Financial Sector Assessment Program (FSAP) in Portugal. Stress tests to the financial system were one of the pillars of the IMF assessment process, and Banco de Portugal was involved in its capacity as the supervisory entity for credit institutions and financial companies. In its Report, the IMF acknowledged that "Portugal's regulatory framework is modern and sound, and highly compliant with international standards. The supervision of financial institutions by Banco de Portugal is active, professional, and well organized." Further the IMF concluded that the Portuguese banking system "is sound, well-managed, and competitive". The factors that in previous years were identified as the most likely to have an impact on the financial system were the risk associated with the stock market, via the portfolios of pension funds of bank employees and, to a lesser extent, credit risk. This assessment was confirmed within the scope of the FSAP. As far as credit risk is concerned, the IMF recommended special surveillance of indebtedness levels of households and non-financial corporations, and of the concentration of exposure to credit risk associated with real estate markets and with a small number of large companies. However, the results of the stress tests conducted by Banco de Portugal allowed the IMF to conclude that the Portuguese banking system is highly resilient, i.e. it holds the adequate capital level to absorb a series of very extreme, albeit plausible, shocks.

Against the background of this overall very positive assessment made by the IMF and of the recommendations regarding the maintenance of risk development monitoring efforts, it is important to put into perspective the sources of vulnerability for the banking system stemming from financial markets and the macroeconomic situation in Portugal, as well as to outline recent developments in the banking system. This analysis makes it possible to assess the ability of banks to better withstand a possible materialisation of those risks.

In the course of 2006 the banking system's profitability remained high and, in general terms, solvency was reinforced. In addition, in a context of very favourable financing conditions in international financial markets, banks' liquidity indicators presented a slight decline. In turn, default indicators remained at low levels, although the flow of non-performing loans increased in the household sector.

In 2006, compared with international standards, the banking system continued to be highly profitable, stress being laid on the recurring nature of the most part of banks' profits. This should be highlighted in terms of assessing the strength of the financial system to withstand adverse shocks that may be absorbed by current income, without directly affecting capital adequacy levels. The system's profitability levels were sustained by the expansion of activity, particularly in the credit market, low default rates, the containment of operational costs and the buoyant activity in investment banking and asset management activities, associated with the good performance of capital markets. In the same vein, the coverage of liabilities for the pensions of bank employees by assets allocated to the respective funds increased in 2006, with positive reflections on the financial situation of banks. In addition, the rise in short-term interest rates in 2006 was reflected in an increase, albeit slight, in the contribution of the financial margin to profitability. This partly translated the mechanical effect associated with the fact that overnight deposits yield a low remuneration, with a small sensitivity to money market interest rates changes. By contrast, reference should be made to the maintenance of the competitive environment in the residential mortgage market, responsible for the narrow spreads by historical standards.

In turn, the solvency of the banking system was reinforced in 2006, in particular in what concerns indicators relating to base own funds (Tier I), while the slight reduction of the overall capital adequacy ratio is due to the change in the regulatory framework. The latter was tightened in terms of the eligibility of general provisions in own funds and on the requirement of more deductions from own funds, namely participating interests in insurance corporations. The narrowing of the dispersion of profitability and capital adequacy ratios is positive from a financial stability point of view, since it was associated with a decline in the share of the group of institutions with lower levels in the previous year. The convergence of capital adequacy ratios to levels closer to most euro area countries is also worth mentioning. In turn, capital markets continued to show a very positive assessment of the Portuguese banking system, as shown by stock market valuations, the maintenance of low spreads in debt securities, the improvement in the ratings given and the good receptiveness of investors to international debt issues, including securitisations.

In the current context, and despite the overall quite positive international macroeconomic environment, there is a series of factors whose materialisation is liable of posing relevant challenges to world financial stability. Robust growth in the world economy has been accompanied by low levels of volatility in financial markets, as well as reduced risk premia in the private debt of developed economies and sovereign issuers of emerging market economies. In turn, stock markets experienced successive historical peaks already in 2007. These developments took place in a context of successive increases in key interest rates – from historically very low levels – by most central banks in developed countries.

One of the possible explanations for the very positive developments in financial markets, within the scope of rising interest rates at the global level, may be associated with the credibility of central banks in the pursuit of their price stability objectives, giving rise to lastingly lower term risk and credit risk premia. If this is the case, higher equilibrium debt levels in the business sector and higher stock market valuations would be expected. In fact, this is mirrored in enterprises' bond and bank lending default rates, which stand at very low levels in most developed countries.

However, it should be taken into consideration that in 2006 global macroeconomic imbalances persisted, reflected in the US economy's borrowing requirements, met through savings originating in various Asian countries, especially China, and in oil exporting countries. The allocation of these surpluses

to fixed-income assets has contributed to lower the respective yields, with a squeeze on credit risk premia and the respective dispersion among debtors into different rating categories, the so-called "search for yield" phenomenon. Financial systems in most economies have been benefiting from these developments, be it through gains in own portfolios or fees associated with the management or intermediation of operations on behalf of third parties. In this respect, it is worth mentioning the strong increase in the number and amount of mergers and acquisitions at the global level, with particular emphasis on those where the acquiring group strongly resorts to debt (leveraged buy outs).

The sustainability of this situation relies, inter alia, on the perception of international investors as regards growth in the US economy, jointly with the maintenance of high external financing flows into this economy. Specifically, in the wake of the 2006 developments in the sub-prime segment, the risk of a deterioration that is significant and broadly based across several US housing market segments may result in a sharper than currently forecast slowdown in this economy's activity. This possibility directly amplifies the initial shock into the private debt securities markets at large, among which are securities issued in mortgage-backed operations, which have a quite relevant weight in the United States. A slowdown in economic activity under these circumstances may thus have a non-negligible impact on the credit quality of non-financial corporations, whose debt was issued under favourable expectations for economic activity.

Furthermore, a significant share of the risk traditionally assumed by the banking system has become increasingly dispersed in the portfolio of other investors, via the use of risk transfer instruments. The markets for these instruments have grown quite strongly in the past few years, and are relevant innovations insofar as they expand opportunities to diversify and transfer risks associated with illiquid assets. However, the greatest source of uncertainty in this domain is associated with market inexperience as regards the conduct/settlement of these contracts in periods of more broadly based default.

As far as the Portuguese economy is concerned, being a small open economy fully integrated at the international level from the economic and financial points of view, exposure to these risks at the global level plays a relevant role. On the other hand, other specific risks in the Portuguese economy may also directly and indirectly affect the Portuguese banking system, namely the exposure of the Portuguese banking system to changes in the sentiment of international markets and to credit risk associated with the non-financial private sector's indebtedness levels.

In fact, Portuguese banks are exposed to changes in market sentiment. This occurs due to changes in the value of assets (in the own portfolio and especially in the portfolio of pension funds of bank employees) and in the confidence of investors in the international markets where Portuguese banks finance their business activity, including the debt securities market, namely through securitisations. The strong increase in the indebtedness of households and non-financial corporations in the Portuguese banking system translates into a significant deterioration of the Portuguese economy's international investment position, especially of the net external debt. Although, in general terms, this debt is exempt from exchange rate risk due to Euro denomination, banks, which have been issuing high amounts in international financial markets and regularly structuring securitisations of a significant part of their portfolio, are particularly exposed to changes in investor sentiment and the consequent decline in liquidity in these markets. In periods of increased volatility and lower available liquidity in the markets, banks may have to face an increased financing cost or even have difficulties in refinancing liabilities maturing in the very short term without jeopardising the smooth operation of credit activity.

Regarding access to and diversification of market financing, in 2006 the Portuguese legislation governing mortgage bonds was amended, making it easier for Portuguese banks to start issuance programmes targeted at international investors, which address this market from a pan-European per-

spective. This year, the gross flow of issues by branches and subsidiaries abroad of Portuguese banks, of mortgage bonds and credit sold associated with the structuring of securitisations was rather significant and, when jointly considered, was only slightly lower than in the previous year, reflecting the high borrowing requirements of the private sector. Consequently, loans originated by the banking system but not financed with customers' funding already accounted for almost half of the base of deposits collected with the public at the end of 2006. In turn, indicators that take into consideration the residual maturity of assets and liabilities generally point to a slight deterioration of the banking system's liquidity position, similarly to the previous year. Within this framework, the maintenance of the strength of liquidity risk assessment, control and management systems, namely the existence of contingency plans that envisage possible unavailability of funds in the market to refinance liabilities over a relatively long horizon, is crucial to ensure that the banking system continues to smoothly perform its functions of financial intermediation in the Portuguese economy.

The high level of household indebtedness is an important vulnerability of the Portuguese economy, mainly in a context of rising interest rates and a still incipient improvement in the labour market. According to the available information, the rise in interest rates already observed seems to have contributed mainly to limit growth in the consumer spending and housing expenditure of households, as well as to a slowdown in loans for house purchase. The increase in the flow of bank credit in default in this sector from the second half of 2005 onwards brought this indicator to a level closer to that recorded in 2003. However, the pass-through of rises in money market interest rate to interest rates applicable in loan contracts does not seem to be completed yet, thereby implying an additional increase in the debt burden of this sector. To a large extent, the low incidence of default in the portfolio of lending to households is likely to be associated with credit market supply side factors, namely the fact that banks entered into mortgage loans with substantially longer maturities or with clauses allowing for postponing a part of capital repayments. Moreover, these developments are occurring in a context of moderate growth in real estate market prices in recent years and available evidence pointing to the absence of excessive valuations in the housing market. The acceleration of lending for purposes other than house purchase is also a noteworthy fact, which may still be contributing to some sustaining of household consumption. Developments in this market segment therefore deserve particular attention in the near future, namely as regards the existence of collateral in these loans and the knowledge as to how these loans are distributed among households. The results of the Household Wealth and Indebtedness Survey (*Inquérito ao Património e Endividamento das Famílias – IPEF*), conducted in late 2006 and early 2007 to a sample of households and that will be available in the second half of 2007, should enable to draw more precise conclusions as to the heterogeneity of the financial situation of households, with special emphasis on the segments of the population that may have assumed greater risks in the most recent years.

Non-financial corporations have recorded substantial financing flows, in contrast to developments in business investment in recent years. Bank lending to this sector accelerated, particularly to larger companies, due to redemptions of commercial paper, a close substitute to bank loans in the financing of these companies. In turn, given that business investment continues to follow a modest trend, the main motivations for the maintenance of high gross financing flows are associated with financial operations, namely mergers and acquisitions and debt restructuring operations. In fact, amounts associated with mergers and acquisitions showed high levels, in a context of significant increases in the profits of larger companies, i.e. those for which there is more accounting information available for the most recent period, with special focus on listed companies. According to available evidence from qualitative surveys to banks, bank lending demand in recent years was also sustained by debt restructuring operations, namely those intended to avoid imminent default situations of some segments of small and medium-sized enterprises.

The flow of new bank loans overdue in operations with companies has remained relatively stable at a quite lower level than that recorded between 2001 and 2003, thereby contributing to a continued reduction in indicators that take into account the amount outstanding of credit default in this sector. Against a background of generally higher financial leverage levels than those seen in previous economic cycles, the rise in interest rates passes through more significantly to the financing costs of indebted companies, notwithstanding lower interest rate volatility in the current economic regime than that seen in previous economic cycles. According to available evidence, the most significant repercussions on the ability of companies to expand their business activities, as well as on default levels, are felt in companies with a more fragile starting point, in terms of the capacity to cover interest expenditure by operational results.

Finally, the results of business surveys suggest that it is not likely that current indebtedness levels are constraining investment, nor are they a significant limitation to the dynamics of the economy recovery. However, in the present context of adjustment of macroeconomic imbalances in the Portuguese economy and the sector restructuring arising from the changing process of comparative advantages at world level, some deterioration is to be expected in the capacity to meet the debt service of corporations more negatively affected in their operational profitability by such processes.

In the beginning of 2007, all the legal framework setting the rules for the calculation of capital requirements consistent with the paradigms underlying the New Basel Accord was enacted. This poses important challenges for banks and supervisory authorities and should lead to the reinforcement of risk assessment, control and management systems by the institutions involved.

MAIN INDICATORS (to be continued)
Per cent; end-of-period figures

	1999	2000	2001	2002	2003	2004	2005	2006
Macroeconomic and financial indicators								
Real GDP (rate of change)								
US	4.4	3.7	0.8	1.6	2.5	3.9	3.2	3.3
Euro area	3.0	3.9	1.9	0.9	0.8	2.0	1.4	2.6
Portugal	3.9	3.9	2.0	0.8	-0.8	1.3	0.5	1.3
Fiscal balance (as a percentage of GDP)								
US	0.9	1.6	-0.4	-3.8	-4.8	-4.6	-3.7	-2.6
Euro area	-1.4	-1.0	-1.9	-2.6	-3.1	-2.8	-2.4	-1.6
Portugal	-2.7	-2.9	-4.3	-2.9	-2.9	-3.3	-6.1	-3.9
Current account balance (as a percentage of GDP)								
US	-3.2	-4.2	-3.8	-4.5	-4.8	-5.7	-6.4	-6.5
Euro area	0.3	-0.7	0.0	0.6	0.4	1.0	0.1	-0.3
Portugal	-8.5	-10.2	-9.9	-8.1	-6.1	-7.7	-9.7	-9.5
Oil price (USD brent; y-o-y rate of change)	142.7	-6.7	-13.6	46.6	-1.2	34.0	44.4	5.5
Key interest rates - Monetary policy								
US	5.50	6.50	1.75	1.25	1.00	2.25	4.25	5.25
Euro area	4.00	5.75	4.25	3.75	3.00	3.00	3.25	4.50
3-month Euribor	3.34	4.86	3.29	2.87	2.12	2.16	2.49	3.73
Yields on (10-year) Government bonds								
US	6.44	5.11	5.05	3.82	4.25	4.22	4.39	4.70
Euro area	5.49	5.02	5.13	4.26	4.33	3.72	3.36	4.06
Stock markets (annual rate of change)								
S&P 500	19.5	-10.1	-13.0	-23.4	26.4	9.0	3.0	13.6
Dow Jones Euro Stoxx	39.5	-5.9	-19.7	-34.5	18.1	10.0	23.0	20.3
PSI Geral	12.6	-8.2	-19.0	-20.7	17.4	18.0	17.2	33.3
PSI Financial Services	n.a.	n.a.	-14.6	-24.8	4.0	12.0	24.4	34.8
Financial situation of the non-financial private sector								
Households								
Indebtedness								
As a percentage of GDP	54	60	64	68	73	78	83	88
As a percentage of disposable income	77	86	91	97	103	110	117	124
Loans granted by resident financial institutions [a]								
Annual rate of change	29.6	19.9	12.7	11.3	11.0	9.8	10.1	9.8
of which:								
Housing purposes	30.0	20.2	14.9	16.0	11.8	10.5	11.1	9.9
Consumption and other purposes	28.8	19.1	7.5	-0.1	8.7	7.4	6.8	9.7
Net lending (+) / borrowing (-) [b]								
As a percentage of GDP	0.8	1.1	2.6	2.9	3.4	2.9	3.4	1.8
As a percentage of disposable income	1.1	1.6	3.7	4.2	4.8	4.1	4.7	2.5
Currents savings [b]								
As a percentage of GDP	6.9	7.2	7.7	7.4	7.8	7.3	6.7	5.9
As a percentage of disposable income	9.9	10.2	10.9	10.5	10.9	10.3	9.5	8.3
Investment in real assets [b]								
As a percentage of GDP	6.9	6.6	6.4	6.0	5.1	5.1	4.9	4.7
Non-financial corporations								
Total debt [c]								
As a percentage of GDP	81	90	96	96	99	98	103	105
Annual rate of change	18.1	19.2	12.7	6.1	5.6	5.1	7.6	5.3
Financial debt [d]								
As a percentage of GDP	72	80	90	91	94	91	95	98
Loans granted by resident financial institutions [a]								
Annual rate of change	25.6	26.4	15.5	7.3	5.4	3.2	4.1	5.5
Net lending (+) / borrowing (-) [b]								
As a percentage of GDP	-5.4	-8.2	-7.0	-6.1	-4.7	-4.3	-5.0	-6.4
Currents savings [b]								
As a percentage of GDP	8.8	7.2	7.8	7.9	8.1	8.6	7.2	5.5
Investment in real assets [b]								
As a percentage of GDP	16.2	16.6	15.9	14.7	13.8	13.6	13.3	12.5

Sources: Bloomberg, IMF, *INE* and Banco de Portugal.
Notes: y-o-y year-on-year. n.a. not available. **(a)** Loans granted by monetary financial institutions and other financial intermediaries adjusted for securitisations conducted through non-resident special purpose vehicles. **(b)** Net lending / borrowing, savings and investment ratios to GDP use National Accounts (base 2000) data and Banco de Portugal estimates. Investment comprises gross fixed capital formation and the net acquisition of land and intangibles. **(c)** It includes loans granted by resident and non-resident credit institutions, loans/additional capital by non-resident intra-group corporations (excluding those granted to non-financial corporations having their head-office in Madeira's off-shore), commercial paper and bonds issued by non-financial corporations held by other sectors and trade credits received from other sectors. **(d)** Total debt excluding trade credits and including loans granted to non-financial corporations having their head-office in Madeira's off-shore. It corresponds to the financial accounts instruments "Securities other than shares" and "Loans".

MAIN INDICATORS (continued) Per cent; end-of-period figures	1999	2000	2001	2002	2003	2004	2004*	2005*	2006*
Profitability									
ROE - Return on equity [e]	18.0	18.3	17.8	14.1	16.2	14.5	13.1	19.4	20.7
ROE - Return on equity - adjusted [e], [f]									18.9
ROA - Return on assets [e]	1.12	1.11	1.01	0.78	0.91	0.87	0.65	1.03	1.30
ROA - Return on assets - adjusted [e], [f]									1.18
Financial margin (as a percentage of average assets)	2.45	2.21	2.24	2.12	2.00	1.94	1.91	1.86	1.89
Income from services and commissions (net, as a percentage of average assets)	0.76	0.70	0.63	0.63	0.69	0.76	0.72	0.77	0.78
Ratio of operational costs to gross income	63.1	58.2	57.6	59.1	57.4	57.2	71.7	58.3	53.3
Capital adequacy									
Overall capital adequacy ratio	10.8	9.2	9.5	9.8	10.0	10.4	10.2	11.3	10.9
Market risk									
Net open position in equities to regulatory capital	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	1.8	1.3	2.7
Coverage ratio of the pension funds of bank employees (as a percentage of regulatory capital)	n.a.	n.a.	-1.8	-0.8	0.1	-0.4	-0.4	1.2	5.3
Liquidity risk									
Credit-to-deposit ratio	104.7	116.0	122.7	129.5	129.1	128.3	130.9	137.5	145.6
Coverage ratio of interbank liabilities by highly liquid assets	n.a.	n.a.	85.6	80.0	100.7	99.5	110.0	98.5	99.3
Liquidity gap [g]									
Up to 3 months	n.a.	n.a.	-2.2	-2.4	1.6	2.4	1.4	-0.9	-1.4
Up to 1 year	n.a.	n.a.	-6.4	-7.2	-6.3	-3.6	-5.4	-8.2	-8.9
For domestic banks									
Credit-to-deposit ratio	99.9	114.6	121.1	125.6	124.8	127.2	129.2	134.2	140.7
Coverage ratio of interbank liabilities by highly liquid assets	n.a.	n.a.	88.1	91.6	120.1	120.8	127.3	126.5	115.8
Liquidity gap [g]									
Up to 3 months	n.a.	n.a.	-3.5	-3.4	0.5	0.7	0.6	-0.7	-0.9
Up to 1 year	n.a.	n.a.	-7.8	-7.6	-6.5	-4.8	-5.4	-7.4	-8.8
Credit risk									
Loans granted by resident financial institutions to the non-financial private sector [a]									
Annual rate of change	27.7	23.0	14.1	9.3	8.3	6.6	6.6	7.4	7.9
Credit and interest overdue (on a consolidated basis)									
As a percentage of credit to customers	n.a.	2.2	2.2	2.3	2.4	2.0	1.8	1.7	1.5
As a percentage of assets	n.a.	1.4	1.4	1.6	1.6	1.3	1.3	1.1	1.0
Non-performing loans of households									
As a percentage of loans to households	2.1	1.8	2.0	2.1	2.4	2.2	2.2	2.0	1.7
Non-performing loans of non-financial corporations									
As a percentage of loans to non-financial corporations	3.2	2.5	2.4	2.4	2.2	1.7	1.7	1.7	1.5
Annual flow of new credit overdue and other credit considered to be doubtful									
As a percentage of bank loans adjusted for securitisation transactions									
Households	0.22	0.27	0.43	0.39	0.61	0.32	0.32	0.29	0.53
Non-financial corporations	-0.01	0.34	0.74	0.76	0.57	0.52	0.52	0.60	0.42
International exposure (for domestic banks):									
Share of external assets in total assets [h]	23.1	21.7	19.8	18.1	21.6	20.5	30.3	27.6	29.0
of which:									
Local assets denominated in local currency	1.8	2.8	1.8	1.2	1.7	1.6	7.1	6.4	6.4
International assets by counterparty sector:									
Banking sector	14.1	12.3	10.6	8.3	14.1	14.8	13.6	12.7	13.6
Non-banking sector	7.1	6.6	7.4	8.5	5.8	4.0	9.6	8.5	9.0

Sources: Bloomberg, IMF, *INE* and Banco de Portugal.
Notes: n.a. not available. * The break in the series in 2004 resulted from the adoption of different accounting standards, which also implied a redefinition of the group of banking institutions under analysis. This break did not apply to the indicators based on Monetary and Financial Statistics, which consider resident monetary institutions. **(e)** ROE and ROA indicators are based on Income before taxes and minority interests, considering average values for the period for the stocks variables. **(f)** The adjusted profitability indicators are obtained after deducting from profit and loss account the impact of the restructuring of participating interests in companies (namely in the insurance sector) in one of the major banking groups considered in the analysis. **(g)** Only the 2005 and 2006 figures were reported under the IAS valuation criteria. **(h)** The comparable figures for 2004, 2005 and 2006 are based on a new information report. Total assets for the whole set of domestic banks is an estimate.

BALANCE SHEET OF THE BANKING SYSTEM On a consolidated basis						
	EUR millions		**Annual rate of change** **(per cent)**		**Structure** **(as a percentage** **of assets)**	
	2005	**2006**	**2005**	**2006**	**2005**	**2006**
Cash and claims on central banks	6 205	6 906	-17.9	11.3	2.0	2.0
Claims and investment in other credit institutions	30 876	31 490	23.3	2.0	10.1	9.3
In the country	5 748	5 773	n.a.	0.4	1.9	1.7
Abroad	25 127	25 718	n.a.	2.3	8.2	7.6
Financial assets at fair value through profit or loss	18 150	20 266	40.7	11.7	5.9	6.0
Equity	853	1 305	n.a.	53.1	0.3	0.4
Debt instruments	12 221	12 712	n.a.	4.0	4.0	3.8
Other	5 076	6 248	n.a.	23.1	1.7	1.9
Available-for-sale financial assets	14 037	17 876	-5.2	27.4	4.6	5.3
Equity	4 169	6 021	n.a.	44.4	1.4	1.8
Debt instruments	8 909	11 485	n.a.	28.9	2.9	3.4
Other	959	371	n.a.	-61.4	0.3	0.1
Net credit to customers	199 873	222 942	9.4	11.5	65.3	66.1
Investment held to maturity	718	663	38.0	-7.6	0.2	0.2
Hedging derivatives	816	953	17.8	16.9	0.3	0.3
Securitised non-derecognised assets	14 186	15 450	16.7	8.9	4.6	4.6
of which: credit to customers	14 186	15 372	16.7	8.4	4.6	4.6
Investment in subsidiaries	3 475	4 080	33.0	17.4	1.1	1.2
Tangible and intangible assets	3 886	4 301	7.6	10.7	1.3	1.3
Other assets	13 768	12 544	40.5	-8.9	4.5	3.7
Total assets	**305 989**	**337 473**	**12.3**	**10.3**	**100.0**	**100.0**
Resources from central banks	6 215	1 739	75.5	-72.0	2.0	0.5
Resources from other credit institutions	38 840	42 941	16.6	10.6	12.7	12.7
In the country	5 384	4 078	n.a.	-24.3	1.8	1.2
Abroad	33 457	38 863	n.a.	16.2	10.9	11.5
Resources from customers and other loans	149 139	156 606	4.5	5.0	48.7	46.4
Liabilities represented by securities	62 807	81 184	12.8	29.3	20.5	24.1
Subordinated liabilities	9 973	9 893	0.9	-0.8	3.3	2.9
Financial liabilities held for trading	4 306	5 776	66.3	34.1	1.4	1.7
Hedging derivatives	956	1 471	70.1	53.9	0.3	0.4
Liabilities for non-derecognised assets in securitisation operations	2 363	4 130	n.a.	74.8	0.8	1.2
Other liabilities	13 608	11 998	35.9	-11.8	4.4	3.6
Total liabilities	**288 208**	**315 738**	**11.5**	**9.6**	**94.2**	**93.6**
Capital	17 782	21 735	26.8	22.2	5.8	6.4
Total liabilities and net wealth	**305 989**	**337 473**	**12.3**	**10.3**	**100.0**	**100.0**

Source: Banco de Portugal.
Note: n.a.- not available.

PROFIT AND LOSS ACCOUNT
On a consolidated basis

	EUR millions		As a percentage of average assets		Annual rate of change (per cent)	
	2005	2006	2005	2006	2005	2006
1. Interest income	13 977	17 278	4.84	5.46	10.7	23.6
2. Interest expenses	8 601	11 291	2.98	3.57	14.6	31.3
3. Financial margin (1-2)	**5 375**	**5 987**	**1.86**	**1.89**	**5.0**	**11.4**
4. Income from capital instruments	217	162	0.08	0.05	34.4	-25.4
5. Income from services and commissions (net)	2 212	2 478	0.77	0.78	15.1	12.0
6. Income from financial assets and liabilities measured at fair value	505	-9	0.17	0.00	46.0	-
7. Income from available-for-sale financial assets	663	455	0.23	0.14	539.1	-31.4
8. Income from foreign exchange revaluation	53	496	0.02	0.16	-74.5	834.1
9. Income from the sale of other financial assets	366	743	0.13	0.23	404.5	103.1
9.a) Income from the sale of other financial assets - adjusted	*366*	*433*	*0.13*	*0.14*	*404.5*	*18.5*
10. Other operating profit and loss	417	624	0.14	0.20	-30.6	49.5
10.a) Other operating profit and loss – adjusted	*417*	*604*	*0.14*	*0.19*	*-30.6*	*44.8*
11. Gross income (3+4+5+6+7+8+9+10)	**9 809**	**10 936**	**3.40**	**3.45**	**14.9**	**11.5**
11.a) Gross income - adjusted (3+4+5+6+7+8+9+10.a)	***9 809***	***10 606***	***3.40***	***3.35***	***14.9***	***8.1***
12. Staff costs	3 300	3 349	1.14	1.06	-10.0	1.5
13. General administrative costs	1 956	2 026	0.68	0.64	3.4	3.6
14. Depreciation and amortisation	465	449	0.16	0.14	-17.3	-3.5
15. Provisions net of restitutions and annulments	187	133	0.06	0.04	-33.2	-28.9
16. Impairment losses and other net value adjustments	1 138	1 091	0.39	0.34	12.5	-4.1
17. Appropriation of income from associates and joint ventures (equity method)	217	233	0.08	0.07	-65.2	7.1
17. a) Appropriation of income from associates and joint ventures (equity method) - adjusted	*217*	*191*	*0.08*	*0.06*	*-65.2*	*-12.3*
18. Income before taxes and minority interests (11-12-13-14-15-16+17)	**2 981**	**4 121**	**1.03**	**1.30**	**70.5**	**38.2**
18 a) Income before taxes and minority interests - adjusted (11-12-13-14-15-16+17.a)	***2 981***	***3 750***	***1.03***	***1.18***	***70.5***	***25.8***
19. Taxes on profit	401	724	0.14	0.23	75.6	80.5
20. Income before minority interests (18-19)	**2 580**	**3 398**	**0.89**	**1.07**	**69.7**	**31.7**
20.a) Income before minority interests - adjusted (18.a-19)	***2 580***	***3 026***	***0.89***	***0.96***	***69.7***	***17.3***
21. Minority interests (net)	383	576	0.13	0.18	62.2	50.2
22. Net profit and loss (20-21)	**2 197**	**2 822**	**0.76**	**0.89**	**71.1**	**28.5**
22.a) Net profit and loss - adjusted (20.a-21)	***2 197***	***2 451***	***0.76***	***0.77***	***71.1***	***11.6***

Source: Banco de Portugal.

Note: The adjustment in some of the items refers to the deduction of the effect of the restructuring of participating interests in corporations of the insurance sector carried out by one of the major banking groups considered in the analysis. However, the corresponding adjustment was not made in the items of taxes on profits and (net) minority interests (19 and 21).

CAPITAL ADEQUACY				
On a consolidated basis				

			Annual rate of change	
	2005	**2006**	**2005**	**2006**
			Per cent	
1. Own funds				
1.1. Original own funds	14 891	17 874	8.5	20.0
1.2. Additional own funds	10 776	9 942	29.3	-7.7
1.3. Deductions	1 948	2 405	-6.9	23.4
1.4. Supplementary own fund	0	0	-100.0	n.a.
Total own funds	23 719	25 411	18.7	7.1
2. Own funds requirements				
2.1. Solvency ratio	16 213	17 960	7.4	10.8
2.2. Position risks	493	468	0.9	-5.1
2.3. Settlement and counterparty risks	67	70	26.7	5.0
2.4. Foreign exchange rate risks	57	92	38.9	60.8
2.5. Other requirements	1	2	-34.8	239.0
Total own funds requirements	16 830	18 591	7.3	10.5
			Percentage points	
3. Ratios (per cent)				
3.1. Own funds / Total requirements	140.9%	136.7%	13.5	-4.2
3.2. Own funds / (Total requirements x 12.5)	11.3%	10.9%	1.1	-0.3
3.3. Original own funds / (Total requirements x 12.5)	7.1%	7.7%	0.1	0.6

Source: Banco de Portugal.
Note: n.a. - not applicable.

2. MACROECONOMIC AND FINANCIAL RISKS

2.1. Overview

Assessing the financial stability of the banking system entails the identification and monitoring of the various risk dimensions underlying its activity, particularly with regard to credit, market, liquidity and interest rate risk. The intensity with which such risks are felt, with systemic implications, is influenced by the macroeconomic environment and by financial market developments (Table 2.1.1). As such, this chapter identifies and assesses the main macroeconomic and financial risks with direct or indirect impact on financial stability in Portugal, which is understood as the ability of financial institutions to continue to smoothly perform their intermediation functions.

Although the international macroeconomic environment is overall positive, there is a set of risk factors that are likely to place relevant challenges for global financial stability. The risk of an abrupt correction of macroeconomic imbalances in the United States, which had already been identified in previous years, together with the risk of a significant and broadly based deterioration in the US housing market, may result in a much more marked deceleration in economic activity than currently expected. In turn, the persistence of risk premia at historically low levels for riskier asset classes is a sign that investors may not be adequately pricing risk. This suggests that asset prices in these markets, namely the private debt, sovereign debt and stock markets in emerging market economies, may be particularly sensitive to changes in investors' expectations. If these were to materialise, they might imply abrupt adjustments in financial asset prices. The most recent episodes of financial instability, in the wake of the Asian and Russian crises, are examples of how investors may make abrupt adjustments following market sentiment changes. This may lead to a disproportionate increase in the demand for assets with low risk and high liquidity. In line with this, a sudden increase in volatility resulting e.g. from a downward revision of economic growth expectations or a significant increase in inflationary pressures may result in this type of reaction. Such events would most likely lead to a reversal of capital flows into emerging market economies, to lower availability of funds for lower-rated companies, and to very marked stock market corrections. The possible materialisation of this scenario is particularly relevant in the current environment, given the high volume of mergers and acquisitions conducted over the past few years with recourse to debt issuance. Indeed, companies involved in such operations are particularly vulnerable to market sentiment changes, given the high degree of financial leverage underlying a large number of such operations. Consequently, these companies may face a number of difficulties in servicing their debt. This may affect their ability to conduct investment projects that could be viable if indebtedness were lower. In more extreme cases, this may lead to broadly based increases in delinquency. It should be noted that two episodes of instability were recently observed in financial markets, in May/June 2006 and February/March 2007 respectively, which illustrate the market sensitivity in periods of increased uncertainty (see "Box 2.1 *Volatility in international financial markets: a comparison of the May 2006 and February 2007 episodes*"). However, these episodes were short-lived and had no systemic repercussions.

Moreover, a significant share of risk traditionally assumed by the banking system has been transferred to other type of investors through financial markets, by using complex financial instruments. Although such transfers contribute to lower risk concentration in the banking system, the main source of uncertainty in these markets regards growing difficulties in monitoring global risks. Such developments imply that the separation between lending activity and investment in financial markets should fade. Also,

Table 2.1.1

MAIN FINANCIAL AND MACROECONOMIC INDICATORS					
			Change between:		
	2005	**2006**	**maximum [a] and 31 Dec. 2006**	**minimum [a] and 31 Dec. 2006**	**31 Dec. 2006 and 30 April 2007**
Rate of change in real GDP					
United States	3.2	3.3			
Euro area	1.4	2.6			
Portugal	0.5	1.3			
Fiscal balance (as a percentage of GDP)					
United States	-3.7	-2.6			
Euro area	-2.4	-1.6			
Portugal	-6.0	-3.9			
Current account balance (as a percentage of GDP)					
United States	-6.4	-6.5			
Euro area	0.1	-0.3			
Portugal	-9.8	-9.5			
Equity market					
(*per cent change*)					
General indices					
Dow Jones Euro Stoxx	23.0	20.3	-15.1	139.2	7.8
S&P 500	3.0	13.6	-7.1	82.6	4.5
PSI Geral	17.2	33.3	0.0	144.8	12.2
Bond market [b]					
(*change in levels, basis points*)					
Government bond yields					
Euro area	-4.8	83.8	0.0	129.6	21.3
United States	71.0	33.0	-51.1	111.4	-12.5
Exchange rate					
(*per cent change*)					
EUR/USD [c]	-13.4	11.6	-3.4	59.6	3.3
USD/JPY [d]	14.7	1.1	-11.6	17.4	0.4
Oil price					
(*per cent change in USD*)					
Spot price (Brent)	44.4	5.5	-22.2	503.1	11.5

Sources: ECB, Bloomberg, Thomson Financial Datastream, IMF, Merrill Lynch and Banco de Portugal.
Notes: Latest observation: 30 April 2007. **(a)** Maximum and minimum levels observed in the period between 1 January 1999 and 31 December 2006. **(b)** Merrill Lynch indices. **(c)** A negative change means an appreciation of the US dollar. **(d)** A negative change means a depreciation of the US dollar.

great uncertainty subsists on the behaviour of such innovative financial instruments in a context of increased volatility and declining liquidity.

Against a background of strong economic and financial integration, the Portuguese economy, which is a small open economy, is particularly exposed to overall risks at international level. In this context, the main macroeconomic and financial risks mentioned above, together with a set of specific risks, may directly or indirectly affect the performance of the Portuguese economy, as well as of the Portuguese financial system. Portuguese banks are thus sensitive to sudden changes in market sentiment, which may give rise to significant changes in the valuation of their portfolio of financial assets and, in particular, of financial assets held by bank employees' pension funds. In turn, the high indebtedness of house-

holds is an important vulnerability of the Portuguese economy, particularly in a context of rising interest rates and the still incipient improvement in the labour market situation. Higher euro area interest rates implied an increase in household debt-servicing costs, which is likely to have contributed to hinder developments in private consumption and housing investment, and may also bring about a rise in credit risk. Non-financial corporations, in turn, have recorded substantial financing flows, in contrast to developments in corporate investment over the past few years. The strong indebtedness of households and companies with the Portuguese banking system has translated into a significant deterioration of the international investment position of the Portuguese economy. In fact, Portuguese banks have funded the expansion of lending activity through the increasing recourse to borrowing from international financial markets. Although such financing does not imply foreign exchange risk, given that most debt is incurred in euro, Portuguese banks are particularly exposed to market sentiment changes, which may lead to unexpected increases in their financing costs, or even difficulties in refinancing a number of assets in a context of lower liquidity available in the markets. Against this background, the maintenance of the soundness of liquidity risk assessment, control and management systems, namely the existence of contingency plans that envisage the unavailability of funds in the market to refinance liabilities over a relatively long horizon, is crucial to ensure that the banking system continues to smoothly perform fund intermediation functions in the Portuguese economy.

Available evidence suggests that even under very unfavourable but still plausible scenarios the Portuguese banking system is prepared to withstand strong and negative shocks, while maintaining adequate solvency and profitability levels. This was one of the main findings of the stress-testing exercises on the Portuguese banking system carried out by the IMF under the Financial Stability Assessment Program in 2006, as discussed in "Box 4.1 *Results of the Portuguese banking system stress-testing exercise*".

## 2.2. Global risks and vulnerabilities

In 2006 the world economy continued to grow strongly, by around 5 per cent, although economic activity in the United States slowed down somewhat. The outlook for this economy points to a continued and very gradual adjustment of macroeconomic imbalances over the next few years, which should translate into a slight deceleration in economic activity. In the euro area, estimates for GDP growth in 2006 were revised upwards throughout the year. The acceleration in economic activity was mostly associated with the buoyancy of domestic demand. This reflected developments in investment and, to a lesser extent, in private consumption, in a context of some improvements in the labour market. According to the Eurosystem staff macroeconomic projections and analysts' expectations, economic activity in the euro area is likely to decelerate somewhat in 2007 compared with the previous year. Most central banks of advanced economies raised their key interest rates in 2006. In the euro area, following a relatively protracted stability period, the ECB increased its key interest rates for the first time at end-2005, with six additional rises up to May 2007, in order to keep inflation expectations anchored at levels consistent with price stability. In cumulative terms, the rise in key ECB interest rates amounted to 1.75 p.p. In the United States, the Federal Reserve raised the Federal funds rate in four occasions during the first half of 2006, in order to contain inflationary pressures associated with energy price growth and possible increases in the utilisation of resources. However, the decline in oil prices as from August helped to contain inflationary pressures, which explained the interruption of the upward cycle of US interest rates in the second half of the year, in a context of gradual slowdown in economic activity. In turn, economic activity continued to record a rather robust pace of growth in emerging market economies, and its importance in world trade followed an upward trend. Capital flows to these countries continued to record very substantial volumes in 2006.

Despite this relatively benign macroeconomic environment, there is a set of macroeconomic and financial risks and vulnerabilities, namely (i) the persistence of global macroeconomic imbalances and implications for the world economy of an abrupt correction of such imbalances; (ii) the cooling of the real estate market in the United States and in other advanced economies, following a relatively protracted period of strong activity and valuation; (iii) the recent increase in the degree of corporate financial leverage; (iv) the high investors' sensitivity to an increase in uncertainty, which is catalysed by evidence that risk premia currently stand at historical lows, in particular in private debt markets and emerging market economies; and, finally, (v) the very strong growth trend in credit risk transfer markets due to the use of innovative and complex financial instruments, which hampers their monitoring and generates some uncertainty regarding the reaction of these markets to adverse events.

Persistence of global macroeconomic imbalances

At international level, one of the main risks to macroeconomic and financial stability continues to be the persistence of global macroeconomic imbalances. In the United States, the current account deficit remained broadly unchanged, although the general government deficit declined significantly in 2006, in line with developments in the previous year (Chart 2.2.1). However, borrowing requirements of the private sector recorded a further significant rise. This increase in borrowing requirements of the US economy has been offset by a strong demand for US dollar-denominated assets by international investors, with emphasis on the role played by Asian central banks and by investors of oil-exporting countries, which have registered very positive current account balances (Chart 2.2.2). The demand for these assets has been supported, on the one hand, by favourable expectations regarding US economic growth and, on the other, by foreign exchange intervention policies of a number of countries in order to restrict the appreciation of their currencies against the US dollar. An abrupt decline in the demand for US dollar-denominated assets by international investors, e.g. due to a downward reassessment of prospects for growth in the United States or due to market sentiment changes, may place significant pressure on domestic demand and contribute to a more abrupt adjustment in the US economy. Moreover, the external deficit of the United States has been mostly funded through fixed-income securities, which may

Chart 2.2.1

BORROWING REQUIREMENTS OF PUBLIC AND PRIVATE SECTORS AND CURRENT ACCOUNT IN THE US
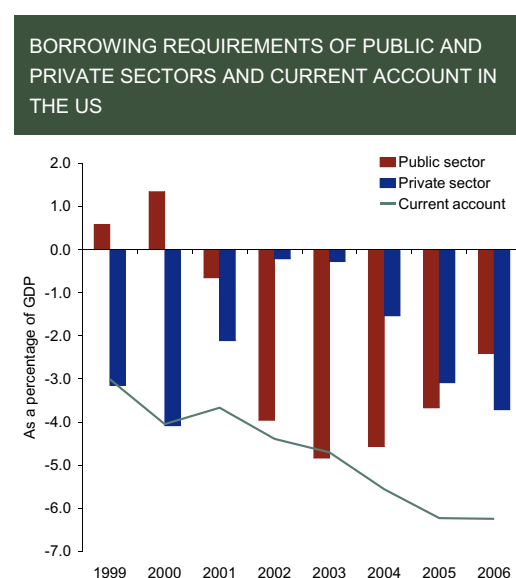
Source: Federal Reserve Board.

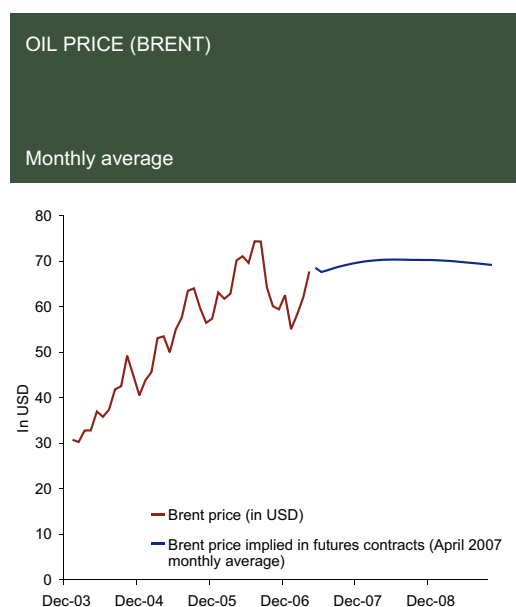**Chart 2.2.2**

CURRENT ACCOUNT BALANCE
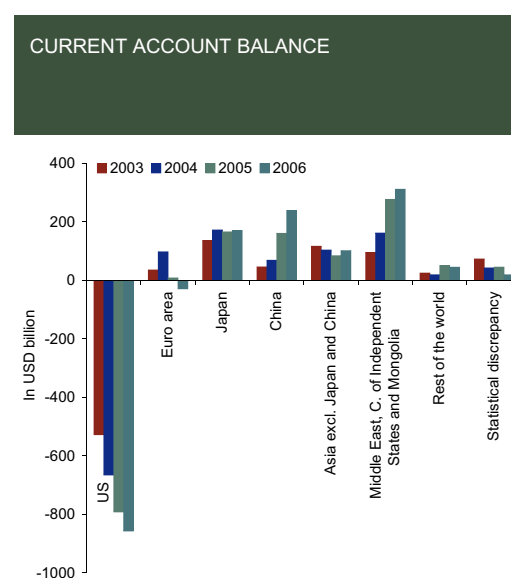
Source: IMF.

imply that such financing flows are more sensitive to changes in interest rate differentials at international level. Also, in 2006 international investor' demand for riskier assets increased. A significant share of such securities comprises corporate bonds and mortgage-backed securities, which contributes to increase the exposure of international investors to a possible abrupt adjustment of global macroeconomic imbalances or to a deterioration in the US real estate market.
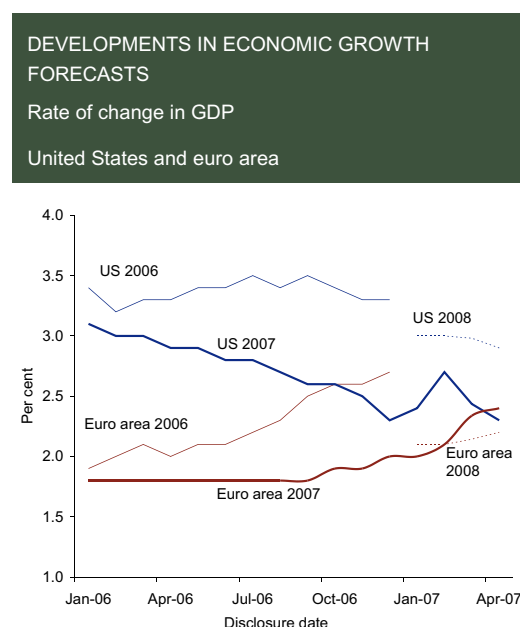
The depreciation of the US dollar, the narrowing of the differential between the US and European interest rates, the greater flexibility of exchange rate regimes in a number of Asian countries (albeit limited in some cases, namely China) and the greater balance in global economic growth contributed to a smaller probability of an abrupt adjustment of such macroeconomic imbalances. The fall in oil prices as from mid-August 2006 also contributed to mitigate the risk of an abrupt adjustment, although this trend was reversed in the early months of 2007, amid heightened geopolitical tensions and greater uncertainty (Chart 2.2.3). Although data available for 2006 and forecasts for 2007 suggest a gradual deceleration of the US economy (Chart 2.2.4), there is still a risk that the cooling of that economy may be more pronounced than previously expected.

Chart 2.2.3

OIL PRICE (BRENT)

Monthly average

Source: Bloomberg.

Chart 2.2.4

DEVELOPMENTS IN ECONOMIC GROWTH FORECASTS

Rate of change in GDP

United States and euro area

Source: Consensus Economics.

Housing market cooling in several countries

Over the past few years, several developed countries recorded strong real estate market activity, particularly in the residential sector, with significant and continued increases in real estate prices and robust mortgage credit growth (Chart 2.2.5). The possibility of a strong slowdown (or even a decline) in the prices of such assets constitutes a risk to economic activity. That risk may directly affect activity through the construction sector or indirectly due to the impact on private consumption, via wealth effects or through the decline in the value of residential property pledged as collateral, against a background where constraints may emerge in the access to mortgage credit for a significant share of the household sector.

In most above-mentioned countries, the real estate market cooling has been gradual, with a relatively subdued impact on economic developments. However, in the United States credit quality has significantly deteriorated in the subprime segments of the mortgage market, particularly in the early months of 2007. This is particularly relevant given the size of the US economy and evidence that housing market buoyancy was one of the factors underpinning private consumption over the past few years. The widespread default in subprime segments increases the probability of a sudden deterioration in financing conditions of other mortgage market segments, and there is a risk of contagion to other segments of credit to households, with the consequent significant impact on private consumption.

In 2006 losses associated with the deterioration in credit quality in the US mortgage market were concentrated in a small number of financial institutions specialising in granting mortgage loans to riskier households. However, a very significant share of risk underlying mortgage loans granted is outside the banking system, given the significant recourse to credit securitisation and the issuance of other risk-transfer financial instruments. In this context, the deterioration in the real estate market situation may pass through directly to securities markets in general and translate into a more marked deceleration in the US economy than currently forecast, with potential implications for other economies.
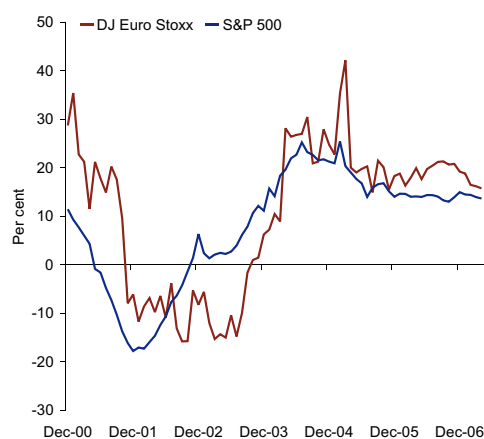
Chart 2.2.5

HOUSING PRICES
Year-on-year rate of change
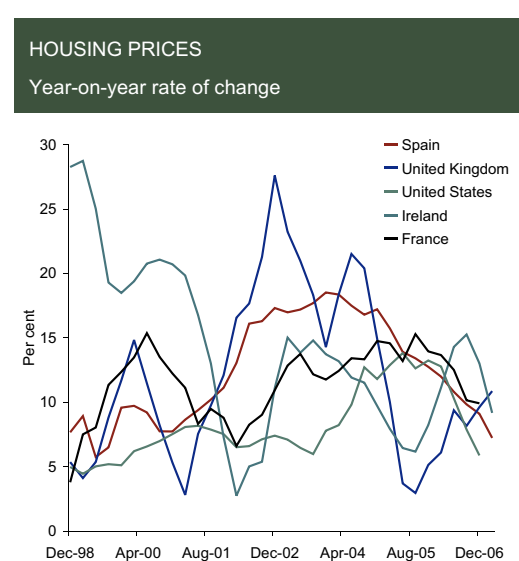
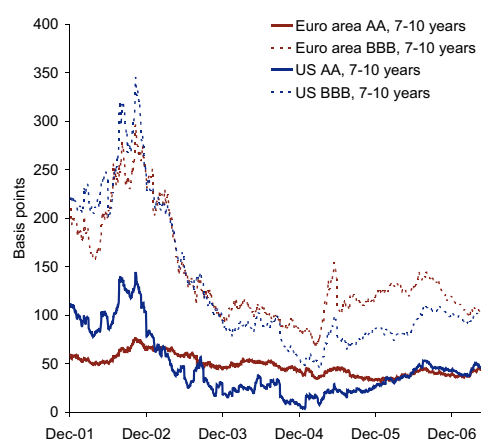**Source:** Thomson Financial Datastream.

Chart 2.2.6

ANNUAL RATE OF CHANGE IN EARNINGS PER SHARE (EPS)

Source: Thomson Financial Datastream I/B/E/S.

Chart 2.2.7

NON-FINANCIAL CORPORATE BOND SPREADS

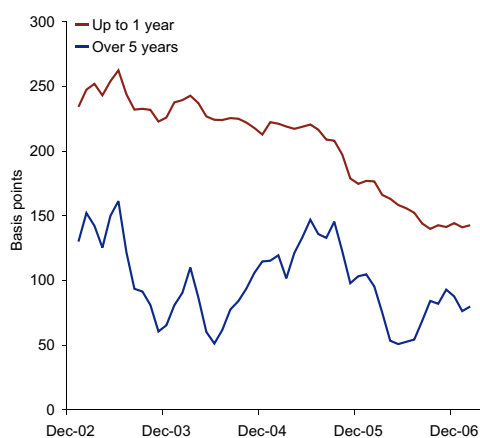**Sources:** Thomson Financial Datastream and Merrill Lynch.
Note: Spreads calculated on the basis of the EMU Direct Government Index and US Treasury Master Index.

Higher financial leverage of non-financial corporations

In general, non-financial corporations continued to show a favourable financial situation in 2006. In fact, corporate earnings maintained a strong pace of growth, interest rate differentials on debt remained at low levels and delinquency rates declined (Charts 2.2.6 to 2.2.9). However, the degree of financial leverage increased significantly, associated with the conduct of leveraged buyouts, mainly through syndicated loans (Chart 2.2.10). The conduct of these operations has been supported by vari-

Chart 2.2.8

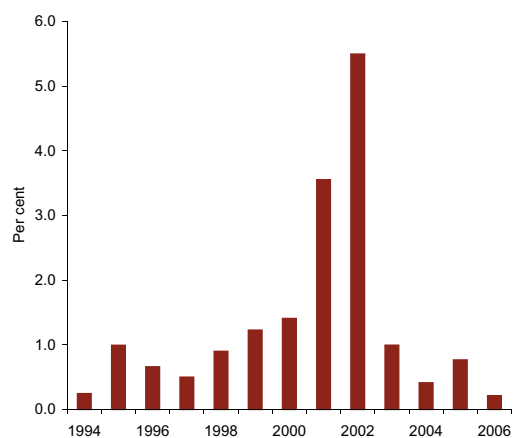SPREADS OF LOANS TO EURO AREA NON-FINANCIAL CORPORATIONS

Sources: ECB, Thomson Financial Datastream and Merrill Lynch.
Note: For loans with interest rate repricing schedules of up to 1 year, the spread is calculated as the difference between the interest rate on new loans granted to non-financial corporations and the 6-month Euribor. For loans with interest rate repricing schedules over 5 years, the spread is calculated as the difference between the interest rate on new loans and the German Treasury bond yield with a residual maturity of 7 years.
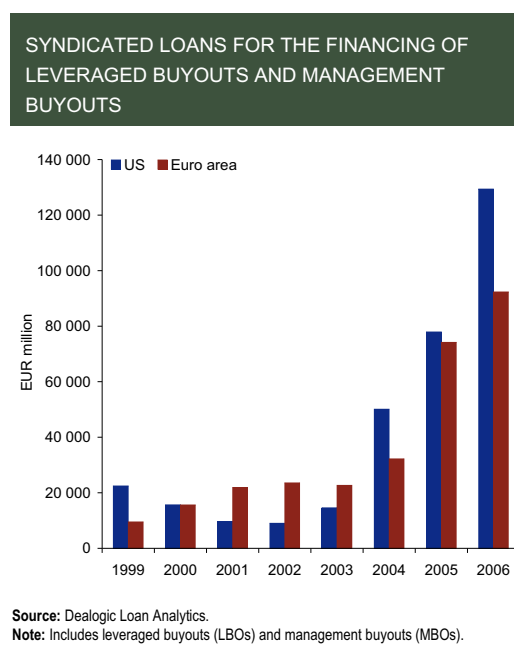
Chart 2.2.9

PERCENTAGE OF DEFAULTED BONDS (WEIGHTED BY VOLUME)

Source: Moody's Investor Service.

Chart 2.2.10

SYNDICATED LOANS FOR THE FINANCING OF LEVERAGED BUYOUTS AND MANAGEMENT BUYOUTS

Source: Dealogic Loan Analytics.
Note: Includes leveraged buyouts (LBOs) and management buyouts (MBOs).

ous factors, such as the improved corporate profitability and the relatively moderate indebtedness levels, in a context of low interest rates, robust global economic growth and low market volatility. However, it should be noted that companies involved in this type of operation usually become highly indebted, which renders them much more sensitive to negative shocks. Although delinquency levels continued to be low, the increase in corporate indebtedness, given its magnitude and international extent, contributed to an increase in credit risk.

Financial market sensitivity to abrupt increases in volatility

One of the main risks to financial stability is related to the fact that economic agents may be assessing risks incorrectly, given that risk premia of some financial assets continue to stand at historically low levels. In fact, corporate bond spreads in the euro area and the United States remained at low levels albeit, on average, slightly higher than in recent years (Chart 2.2.7). The persistence of low risk premia suggests that investors in debt markets may be underestimating the impact resulting from the greater correlation between different markets usually observed in periods of strong instability. However, unlike in private debt markets, estimates available for the risk premium implicit in equity markets suggest that it stands at a level close to its historical average.

In 2006 the main stock indices increased very significantly, contributing to a rise in the price-to-earnings ratio (Charts 2.2.11 and 2.2.12). In turn, volatility in such indices remained, in general, at historically low levels (Chart 2.2.13). Several reasons have been given to explain the maintenance of volatility at low levels. On the one hand, upward risks to inflation developments are perceived to remain controlled, and structural changes in inflation expectations associated with central bank credibility seem possible. On the other hand, at the current juncture, risk dispersion is higher, favoured by the strong expansion of the credit risk transfer market, as discussed below.

Although volatility remained at historically low levels, it increased strongly between May and June 2006, in a context of uncertainty regarding the rise in interest rates in the United States due to higher inflationary pressures. In fact, during this period, stock prices fell very significantly and the risk premium

Chart 2.2.11
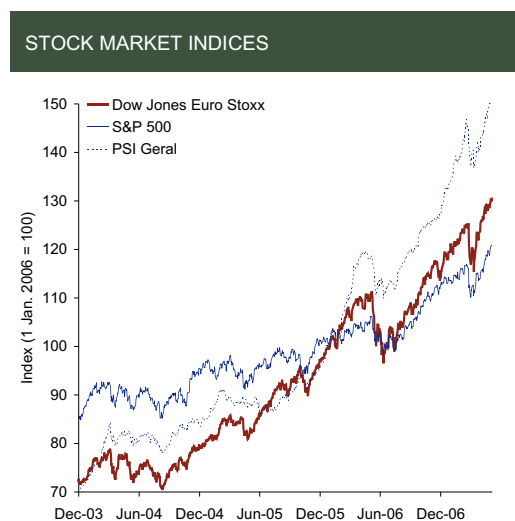
STOCK MARKET INDICES

Source: Bloomberg.

Chart 2.2.12

PRICE-TO-EARNINGS RATIOS
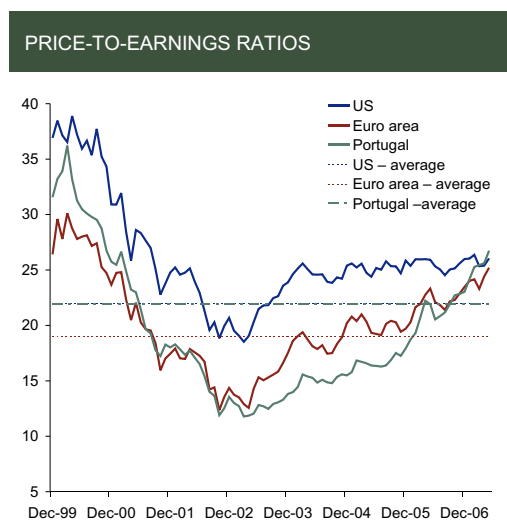
Sources: Thomson Financial Datastream and Banco de Portugal.
Note: Averages for the period from January 1983 to December 2006 (except for Portugal, where the average covers the period from January 1995 to December 2006). PER calculated as the ratio of the price index to the moving average of the last five years earnings.

demanded by investors in public debt markets of emerging market economies grew markedly (see "Box 2.1 *Volatility in international financial markets: a comparison of the May 2006 and February 2007 episodes*") (Charts 2.2.14 and 2.2.15). Moreover, lower-rated corporate bond spreads increased more significantly than those of companies with better credit quality (Chart 2.2.7). Although this volatility episode also led to similar movements in financial markets of advanced economies, its amplitude was much higher in financial markets of emerging market economies, and the subsequent recovery was rather slower in those countries. At the end of summer 2006, volatility had recovered to figures close to those seen prior to this period of instability. More recently, at end-February 2007, there was a new pe-
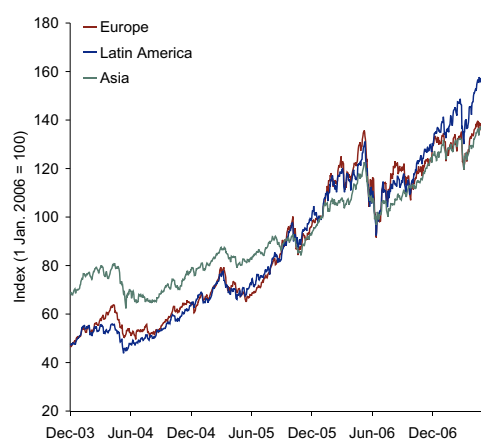
Chart 2.2.13

HISTORICAL VOLATILITY OF STOCK PRICE INDICES
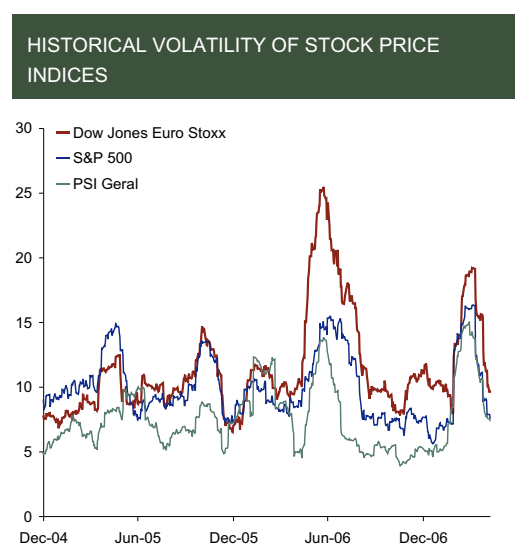
Sources: Bloomberg and Banco de Portugal.
Note: The historical volatility is computed as the annualised standard deviation of daily changes over 30-business-day periods.
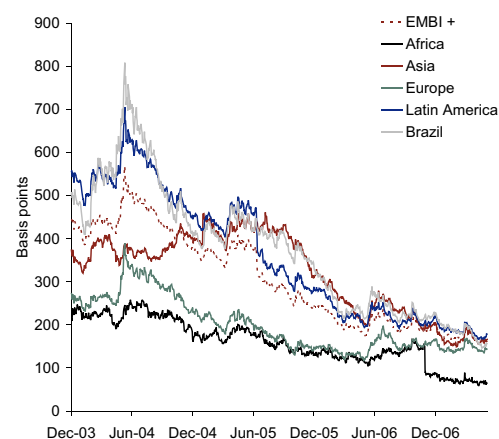
Chart 2.2.14

DEVELOPMENTS IN STOCK MARKET INDICES IN
SOME EMERGING MARKET ECONOMIES (MSCI)

Sources: Bloomberg and Morgan Stanley.

Chart 2.2.15

SPREADS BETWEEN GOVERNMENT BONDS
ISSUED BY EMERGING MARKET ECONOMIES AND
US GOVERNMENT BONDS

Source: J.P. Morgan Chase.

riod of strong increase, albeit temporary, in the volatility of international financial markets. However, losses in equity markets were much more limited during this period.

These episodes of substantial increases in volatility illustrate the investors' sensitivity to negative events, namely reflecting greater risk aversion (Chart 2.2.16). In this context, a downward revision of economic growth expectations or a significant increase in inflationary pressures may give rise to changes in investors' sentiment resulting in a widespread rise in the perception of the risk implicit in their portfolios, associated with a possible abrupt increase in volatility.[1] Moreover, the correlation be-

Chart 2.2.16

RISK AVERSION INDEX
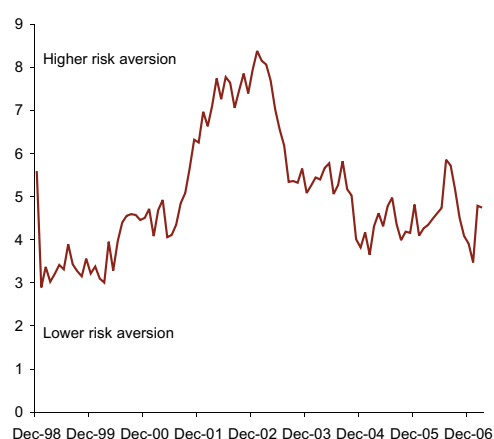
Source: Goldman Sachs.

(1) In the first months of 2007, the underlying inflation rate in the United States, as measured by the consumer price index excluding food and energy, was clearly above the level usually considered to be consistent with the Federal Reserve's mandate. At the same time, the situation in the subprime lending segment deteriorated, as discussed above, which may contribute to a greater slowdown in economic activity. In this scenario, some uncertainty subsists regarding the short-term US monetary policy stance, like in mid-2006.

Chart 2.2.17

INTERNATIONAL DEBT INSTRUMENTS ISSUED BY
EMERGING MARKETS

Net issuance
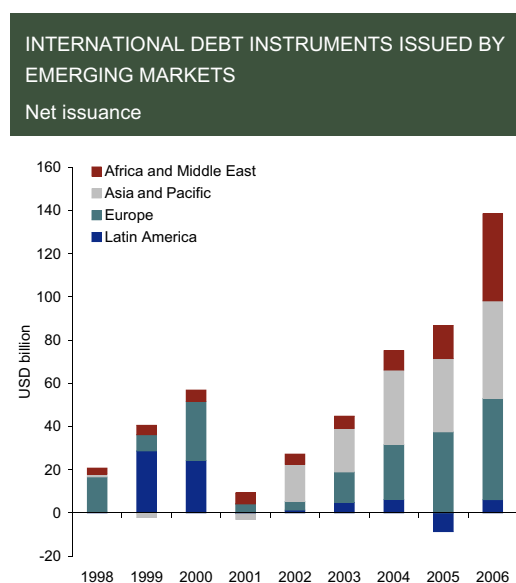
Source: BIS.

tween the various financial markets followed an upward trend in 2006, indicating how easily a market shock can be passed through to other markets. Against this background, disturbances observed in February 2007 illustrate how shocks in a given market may quickly lead to the closing out of positions in other financial asset markets (see "Box 2.1 *Volatility in international financial markets: a comparison of the May 2006 and February 2007 episodes*"). This type of episode, if persistent and, in particular, if due to the sudden reassessment of macroeconomic fundamentals, may generate disruptions in most financial asset markets, particularly in riskier classes. This may have consequences for financing conditions and the availability of funds for companies with ratings below investment grade and for issuers from emerging market economies. The reaction of financial markets in emerging market economies to such increased volatility episodes illustrates their strong sensitivity to changes in the dominant sentiment in international markets. In line with this, although capital flows into these economies over the past few years were partly supported by broadly positive developments in macroeconomic fundamentals, an abrupt increase in risk aversion of international investors may lead to a reversal in such capital flows (Chart 2.2.17).

Credit risk transfer

In a context of a less accommodative monetary policy, an increase in debt spreads of non-financial corporations, in particular riskier companies, seemed likely but did not materalise. One possible explanation for the low levels recorded by these spreads is associated with developments in instruments and markets that make it possible to transfer and redistribute credit risk through the financial system (Chart 2.2.18), as well as with the greater importance of hedge funds. Hedge funds have borne a significant share of risks that were transferred from the banking sector to the financial market.

Although such transfers are positive given that they support lower risk concentration in the banking sector, there are concerns about how these instruments and markets may continue to ensure the risk redistribution function against a background of a deteriorating credit cycle. On the one hand, the lack of detailed data on hedge fund activity and on counterparties involved in these operations hampers credit risk monitoring. On the other hand, the use of such credit risk transfer financial instruments implies that

Chart 2.2.18

GLOBAL OUTSTANDING AMOUNTS OF CREDIT
DEFAULT SWAPS

Source: BIS.
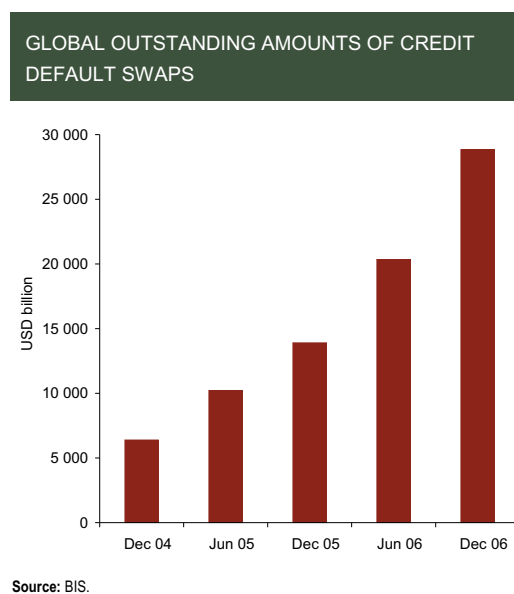
it is much more difficult to identify boundaries between the concept of market risk and credit risk. As such, the valuation of credit risk in the balance sheet of financial institutions became more dependent of risk factors that usually are taken into account for the quantification of market risk. In this context, intermediation functions of the banks more directly involved in this market recorded substantial changes, given that the traditional paradigm underlying credit granting and the subsequent management of credit has been gradually replaced by an intermediation paradigm. According to the latter, banks grant credit, structure standardised financial products on the basis of such credits and, finally, sell those products to others. The transfer of a significant share of risks out of banks' balance sheets implies that credit quality monitoring, which traditionally is undertaken by banks, has been transferred to financial markets. In a context where there is some evidence that risk premia demanded by investors in private debt markets stand at historically low levels, supported by a favourable view of risks, the possibility that loan approval is based on relatively less demanding criteria should not be ruled out. It should also be noted that this type of financial innovation tends to be mainly used by major internationally active banks and, for reasons associated with economies of scale in the preparation of such operations, it may be too expensive for smaller banks.

Finally, given that these innovative instruments expanded significantly over the past few years, there is great uncertainty regarding the manner in which the respective markets may react to a considerable and protracted increase in volatility and to lower liquidity.

2.3. Risks and vulnerabilities in Portugal

In 2006 developments in the Portuguese economy were more favourable than in the previous year, largely as a result of the buoyancy of goods and services exports. In contrast, domestic demand decelerated, reflecting subdued private consumption and a fall in government consumption and investment, as well as in housing investment. In turn, corporate investment recorded slightly positive growth, in contrast to the downward trend seen over the past few years, amid improved confidence levels in the industrial sector. The deceleration in domestic demand was partly associated with the necessary correction of macroeconomic imbalances accumulated in previous years. On the one hand, higher debt

service costs for households due to the gradual increase in interest rates and the greater tax burden seem to have contributed to the moderation in household consumption expenditure. On the other hand, the fiscal deficit decreased considerably, and more than expected. Notwithstanding the acceleration in activity, the Portuguese economy did not resume the process of real convergence towards the euro area in 2006.

The Portuguese economy and financial system are exposed to most of the above-mentioned global risks, given their strong economic and financial integration. On the one hand, the materialisation of those risks would imply a significant deceleration in world economic activity that would have a negative impact on external demand for Portuguese goods and services. On the other hand, the strong integration of financial markets at global level makes it easier for international shocks to propagate. In addition to the global risks discussed in the previous section, there are some vulnerabilities and risk factors specific to the Portuguese economy. These vulnerabilities and risk factors are associated with the correction of economic imbalances accumulated over the past few years, namely the high indebtedness of households and non-financial corporations and the still high structural fiscal deficit. In this context, an abrupt deterioration in market sentiment may imply a significant adjustment in stock prices, which recorded very positive developments over the past few years. This would have consequences for the financial position of the Portuguese banking system, in particular through the impact on financial assets held by pension funds of bank employees. In fact, the IMF considered this to be a vulnerability within the scope of the Financial Stability Assessment Program of the Portuguese economy in 2006 (see "Box 4.1 *Results of the Portuguese banking system stress-testing exercise*"). However, simulation exercises proved that, even in extreme but plausible scenarios, the Portuguese banking system would be capable of maintaining adequate solvency and profitability levels.

Impact of global macroeconomic and financial risks

As previously mentioned, the fact that Portugal is a small open economy renders it particular exposed to global macroeconomic and financial risks. In line with this, the materialisation of the risk factors mentioned in the previous section of this chapter would have a non-negligible impact on the Portuguese economy and the banking system. First, the abrupt correction of global economic imbalances would result in a significant deceleration in global economic growth, with inevitable negative effects on developments in the external demand for Portuguese goods and services. Given that in 2006 economic growth in Portugal was largely supported by the positive behaviour of goods and services exports, the materialisation of this scenario might jeopardise the continuity of the gradual acceleration in economic activity. Moreover, the abrupt correction of global imbalances would imply substantial disturbances in international financial markets, with probable contagion effects on the Portuguese financial markets. This type of development directly affects Portuguese banks, which, through several channels, are exposed to sudden changes in the global financial market sentiment.

In turn, the cooling of the real estate market in some developed countries should have a more subdued impact on financial stability in Portugal, where available evidence points to the non-existence of an excess valuation of Portuguese real estate prices over the past few years.[2] With regard to the deterioration of the US real estate market, and even in the case of a further significant worsening, a spillover from the direct exposure to this market is unlikely to occur. Thus, the effect would only be indirect, via the above-mentioned contraction of external demand. However, a very significant deterioration of the

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(2) See "Box 6.1 *"Housing prices in Portugal and macroeconomic fundamentals: evidence of quantile regression"* in the 2005 *Financial Stability Report* of Banco de Portugal, which results show that housing prices in Portugal are overall in line with those suggested by macroeconomic and financial fundamentals.

situation of the real estate market in some European countries, particularly Spain, could have stronger effects given that the Spanish economy is the main trading partner of Portugal.

Finally, the risk associated with the apparent sensitivity of financial markets to abrupt increases in volatility has potential consequences for Portugal that are relatively similar to those discussed in the previous section. Given the strong integration of financial markets, in particular at the euro area level, an abrupt increase in international volatility, together with strong falls in financial asset prices, would undoubtedly tend to be reflected, with more or less intensity, in Portuguese financial markets. According to the results of the stress-testing exercises undertaken within the framework of the FSAP, the impact of this type of episode on the securities portfolio of Portuguese banks is likely to be relatively limited. However, the direct exposure of bank employees' pension funds to financial markets is relatively significant, and could facilitate the pass through of shocks of this nature. Moreover, a considerable share of credit growth in Portugal has been supported by very significant loan securitisation volumes, in particular loans for house purchase, and by the issuance of debt securities. Therefore, given that a substantial share of securities issued within the scope of these financing operations is placed with international investors, the liquidity management of Portuguese banks must take into account the possibility of protracted disturbances in these markets, in order to prevent constraints to their credit activity.

Idiosyncratic risks

Household indebtedness

The high level of household indebtedness is an important vulnerability of the Portuguese economy, mainly in a context of rising interest rates and a still incipient improvement in the labour market situation. The rise in euro area interest rates implied an increase in debt service costs, which is likely to have contributed to limit developments in private consumption and housing investment and may imply a deterioration in credit risk. Moreover, the persistence of relatively high growth rates of loans for house purchase, despite some recent slowdown, and the acceleration in loans for consumption and other purposes have been supported by the supply of new products and new contractual arrangements by banks. This includes the widening of grace periods, the lengthening of loan maturities or less strict requirements regarding loan-to-value ratios. Such instruments facilitate access to credit by a number of households, which, otherwise, would have faced difficulties in funding their consumption and investment expenditures. In line with this, banks must implement adequate credit risk assessment and management policies, in particular to certain parts of the population that are more sensitive to adverse developments affecting their ability to comply with debt servicing. Nonetheless, it must be taken into account that, in broad terms, household wealth has also recorded significant growth rates and available evidence does not point to the existence of a speculative bubble in the Portuguese real estate market, in contrast to other European countries (see "Box 6.1 *Housing prices in Portugal and macroeconomic fundamentals: evidence of quantile regression*" in the 2005 *Financial Stability Report* of Banco de Portugal).

Corporate indebtedness

Non-financial corporations have recorded substantial financing flows, in line with developments in the United States and the euro area. In 2006 total corporate debt decelerated slightly, with issuance of commercial paper being in part replaced by a greater recourse to bank financing. However, in contrast to the United States and the euro area, the higher indebtedness of Portuguese companies was not counterbalanced by significant growth in investment. Available data suggest that these flows of loans seem to be largely associated with debt restructuring operations and the financing of mergers and ac-

quisitions (Chart 2.3.1).[3] In fact, answers to the Bank Lending Survey persistently indicate that debt restructuring has been inducing higher demand for credit. This conclusion justified the introduction of an extraordinary question in the survey conducted in April 2007, aimed at a better understanding of the specific situations encompassed in the concept of debt restructuring. According to the answers given by banks included in this survey's sample, debt restructuring should mainly comprise situations in which firms show some inability or difficulty in servicing their debt, reflected in an observed or highly probable default episode. This debt restructuring mainly regards loans granted to small and medium-sized companies. Moreover, debt restructuring is also likely to be associated with debt renegotiation in terms of maturity or collateral. Some banks consider that the consolidation of corporate liabilities with the purpose of reducing overall financing costs is also important, particularly regarding large companies.

Taking into account firm-level data, loan growth has been particularly significant for larger companies, remaining at relatively subdued levels for other companies. Although such developments contribute to an increase in the concentration of banking system exposure to a relatively reduced number of debtors, their impact in terms of credit risk may be considered benign, given that larger companies tend to show lower default probabilities.

Bank indebtedness with international financial markets

Over the last decade, the international investment position deteriorated markedly, particularly in terms of net external debt. Such developments were associated with the financial integration process and the increase in external indebtedness compatible with the balance of the Portuguese economy. This situation implies very substantial costs with interest payments abroad, which, in the absence of favourable productivity developments in Portugal, will tend to translate into a lower contribution of domestic demand to future economic growth. A significant share of this indebtedness with non-residents was due to the banking system, which borrowed foreign resources to fund the strong growth of indebtedness in the private sector. As a result, the Portuguese banking system is particularly exposed, on the one

Chart 2.3.1

MERGERS AND ACQUISITIONS ANNOUNCED IN PORTUGAL
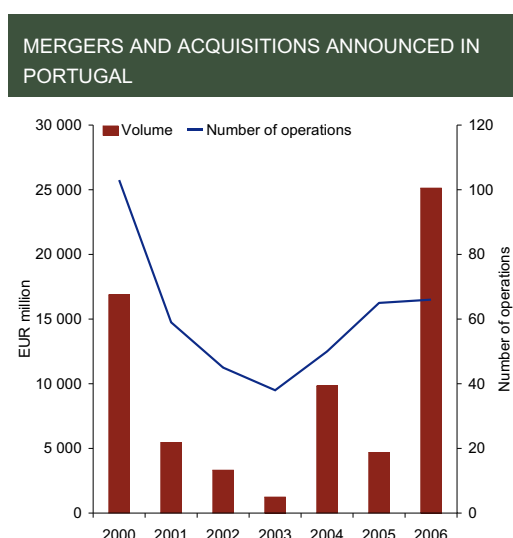
Source: Bloomberg.

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(3) The financial situation of non-financial corporations and households is discussed in detail in "Chapter 3 *Financial situation of the non-financial private sector*".

hand, to unfavourable developments in international financial markets that imply a deterioration in financing conditions and, on the other hand, to a deterioration in solvency conditions of the Portuguese non-financial private sector. In this framework, the maintenance of adequate liquidity levels and the soundness of systems for the assessment, control and management of liquidity and credit risk are particularly relevant in the case of the Portuguese banking system.

Public finances

The significant fiscal consolidation seen in 2006 was far higher than expected, in a context of government expenditure restraint. Therefore, risks associated with the Portuguese fiscal situation declined significantly in 2006, although fiscal consolidation efforts must proceed, given that the structural deficit is clearly higher than the medium-term objective. This process has inevitable short-term implications for the economic activity, given the restraining effects of domestic demand. In contrast, fiscal consolidation may have an important effect in reducing uncertainty for economic agents, thus contributing to boost the rebound in corporate investment. Moreover, the existence of a sustained fiscal position close to balance is an important condition for economic growth in the medium to long term. The risk premium implicit in Portuguese government debt securities was broadly stable throughout 2006, signalling a relatively positive assessment of its risk (Chart 2.3.2). On 1 May 2007 Fitch changed its rating outlook for the Portuguese Republic from negative to stable, as a result of progress in fiscal consolidation.

Chart 2.3.2

YIELDS ON PORTUGUESE GOVERNMENT BONDS AND SPREAD BETWEEN (10-YEAR) GOVERNMENT BONDS IN PORTUGAL AND GERMANY
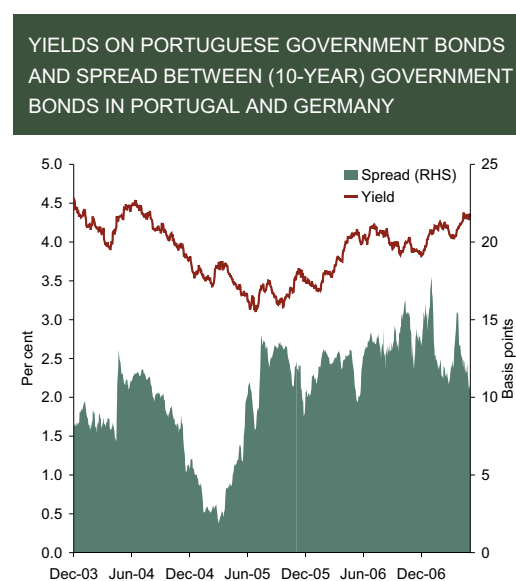
Sources: Reuters and Banco de Portugal.
Note: End-of-day yields. The spread was calculated by interpolating the German yield curve, so as to ensure that the Portuguese 10-year benchmark bond is compared with a German bond with similar maturity. The spread was calculated on the basis of 5-day moving averages.

Box 2.1. Volatility in international financial markets: a comparison of the May 2006 and February 2007 episodes

Since the beginning of 2004, the situation in international financial markets has been characterised by the persistence of historically low volatility levels, substantial equity valuations and the maintenance of financing costs in private debt markets at very low levels (Chart 1). Moreover, investment in riskier assets has increased significantly, due to the search for yield in a context of favourable financing conditions.

Such developments in financial markets were interrupted by two episodes characterised by an abrupt increase in volatility, together with an adjustment in asset prices in some financial market segments. The first disturbance episode occurred in May/June 2006 and was triggered by a rise in perceived risk associated with uncertainty regarding the conduct of monetary policy in the United States, taking into account the inflationary pressures observed in previous months and doubts about the impact of the slowdown in the real estate market on US economic activity (Chart 2). At end-February 2007, there was a second episode of financial market instability, triggered by a closing out of positions in risky financial assets, which was concentrated in the Chinese stock market, following the disclosure of news on greater vigilance on capital market operations in China. The increased uncertainty in this period was worsened by the disclosure of a relatively negative outlook regarding developments in the US economy and by the gradual deterioration in credit quality in the subprime mortgage market segments. Exchange markets were also considerably affected by the offsetting of positions in carry trades[1] (the yen and the Swiss franc appreciated against the US dollar and, in contrast, currencies of a number of emerging market economies depreciated significantly). Both episodes suggest that investors are very sensitive to disturbances and shocks in financial markets, which may trigger the reassessment of the price of risk, with consequent portfolio shifts towards increased demand for less risky and more liquid financial assets.

Such episodes displayed a number of relatively similar characteristics, with abrupt falls in stock prices and substantial rises in volatility. This increased uncertainty gave rise to shifts in international investors' portfolios from investments in stock and corporate bond markets into government bonds. These shifts implied a slight increase in the price of the last mentioned securities. However, there are non-negligible differences in the manner in which

Chart 1

IMPLIED VOLATILITY OF STOCK INDICES
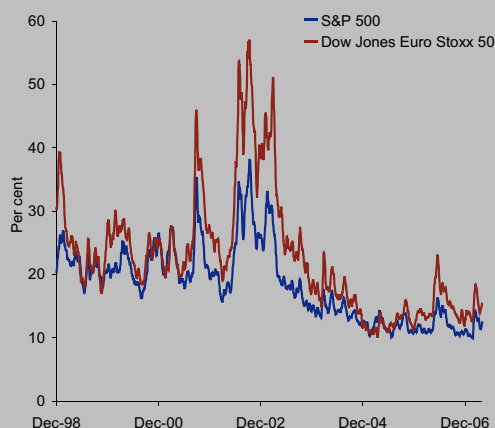
Source: Bloomberg.
Note: Implied volatility calculated from option prices on stock indices (10-day moving averages).

Chart 2

REAL INTEREST RATES AND INFLATION EXPECTATIONS IMPLIED IN INFLATION-INDEXED GOVERNMENT BONDS
US, 10 years
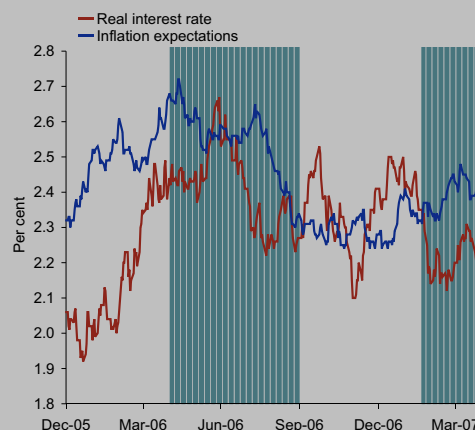
Sources: Bloomberg and Banco de Portugal.

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(1) *Carry trades are investment strategies by which an investor borrows in the currency of a country with low interest rates in order to invest in another country with higher interest rates. The close to zero level of interest rates in Japan over the past few years contributed to the rise in these investment strategies.*

markets reacted to such shocks, namely with regard to their amplitude, coverage, duration and subsequent recovery.

During the instability period that started in May 2006, stock indices fell considerably at international level and, in contrast, bond prices increased slightly (Charts 3 and 4). These movements affected more significantly financial market segments with higher risk, namely emerging market economies and private debt issuers with lower ratings (Charts 5, 6 and 7). Moreover, while in stock markets of advanced economies the unwinding of such losses started in June and were fully compensated at the end of the summer, in emerging market economies the levels observed before May were only reached again in early 2007.

At the end-February/early March 2007 financial market volatility increased again, leading to a decline in stock prices to the levels recorded at end-2006. However, while in May 2006 losses in stock markets had been particu-

Chart 3

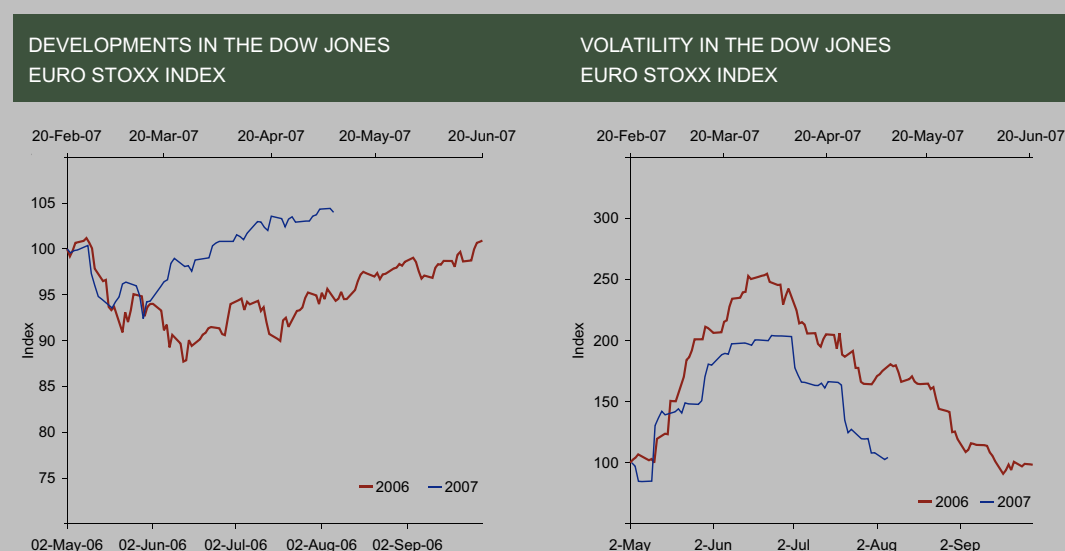| DEVELOPMENTS IN THE DOW JONES EURO STOXX INDEX	VOLATILITY IN THE DOW JONES EURO STOXX INDEX

Source: Bloomberg.
Note: The index for 2006 was calculated on the basis of the DJES value as at 2 May 2006, while the index for 2007 was calculated on the basis of the DJES value as at 20 February 2007. Volatility was calculated as the annualised standard deviation of daily changes over 30-working-day periods.

Chart 4

DEVELOPMENTS IN THE S&P 500 INDEX	VOLATILITY IN THE S&P 500 INDEX

Source: Bloomberg.
Note: The index for 2006 was calculated on the basis of the S&P 500 value as at 2 May 2006, while the index for 2007 was calculated on the basis of the S&P 500 value as at 20 February 2007. Volatility was calculated as the annualised standard deviation of daily changes over 30-working-day periods.

Chart 5
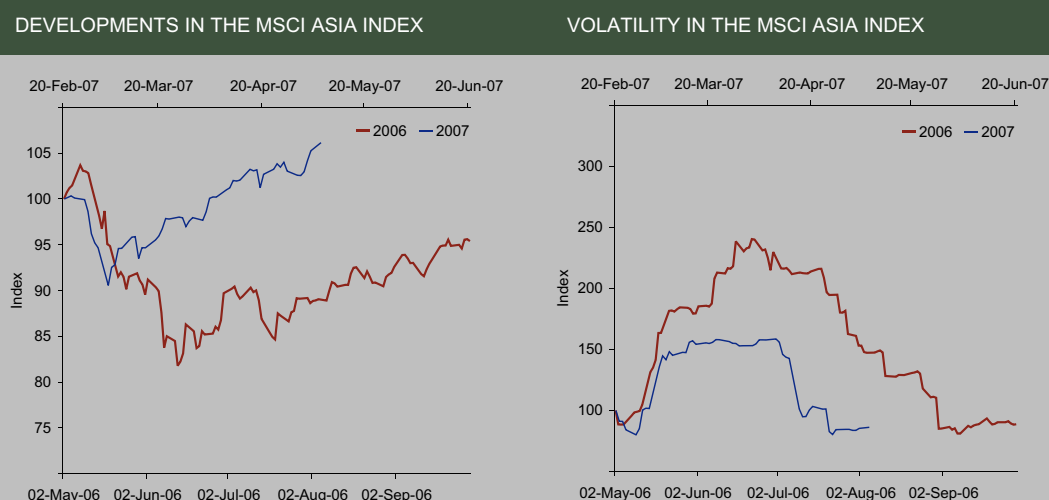
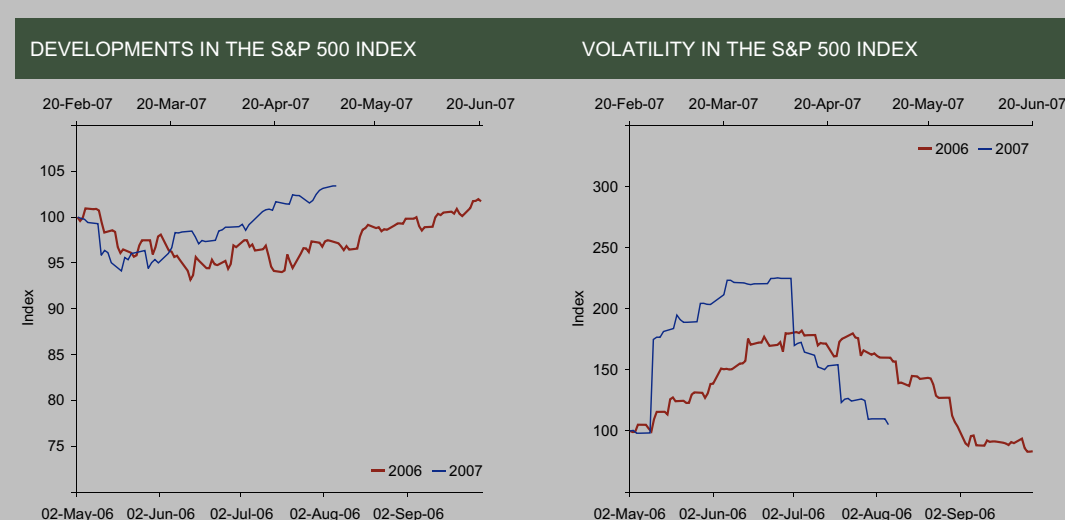| DEVELOPMENTS IN THE MSCI ASIA INDEX	VOLATILITY IN THE MSCI ASIA INDEX

Source: Bloomberg.
Note: The index for 2006 was calculated on the basis of the MSCI Asia value as at 2 May 2006, while the index for 2007 was calculated on the basis of the MSCI Asia value as at 20 February 2007. Volatility was calculated as the annualised standard deviation of daily changes over 30-working-day periods.

Chart 6
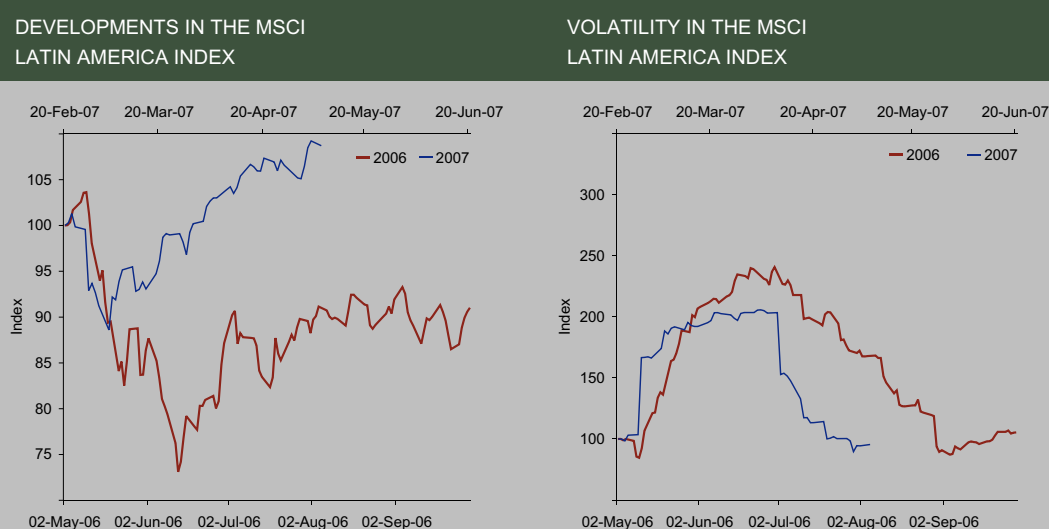
DEVELOPMENTS IN THE MSCI LATIN AMERICA INDEX	VOLATILITY IN THE MSCI LATIN AMERICA INDEX

Source: Bloomberg.
Note: The index for 2006 was calculated on the basis of the MSCI Latin America value as at 2 May 2006, while the index for 2007 was calculated on the basis of the MSCI Latin America value as at 20 February 2007. Volatility was calculated as the annualised standard deviation of daily changes over 30-working-day periods.

larly concentrated in emerging market economies, these losses were far more widespread in 2007, affecting less markedly those countries.[2] In early April the main international stock indices had almost fully recovered from the losses recorded over this period.

The comparison of the impact of these two instability periods on equity market developments suggests that the instability period observed in 2007 was of a smaller magnitude and duration. In this episode, rebound was relatively faster regarding prices and, at end-April 2007 volatility in main markets recorded levels close to those observed at the beginning of this instability period. With regard to the reaction of stock prices to such disturbances, developments in the United States and the euro area were relatively similar during both episodes, although in the euro area

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(2) *Although disturbances in February 2007 were triggered by the release of news regarding increased vigilance in capital market operations in China, the fall in Chinese stock prices was relatively limited, and fully reverted by mid-March.*

Chart 7

SPREADS OF EURO AREA AA-RATED NON-FINANCIAL CORPORATIONS	SPREADS OF EURO AREA BBB-RATED NON-FINANCIAL CORPORATIONS

Sources: Thomson Financial Datastream and Merrill Lynch.
Note: Spreads calculated on the basis of the EMU Direct Government Index.

losses were slightly higher in May/June 2006. However, developments in volatility were rather distinct: while in the euro area volatility recorded a similar increase in both periods, in the United States the most recent instability period was marked by a far higher increase in observed volatility.

In Portugal, the consequences of both periods of strong financial market volatility were rather similar to those seen in the euro area (Chart 8). The main difference is related to the fact that, in the most recent period, stock market volatility started off from a higher level, given market uncertainty during the previous weeks associated with the takeover bid for Portugal Telecom.

Chart 8

DEVELOPMENTS IN THE PSI GERAL	VOLATILITY IN THE PSI GERAL
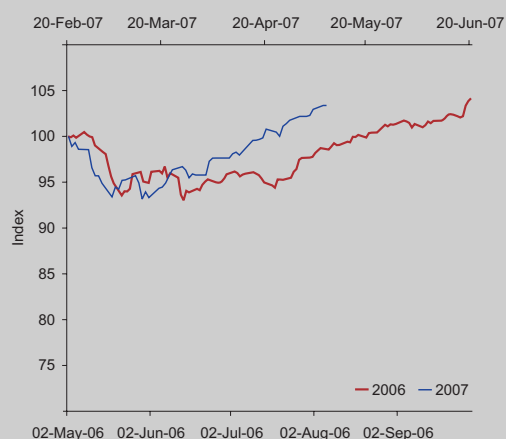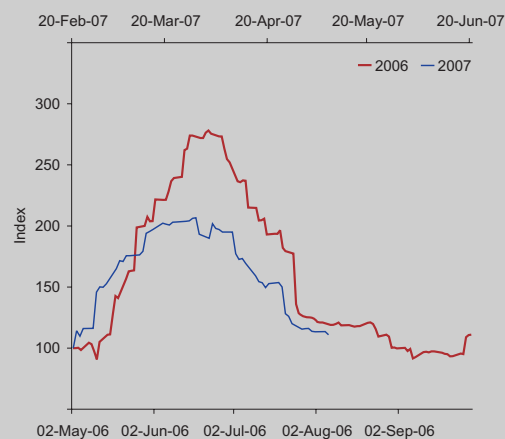
Source: Bloomberg.
Note: The index for 2006 was calculated on the basis of the PSI Geral value as at 2 May 2006, while the index for 2007 was calculated on the basis of the PSI Geral value as at 20 February 2007. Volatility was calculated as the annualised standard deviation of daily changes over 30-working-day periods.

3. FINANCIAL SITUATION OF THE NON-FINANCIAL PRIVATE SECTOR

3.1. Overview

The analysis of the financial situation of the non-financial private sector, i.e. households and non-financial corporations, and of its sustainability is a key element in the evaluation of risks for financial stability, in particular credit risk. The latter is associated with the uncertainty about the capacity of economic agents that borrow to fulfil debt service obligations *vis-à-vis* the counterparties that provide such funding. The evaluation of the portfolio credit risk relies on the distribution of losses associated with the relevant assets, which depends on the amount invested in each asset (exposure), on the probability of non-compliance by each issuer (debtor), on the expected rate of recovery and on possible diversification effects of the portfolio as a whole. Moreover, the financial situation of the non-financial private sector also has spillover effects on the macroeconomic environment where the banking system activity evolves, and therefore it is also relevant from the point of view of the appraisal of the banking system financial stability.

According to the available data, households net lending declined significantly in 2006, whereas non-financial corporations' net borrowing continued to widen. This development reflected a decline in the savings rate in both sectors and a slight reduction of the respective investment in fixed capital. In this context, the indebtedness ratios of households and non-financial corporations rose further, more markedly in the first case.

In the context of the rise in ECB interest rates, credit risk did not undergo significant changes in 2006. Behind this development there were more favourable conditions in most banks' credit supply. In effect, in the case of households and in a framework of strong competition, banks offered increasingly diversified contract arrangements, aimed at containing the financial burden associated with the household debt service. This translated into longer loan maturities, looser loan-to-value ratios and narrower interest rate spreads. In the case of corporations, it is worth mentioning debt restructuring situations – namely through the change in contractual conditions or the consolidation of liabilities with the purpose of reducing the overall financing cost – as well as the renegotiation of conditions at the initiative of the bank, in the case of corporations facing difficulties in meeting the debt service.

However, the present macroeconomic framework poses some risks regarding the development of the financial situation of households and corporations. In the case of households, in a context of gradual recovery of economic activity, the unemployment rate in Portugal is still high, with long-term unemployment accounting for more than half of total unemployment. In addition, interest rate rises may have been translated into a significant increase in the debt service burden, considering the high households' indebtedness observed in recent years. In aggregate terms, possible additional increases in the debt service will tend to have a non-negligible effect on the path of household consumption and investment. Also, the possibility of an increase in the credit delinquency ratio in this sector should not be excluded, albeit of a limited size in terms of the expected losses for the banking system.

In this context, it is important to stress that the significant share of house purchase-related household debt – together with the non-excessive valuation of real-estate prices – mitigates the extension of risks to financial stability inherent in the household financial situation. Moreover, in parallel with a significant increase in household indebtedness, data available on their financial and non-financial wealth indicate that it grew considerably over the last ten years, contributing to the moderation of the above-mentioned risks to financial stability. In effect, latest information available about the distribution of indicators on to-

tal household indebtedness and wealth suggests that, at the time, the wealth situation of indebted households was in general sound, although some segments, in particular younger households with lower income, were more vulnerable.

As regards corporations, in a context where financial leverage levels are generally higher than in previous business cycles, the rise in interest rates may have a significant impact on the financial costs of indebted corporations. However, evidence available suggests that the present indebtedness levels should not constrain future investment opportunities, thereby not posing a significant obstacle to economic recovery. In the present context of adjustment of the Portuguese economy's macroeconomic imbalances and of sector restructuring arising from the changes in comparative advantages worldwide, some deterioration is to be expected in the capacity to meet the debt service of those corporations more negatively affected by such processes.

3.2. Households

Data available indicate that the household net lending declined significantly in 2006 (to 1.8 per cent of GDP, i.e. 2.5 per cent of the sector's disposable income). This chiefly reflected a decline in the household savings rate (to slightly over 8 per cent of disposable income) and an amount of capital transfers significantly lower than in 2005. Investment in fixed capital in this sector was slightly lower than in the previous year. In 2005 household net lending (3.4 per cent of GDP, i.e. 4.7 per cent in terms of disposable income) was strongly influenced by the significant amount of capital transfers associated with the extraordinary contributions made by financial institutions to the respective pension funds as a result of the implementation of the International Accounting Standards (IAS).[1] Excluding these transfers, household net lending would have reached around 2.0 per cent of GDP in 2005, declining to 1.5 per cent in 2006 (2.8 and 2.2 per cent in terms of disposable income respectively), thus following a downward trend since 2003 (Chart 3.2.1).

This trend was reflected in a further increase in household indebtedness, which was equivalent to nearly 90 per cent of GDP at the end of 2006 (124 per cent in terms of disposable income), corresponding to slightly over 70 per cent of the value of the more-liquid assets held by households[2] (Chart 3.2.2).

In 2006, loans to households continued to grow significantly (approximately 10 per cent, similarly to the previous year). However, loans for house purchase decelerated gradually in the course of the year, with the annual rate of change declining to approximately 10 per cent in December (1.3 percentage points below the value observed at the end of the previous year). The slowdown in loans for house purchase is slightly more apparent when the annualised quarterly rates based on seasonally-adjusted figures are examined (which declined by approximately 1.5 percentage points from the end of 2005 to December 2006) (Chart 3.2.3). The deceleration of loans for house purchase has largely reflected the rises in interest rates observed since late 2005 (Chart 3.2.4). In effect, since October 2005 (when it reached its trough) up to the end of 2006, the average interest rate of outstanding loans for house purchase has risen by 1.15 percentage points. This rise, combined with the high level of house purchase-related household debt, contributed with almost 60 per cent to the total increase of approximately 45 basis points in the average cost implied in household debt in 2006.[3] This raised the

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(1) For further information see the 2005 issue of the *Financial Stability Report* and Section 7.4 of the chapter on the Financial Situation in the 2005 *Annual Report* of Banco de Portugal.

(2) The "more-liquid assets" concept includes deposits, debt securities, quoted shares and mutual fund units excluding pension fund units.

(3) Calculated as the ratio of interest payable by households in the year (estimate) to the annual average stock of the respective financial debt.

Chart 3.2.1

SAVING, INVESTMENT AND FINANCING CAPACITY
OF HOUSEHOLDS

As a percentage of GDP
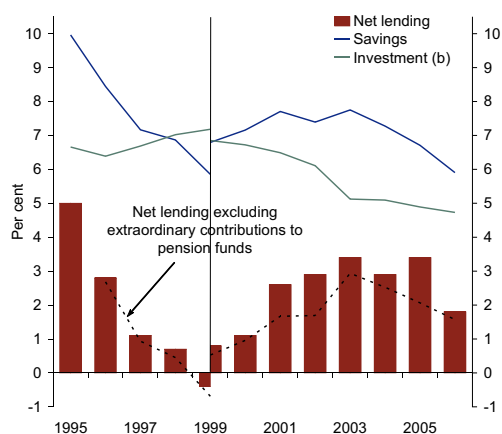
Sources: *INE* and Banco de Portugal.
Notes: (a) Up to 1999, the ratios of net lending, savings and investment to GDP are calculated using National Accounts (base 1995). From 1999 onwards the ratios use National accounts (base 2000) up to 2003 and Banco de Portugal estimates. For 1999, values for the two considered basis are presented. **(b)** Including net acquisition of land and intangibles.

Chart 3.2.2

FINANCIAL ASSETS AND LIABILITIES OF HOUSEHOLDS

END-OF-YEAR POSITIONS

As a percentage of GDP
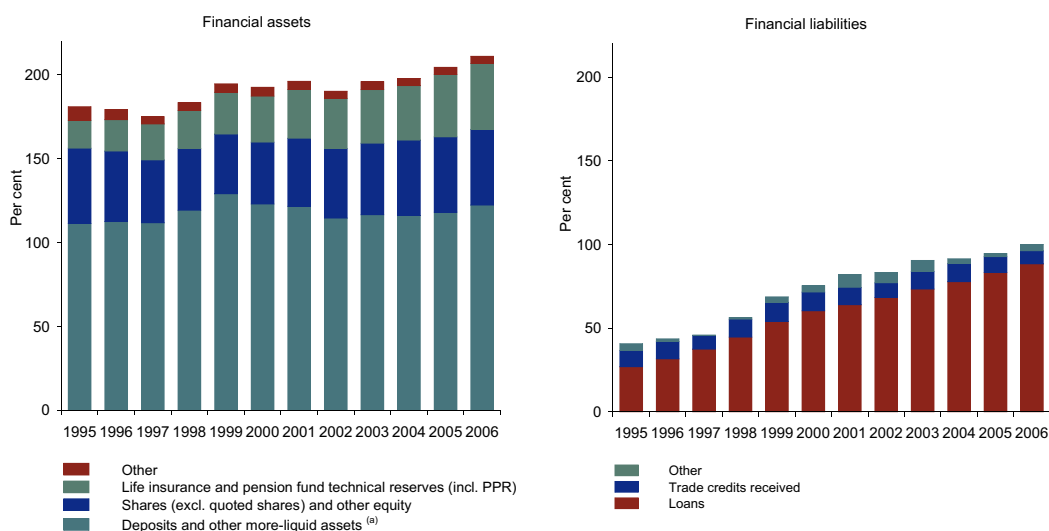
Sources: *INE* and Banco de Portugal.
Note: (a) Including deposits, debt securities, quotes shares and mutual fund units, excluding pension fund units (PPR).

Chart 3.2.3

LOANS TO HOUSEHOLDS

Total loans to households
Annual rate of change [a]

Bank loans to households
Annualised quarterly rates of change on the basis of
seasonally adjusted figures [a]

Housing   Total   Consumption and other lending

Housing   Total   Other lending
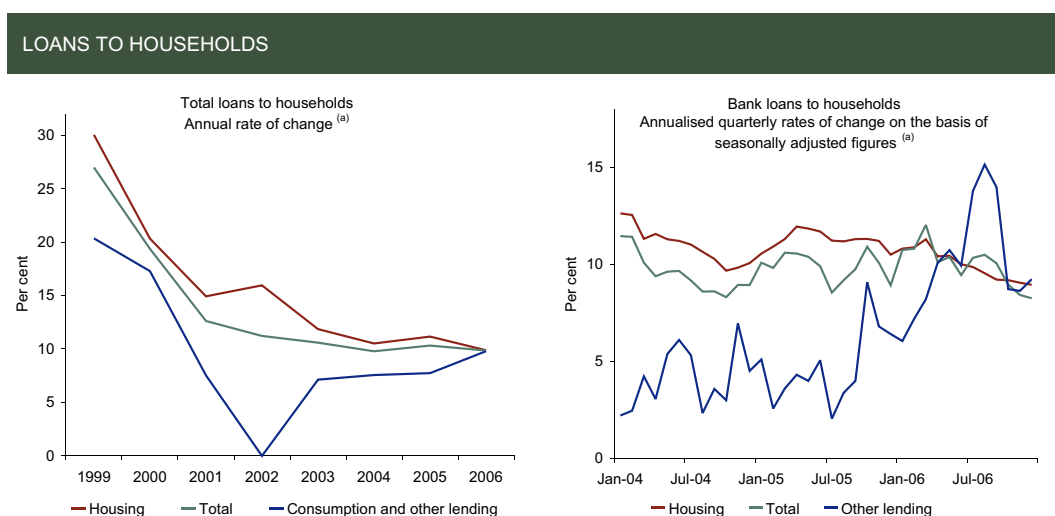
Source: Banco de Portugal.
Note: (a) Rates calculated from figures adjusted for securitisation and reclassifications, write-offs/write-downs and exchange rate and price revaluations.

Chart 3.2.4

Chart 3.2.5

INTEREST RATES ON LOANS TO HOUSEHOLDS
FOR HOUSE PURCHASE

INDEBTEDNESS AND INTEREST PAYABLE

As a percentage of disposable income

Average interest rate
of outstanding loans
for house purchase

Interest rate on new
housing loan
operations

Housing   Other lending
Implied interest rate (rhs)   Interest payable (rhs)
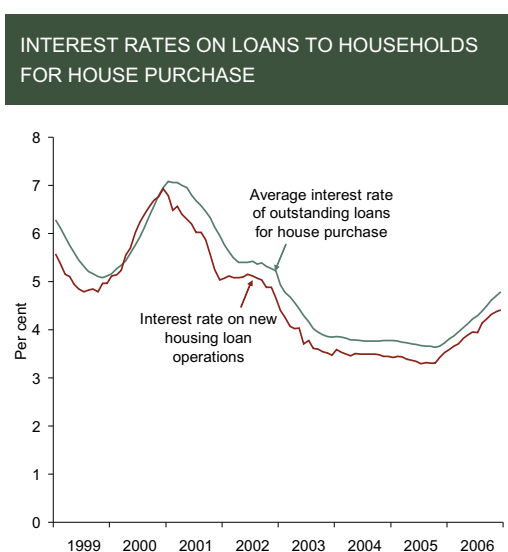
Source: Banco de Portugal.
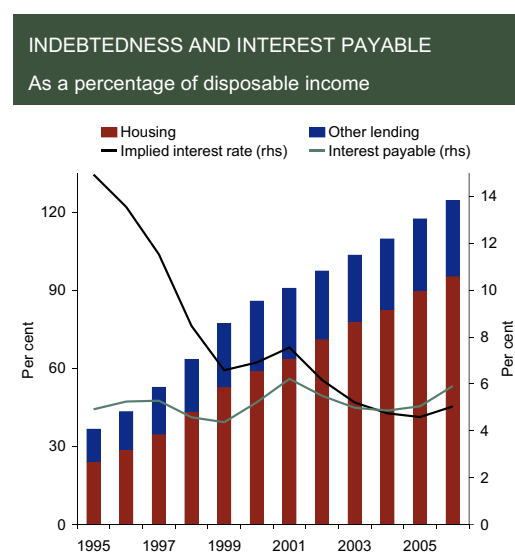
Sources: *INE* and Banco de Portugal.
Note: Interest payable, as a percentage of disposable income, is estimated by Banco de Portugal in relation to total loan interest.

weight of the interest rate burden in the disposable income of this sector to nearly 6 per cent, to stand close to the value observed in 2001 (Chart 3.2.5).

According to the results of the Bank Lending Survey, Portuguese banks reported that demand for loans for house purchase has actually declined continuously during the year, considering the still weak confidence levels among consumers (although somewhat recovering in the second half of the year) (Chart 3.2.6). Also, according to information of the Directorate General of the Treasury on new housing credit contracts (the overall amount of which grew at a more moderate pace than total bank credit for

Chart 3.2.6

DEVELOPMENTS IN DEMAND FOR LOANS TO
HOUSEHOLDS FOR HOUSE PURCHASE AND KEY
DETERMINANTS
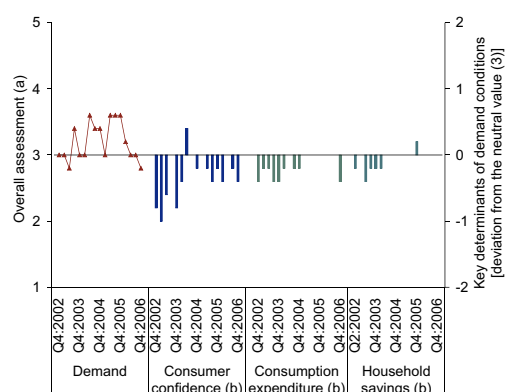
Chart 3.2.7

NEW HOUSING LOAN CONTRACTS

Notes: (a) Average responses of the five Portuguese banking groups to the euro area Bank Lending Survey. Figures below 3 correspond to factors contributing to the decline in demand for credit compared to the previous quarter, while figures above 3 account for factors prompting an increase in demand for credit. **(b)** Right-hand scale.
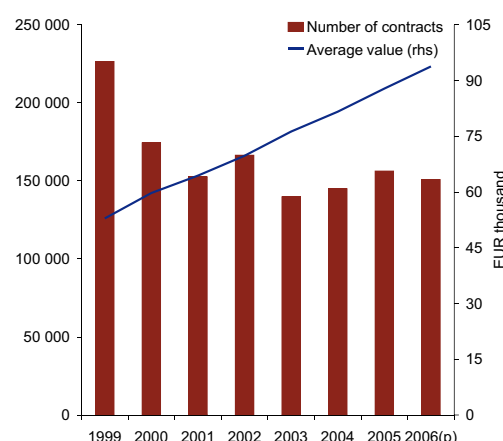
Source: *Direcção Geral do Tesouro.*

the same purpose), the number of contracts in 2006 was slightly smaller than in the previous year, but the average value of loans agreed continued to increase[4] (Chart 3.2.7). Similarly to 2005, supply conditions were essential to maintaining a high growth rate in loans for house purchase. Indeed, against the background of strong competition among banking institutions, this credit market segment saw an increase in contractual modalities offered over recent years. These modalities have had the purpose of containing the financial burden associated with the household debt service, and were translated in longer maturities, looser loan-to-value ratios and narrower interest rate spreads. Likewise, in 2006, conditions offered by bank in this type of credit remained broadly unchanged or were even slightly looser (except for riskier loans), thus mitigating the effect of the interest rate increase on the household financial burden associated with the debt service and sustaining a significant demand for this type of loans (see "Section 4.6 on *Credit risk* in Chapter 4 *Banking System*").

Contrasting with the slowdown in loans for house purchase, consumer credit and other lending to individuals accelerated sharply in the course of 2006. At the end of the year, the annual rate of change of these loans stood also close to 10 per cent (2 percentage points above the value recorded in December 2005). These developments occurred in the context of clear deceleration in private consumption (actually consumption of durable goods declined, in real terms) (Chart 3.2.8) and were reflected in an increase in the ratio between consumer credit flows and the household expenditure in durable goods to levels similar to those observed in the late 1990s (when consumption growth was stronger).

According to the Portuguese banks that participated in the Bank Lending Survey, demand for consumer credit and other lending increased slightly, mostly on account of consumer expenditure of durable goods (Chart 3.2.9). In particular, focus is on the marked increase of the longer-term segment in total consumer credit and other lending, which usually includes loans for car purchase and other consumption expenditure of higher amount. Also note that interest rates on this type of loans are lower in this maturity segment (Chart 3.2.10).

(4) However, this information relates not only to the purchase of new housing but also to new contracts intended to replace previous loans obtained under less favourable conditions.

Chart 3.2.8

CONSUMPTION OF DURABLE GOODS AND
CONSUMER CREDIT AND OTHER LENDING
Annual rate of change (nominal)
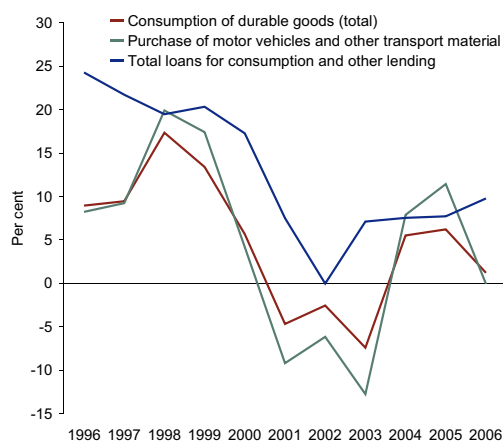
Sources: *INE* and Banco de Portugal.

Chart 3.2.9

DEVELOPMENTS IN DEMAND FOR CONSUMER
CREDIT AND OTHER LENDING AND KEY
DETERMINANTS
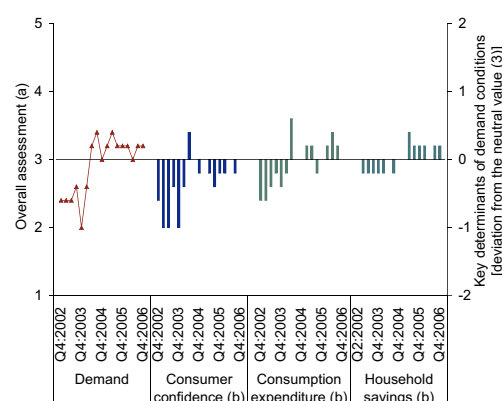
Notes: (a) Average responses of the five Portuguese banking groups to the euro area
Bank Lending Survey. Figures below 3 correspond to factors contributing to the decline in
demand for credit compared to the previous quarter, while figures above 3 account for
factors prompting an increase in demand for credit. (b) Right-hand scale.

Chart 3.2.10a

BREAKDOWN BY MATURITY OF BANK CONSUMER
CREDIT AND OTHER LENDING [(a)]

(as a percentage of disposable income)
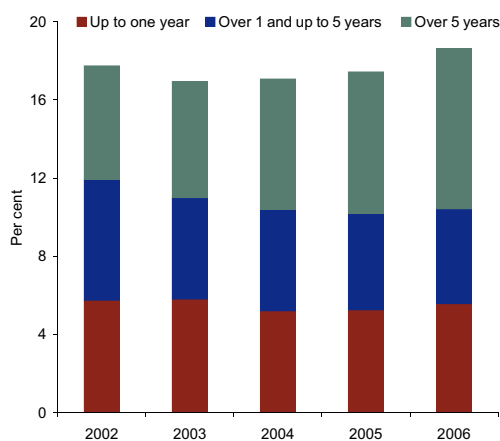
Source: Banco de Portugal.
Note: (a) Annual average values of the stock of credit granted by other monetary financial
institutions.

Chart 3.2.10b

INTEREST RATE OF BANK CONSUMER CREDIT
AND OTHER LENDING AND DIFFERENTIAL ON
THE BASIS OF THE MONEY MARKET RATE [(a)]
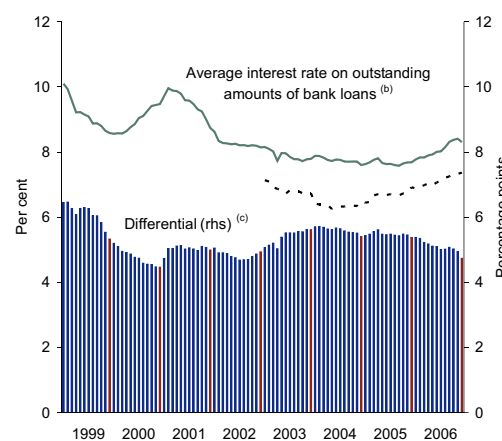
Source: Banco de Portugal.
Notes: (a) Rates and differential refer to end-of-period outstanding amounts. (b) Up to
December 2002, average interest rates on outstanding amounts are estimates. Since
January 2003, the dotted line shows the rate on loans with a maturity over 5 years. (c) The
differential is calculated as the difference between the interest rate on outstanding
amounts and the six-month moving average of six-month Euribor. Red bars refer to
December each year.

In spite of its significant amount, the flow of loans to households in 2006, as a percentage of GDP and
of the sector's disposable income, was close to that recorded in the previous year (approximately 8
and 11 per cent respectively). The decline in the individuals' net lending in aggregate terms was re-
flected into lower accumulation of financial assets than in 2005 (Chart 3.2.11). Excluding extraordinary

Chart 3.2.11
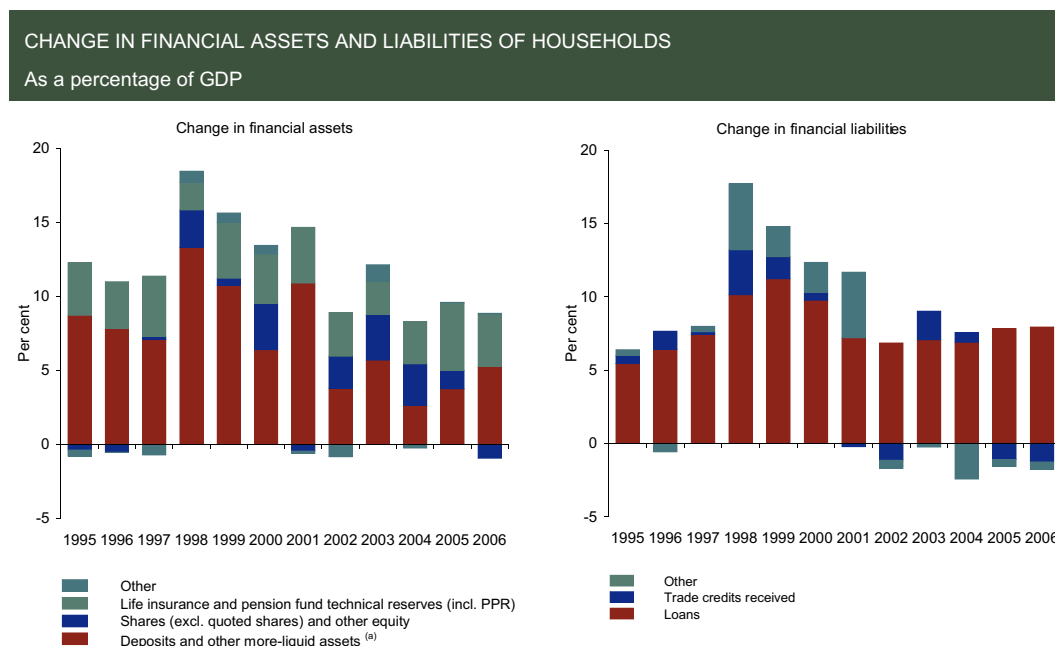
CHANGE IN FINANCIAL ASSETS AND LIABILITIES OF HOUSEHOLDS
As a percentage of GDP

Change in financial assets

Change in financial liabilities

Other
Life insurance and pension fund technical reserves (incl. PPR)
Shares (excl. quoted shares) and other equity
Deposits and other more-liquid assets [(a)]

Other
Trade credits received
Loans

Sources: *INE* and Banco de Portugal.
Note: **(a)** Including deposits, debt securities, quoted shares and mutual fund units, excluding pension fund units (PPR).

contributions to pension funds, the change in household financial assets was lower by approximately 0.6 percentage points of GDP (0.8 percentage points of disposable income) in 2006 than in the previous year. Individuals' portfolio shifted somewhat towards an increase in liquidity, with assets in the form of deposits (including savings certificates) growing whereas households' claims in equity capital, excluding quoted shares, declined significantly. Similarly to the previous year, investments by households in life insurance savings products reached a significant level (albeit lower than in 2005), standing above 3 per cent of GDP).[5]

Notwithstanding the decline in financial savings, the household financial position (i.e. the difference between stocks of financial assets and liabilities) maintained a slightly upward trend, reflecting the valuation of equity securities in the sector's portfolio. However, when only more liquid assets (i.e. deposits, debt securities, quotes and shares and mutual fund units, excluding pension fund units) net of loans are considered, the position reveals a continued downward trend since 1995, albeit remaining positive (Chart 3.2.12).

The pace of growth of household indebtedness was particularly high during the second half of the 1990s, in a macroeconomic framework characterised by the continued increase in disposable income (perceived as permanent) and by a sustained decline in borrowing cost and respective volatility. This context favoured the growth of expenditure in the sector, both consumption and investment, leading to a decline in the savings rate and in net lending in aggregate terms (Chart 3.2.1). Overall, this path did not differ from that observed in other European Union countries, although credit granted to this sector

(5) In 2005, these investments reached approximately 4 per cent of GDP, which was considerably higher than in previous years. This increase reflected portfolio shifts that were, to a large extent, associated with the implementation of the Community Directive on taxation of savings (Council Directive 2003/48/EC of 3 June 2003, transposed into national legislation by Decree-Law No 62/2005 of 11 de March, which entered into force on 1 July 2005). This Directive aims at the creation of mechanisms for the automatic exchange of information between Member States in order to enable the effective taxation of interest payable to individuals in accordance with the national laws of the Member State of their residence. This Directive covers only taxation of saving income in the form of interest, such as interest payments on deposits, debt claims and debt securities, excluding pension and insurance benefits. In Portugal, the effects of this Directive were especially important in the case of emigrants' remittances, which no longer benefit from the 11.5 per cent reduced rate of the personal income tax applicable to the interest of deposits located in Portugal.

Chart 3.2.12

| FINANCIAL POSITION OF HOUSEHOLDS |
| As a percentage of GDP |

Sources: *INE* and Banco de Portugal.
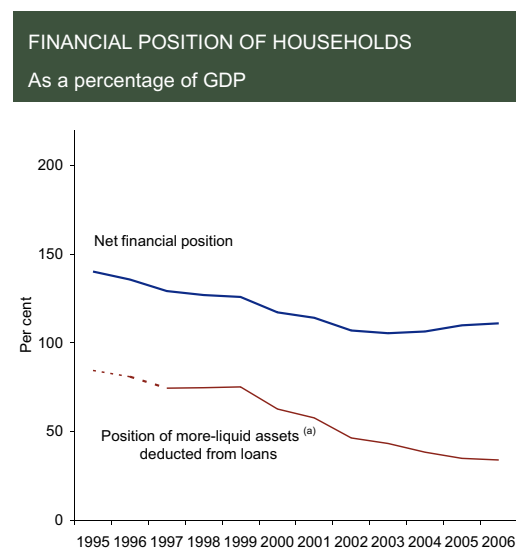**Note: (a)** Including deposits, debt securities, quoted shares and units of investment funds, excluding pension fund units. For 1995 and 1996, the amounts of quoted shares were estimated based on the structure in 1997.

Chart 3.2.13

| HOUSEHOLD FINANCIAL DEBT |
| As a percentage of GDP |
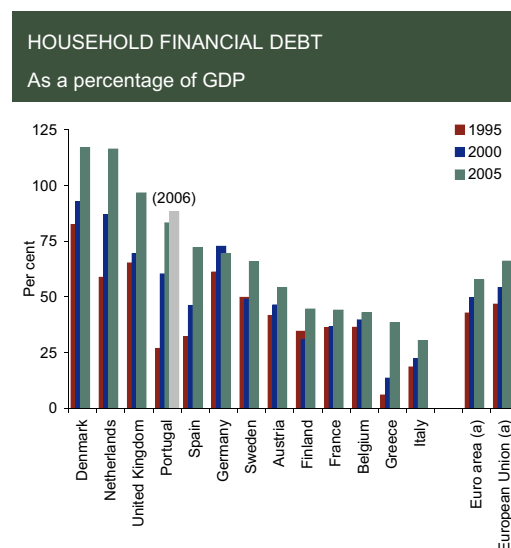
Sources: Eurostat, *INE* and Banco de Portugal.
Note: (a) EU15. The euro area aggregate excludes Ireland and Luxembourg.

in Portugal, as a percentage of disposable income, has reached higher levels, in general. As a result, the household indebtedness ratio (which in the early 1990s was approximately 20 per cent of disposable income) increased gradually, to stand among the highest levels in the European Union (Chart 3.2.13).

The sustained growth of the household indebtedness ratio and, chiefly, the marked increase in the aggregate debt service burden in the second half of the 1990s did not reflect particularly critical situations in terms of financial stress by individual households. In aggregate terms, these indicators reflect not only the value of the indebtedness ratios of households with debt, but also the number of indebted households. Their increase reflected mainly a strong rise in the number of indebted households. This conclusion is based on the results of the Surveys on Household Wealth and Indebtedness conducted in 1994 and in 2000. Such results made it possible to assert that, in the period between these two years, both the indebtedness ratio and the debt service burden did not increase significantly for individual households[6].

The general increase in bank interest rates in 2000 led to a significant decline in the growth pace of credit. Then, it started an adjustment process of the households' balance sheet to the indebtedness level reached at that time. Therefore the households' savings rate increased, partly boosted by the need to repay loans borrowed in previous years. In spite of the significant investment in fixed capital of this sector, its net lending capacity has recovered. This trend continued in 2002 and 2003, with the households savings rate fluctuating somewhat and net lending increasing slightly in those two years, chiefly reflecting a cut in investment as a percentage of GDP.

In 2004 and 2005, consumption grew at a higher pace than disposable income (in contrast to the euro area average, which stabilised) leading to a continued fall in the households savings rate and financing capacity. In this period, the decline in financial savings reflected mainly the fall in net flows of financial assets (excluding extraordinary contributions to pension funds), since the flow of financial liabilities remained relatively stable. In turn, the growth rates of household debt were high in that period (around 10

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(6) For further details see Farinha and Noorali, "Indebtedness and wealth of Portuguese households", Banco de Portugal, *Financial Stability Report, 2004*.

per cent), benefiting from the downward trend of the interest rates and from their maintenance at low levels for a considerably long period. In particular, loan demand for house purchase continued to be significant, in spite of weak economic growth, rising unemployment and consumer confidence at low levels. In effect, against the background of strong competition in the banking sector and no significant speculative pressures in the housing market, credit supply has been adjusting to the current capacity of households to ensure the debt service. Through the availability of credit products intended to contain the financial burden related to debt service, credit supply has supported continued access by Portuguese households to the credit market, without evincing critical situations concerning the financial solvency of the sector. Notwithstanding the rise in ECB interest rates, the conditions applied by most banks to credit granting seem to have mitigated the occurrence of defaults until the end of 2006.

However, a correct assessment of the impact of the financial situation of households on the financial system stability requires an analysis not only of the sector in aggregate terms, but mainly of the distribution of the main risk indicators. Data currently available suggest that up to 2000, no serious situations had occurred in terms of the indebtedness ratio, debt service burden and debt to assets ratio, at the level of individual households. Some segments, however, (mainly those of younger households, with lower income and a higher probability of moving into unemployment) were particularly sensitive to significant interest rate rises.[7] The results of the Survey on Household Wealth and Indebtedness, conducted in late 2006 and early 2007 to a sample of household aggregates, which will be available in the second half of 2007, will permit to draw more accurate conclusions as to heterogeneity of the household financial position, with special focus on fringe population that may have taken on higher risks in recent years.

In effect, the present macroeconomic framework poses some risks as regards developments in the household financial situation. In a context of gradual recovery of economic activity, the unemployment rate in Portugal is still high , with long-term unemployment accounting for more than half of total unemployment. In addition, the process of consolidation of public accounts will continue to be reflected in the path of domestic demand. Interest rate rises may have been translated into a significant increase in the debt service burden, considering the high levels of households' borrowing in recent years. In aggregate terms, the need to address possible additional increases in debt service will tend to have a non-negligible effect on developments in household consumption and investment. Also, the possibility of an increase in the credit delinquency ratio of this sector should not be excluded, albeit of a limited size in terms of the expected value of losses for the banking system.

It is also important to stress that an evaluation of the households financial situation will not only address its debt, but also its total wealth. In this view, assets held by households should be considered, either real-estate or financial assets. Data available on household financial and non-financial wealth indicate that it grew considerably over the last ten years, thus contributing to moderate the risks to financial stability associated with household indebtedness.[8] As previously mentioned, aggregate indicators are, per se, insufficient to correctly evaluate the actual risks to the financial system stability. The distribution of indicators on total household wealth is therefore a valuable tool to gauge the capacity of the sector to meet its financial liabilities. Data available suggest that, up to 2004, the wealth situation of indebted households was in general sound, although some segments (in particular younger households with lower income) were more vulnerable, given the lower holdings of assets. Also, these segments revealed greater sensitivity to sudden changes either in real-estate prices or in interest rates.[9]

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(7) See Farinha and Noorali, "Indebtedness and wealth of Portuguese households", Banco de Portugal, *Financial Stability Report de 2004*.

(8) For further information, see Cardoso e Cunha (2005), "Household wealth in Portugal: 1980-2004", Banco de Portugal, *Working Paper No 4*.

(9) See also Farinha and Noorali, "Indebtedness and wealth of Portuguese households", Banco de Portugal, *Financial Stability Report 2004*.

Chart 3.2.14

HOUSE PRICE DEVELOPMENTS IN PORTUGAL
Year-on-year rate of change
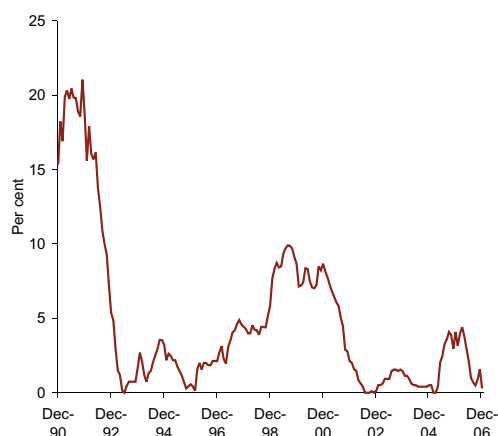
Source: *Confidencial Imobiliário* Index.

Moreover, since a significant share of household debt is related to house purchase, the extension of risks to financial stability inherent in the household financial situation is somewhat mitigated. In effect, real estate is generally used as collateral in loans, thus contributing to minimise the value of the creditor's loss in case of debtor failure. This is the typical case of loans for house purchase. The trend of prices in the real-estate market is, therefore, an essential aspect to gauge the influence of the household financial position on financial stability. Contrary to developments in other EU countries, evidence points to no excessive valuation of real-estate prices in Portugal (Chart 3.2.14). Therefore, significant adjustments in these prices are not expected, which is a positive feature from the point of view of financial stability.[10]

3.3. Non-financial corporations

Non-financial corporations net borrowing continued to increase in 2006, reaching 6.4 per cent of GDP. This path reflected the decline in the sector's savings, against a background in which investment as a percentage GDP was slightly below the level observed in the previous year. As a result, non-financial corporations resorted again significantly to debt, although net flows were lower than in 2005. In 2006, the rate of change of gross debt in this sector stood slightly above 5 per cent, compared with approximately 7.5 per cent in the previous year (Chart 3.3.1). This increase, albeit lower on average than in the euro area countries, raised the gross debt ratio of non-financial corporations to 105 per cent of GDP at the end of the year,[11] among the highest in the European Union (Chart 3.3.2).

In 2006, recourse to loans granted by resident credit institutions went up (the annual rate of change stood close to 6 per cent, approximately 1.5 percentage points higher than in 2005). The acceleration of these loans reflected, to a large extent, the substitution of other financing sources, such as net issu-

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

(11) The debt concept considered here includes loans granted by resident and non-resident credit institutions; loans/additional capital by non-resident corporations of the same economic group (excluding those granted to non-financial corporations having their head-office in Madeira off-shore); commercial paper and bonds issued by non-financial corporations held by other sectors and trade credits received from other sectors.

Chart 3.3.1

TOTAL DEBT OF NON-FINANCIAL CORPORATIONS

Annual rate of change and end-of-period positions (rhs)
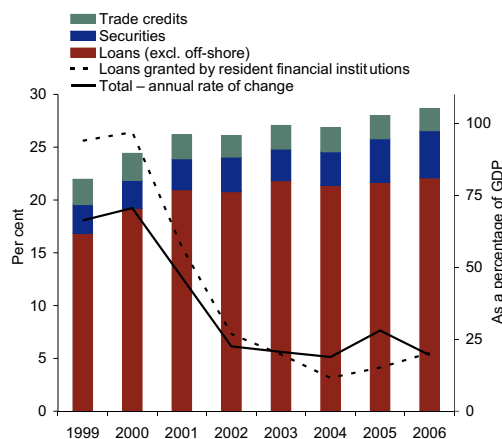
Source: Banco de Portugal.
Note: Including loans granted by resident and non-resident credit institutions; loans/additional capital by non-resident intra-group corporations (excluding those granted to non-financial corporations having their head-office in Madeira's off-shore); commercial paper and bonds issued by non-financial corporations held by other sectors and trade credits received from other sectors. The values indicated refer to total debt as a percentage of GDP and to the annual rate of change of total debt.

Chart 3.3.2

RATIO OF TOTAL DEBT IN GDP [(a)]
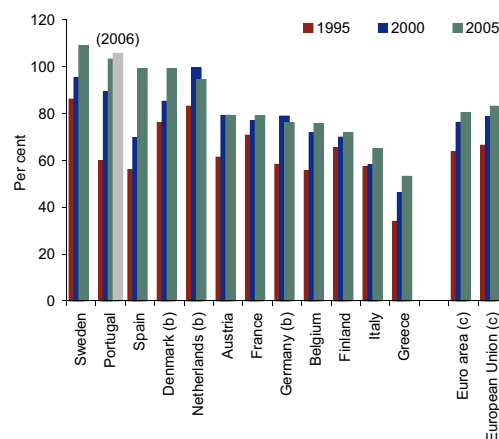
Sources: Eurostat and Banco de Portugal.
Notes: **(a)** Total debt corresponding to the sum of loans, debt securities and trade credit liabilities. **(b)** Also includes other accounts payable. **(c)** EU15, excluding the United Kingdom, Ireland and Luxembourg. The last two are also excluded from the euro area aggregate.

Chart 3.3.3

MAIN FINANCING FLOWS OF NON-FINANCIAL CORPORATIONS

As a percentage of GDP
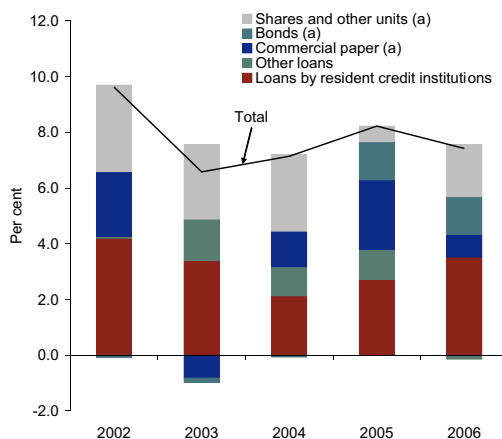
Source: Banco de Portugal.
Note: **(a)** Non-consolidated amounts.

ance of debt securities which markedly declined due to lower net issuance of commercial paper (Chart 3.3.3). In 2005, commercial paper issues had reached significant amounts (approximately 2.5 per cent of GDP) while in 2006, it was around 0.8 per cent of GDP. In turn, net issuance of bonds by non-financial corporations amounted, as a percentage of GDP, the same as recorded in 2005, approximately 1.4 per cent. In a context of expectations of further interest rate increase, most gross issuance in 2006 was at fixed rate, contrary to the previous year (Chart 3.3.4). Net equity issuance by non-financial corpora-

Chart 3.3.4

GROSS ISSUANCE OF BONDS BY NON-FINANCIAL CORPORATIONS
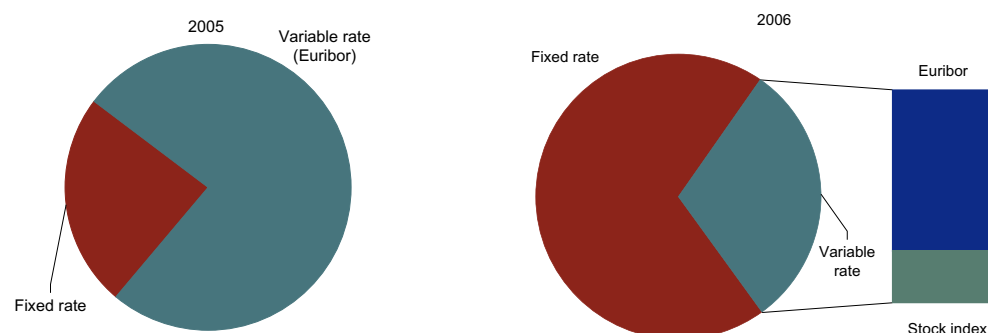
Source: Banco de Portugal.

tions was approximately 2 per cent of GDP (after the low level observed in 2005, reflecting the winding up of a large corporation early in the year).

In the course of the second half of the 1990's, net borrowing requirements of non-financial corporations increased gradually and considerably, as a result of the significant level of investment in fixed capital and the gradual decline in savings (Chart 3.3.5a). Therefore, net borrowing of this sector were virtually nil in 1996, widening subsequently in a context of marked acceleration of economic activity. This development reflected strong fixed capital investment growth and, particularly at the end of that decade, the internationalisation process of some corporations. As a result, net borrowing requirements of non-financial corporations reached a peak in 2000, and the indebtedness ratio attained one of the highest values in the European Union.

In the first years of the current decade, net borrowing requirements were still high, associated in particular with intense merge and acquisition activity related with the restructuring process of economic groups. Nonetheless, up to 2003,[12] in line with the business cycle, the adjustment path shown by non-financial corporations (Chart 3.3.5b) was the result, on the one hand, of current savings recovery and, on the other hand, of the gradual deceleration in corporate investment. This adjustment trend, however, was interrupted in 2004 and since then net borrowing requirements of non-financial corporations have shown an upward trend, in spite of the slight decline in fixed capital investment, as a percentage of GDP. According to available data, this development reflects a gradual decline in savings, in contrast to developments in the euro area as a whole (Chart 3.3.6).[13]

The decline in non-financial corporations savings in 2004 and 2005 was probably associated with the low growth in economic activity and the less favourable trend of profitability, chiefly in sectors most exposed to external competition. According to data available, savings in the non-financial sector as a whole declined further in 2006, as a percentage of GDP. However, aggregate savings in this sector reflects rather mixed performances of non-financial corporations. Export recovery in 2006 enabled profit-

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(12) Considering net lending of non-financial corporations adjusted for temporary fiscal measures.

(13) It should be noted, however, that although the current saving levels of Portuguese non-financial corporations, as a percentage of GDP, are below the euro area average, their savings rate (measured in terms of the sector operating surplus) does not differ significantly from the area's average value (reflecting a lower contribution of this sector gross value added to GDP in Portugal than in the area, on average). This comparison is made for 2003 which is the most recent year with the complete set of National Accounts by institutional sector available.

Chart 3.3.5a

NET BORROWING, SAVINGS AND INVESTMENT
OF NON-FINANCIAL CORPORATIONS

As a percentage of GDP
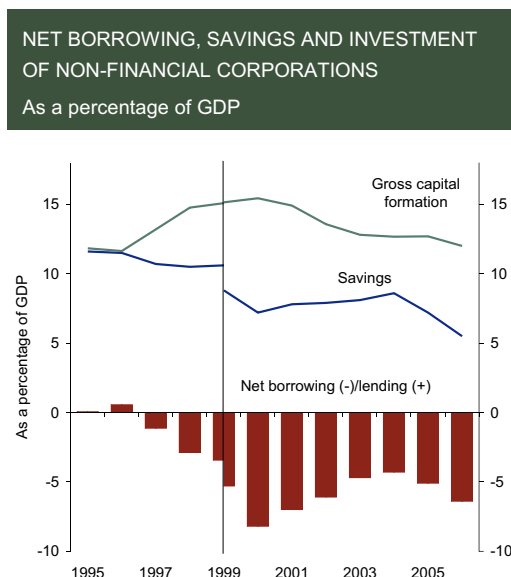
Sources: *INE* and Banco de Portugal.
Note: Up to 1999, the ratios of net borrowing/lending, savings and gross capital formation to GDP are calculated using National Accounts (base 1995). From 1999 onwards the ratios use National accounts (base 2000) up to 2003 and Banco de Portugal estimates. For 1999, values for the two considered basis are presented.

Chart 3.3.5b

FINANCIAL OPERATIONS OF NON-FINANCIAL
CORPORATIONS

As a percentage of GDP
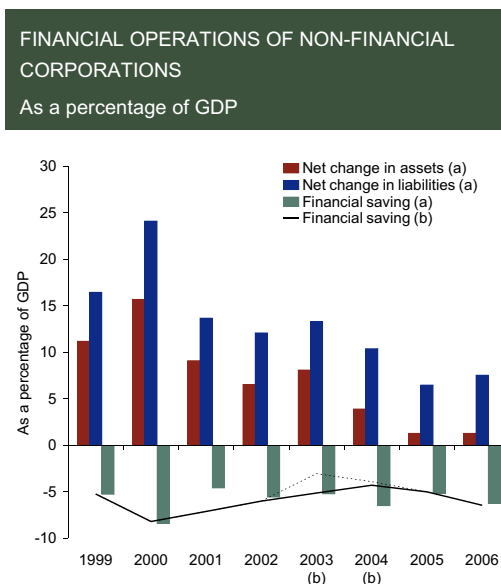
Sources: *INE* and Banco de Portugal.
Notes: (a) Excluding operations related to Portuguese direct investment abroad and foreign direct investment in Portugal of companies having their head office in Madeira's offshore. **(b)** Dotted lines represent figures adjusted for temporary fiscal measures.

Chart 3.3.6

SAVINGS AND NET BORROWING/LENDING OF NON-FINANCIAL CORPORATIONS IN THE EUROPEAN UNION

As a percentage of GDP
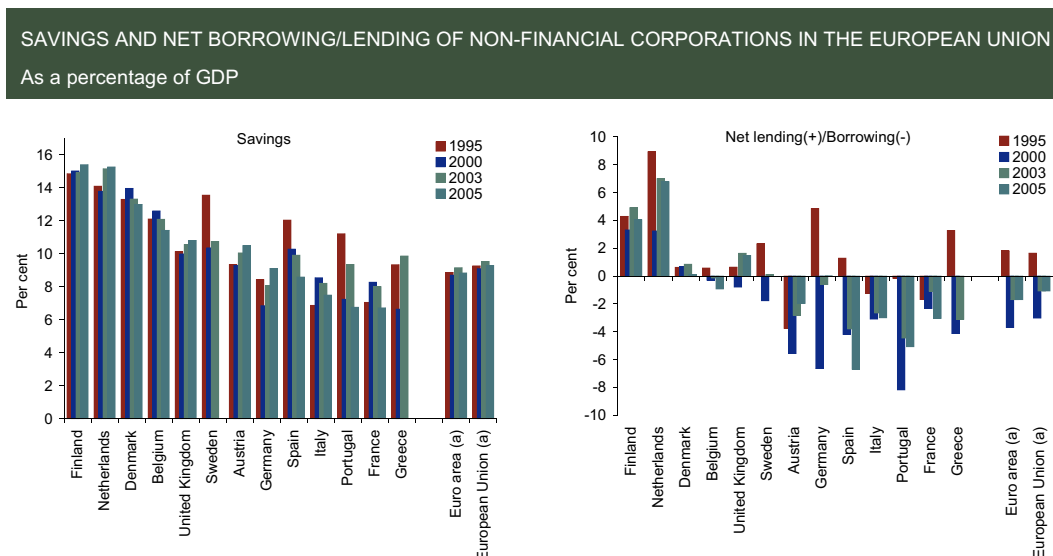
Sources: Eurostat and Banco de Portugal.
Note: (a) EU15 and euro area, excluding Ireland and Luxembourg. In 2005 Sweden and Greece will also be excluded from the respective aggregates.

ability to improve in some sub-sectors of the tradable sector, thus reversing the downward trend observed in previous years. Also, mixed performances have been revealed according to the size of corporations, with large corporations presenting more positive results than the sector in aggregate terms. According to available information for the sample of non-financial corporations of the Central

Chart 3.3.7

RETURN ON EQUITY OF NON-FINANCIAL
CORPORATIONS
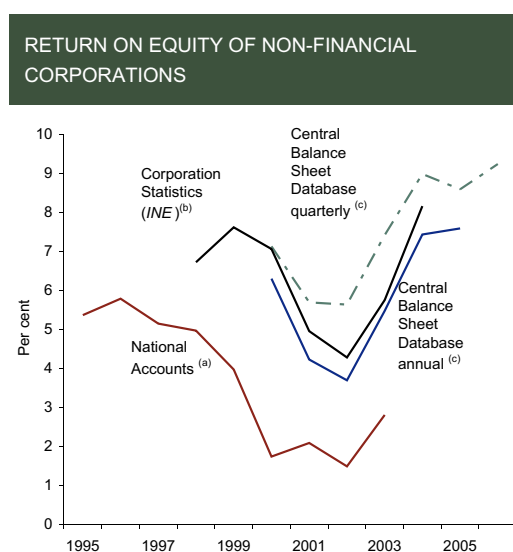
Sources: *INE* (National Accounts and Integrated System of Corporation Statistics) and Banco de Portugal (Financial Accounts and Central Balance Sheet).
Notes: (a) Ratio of net savings in the sector, plus distributed income of corporations and reinvested profits of foreign direct investment (employment in the sector), to the annual average stock of shares and other non-consolidated equity (liabilities) in the non-financial corporations sector, based on the stock at market prices in t-1 and t, where the stock in t is adjusted for annual capital gains and losses. **(b)** Ratio of net profit/loss for the year to the annual average value of the equity of non-financial corporations with more than 20 workers. **(c)** Corresponding to the ratio of current profit and loss (operational profit and loss plus financial profit and loss) to the value of shares and other equity (equity plus provisions and adjustments). Rates of change in return on equity based on joint undertakings for two consecutive years are applied to the last available value obtained.

Balance Sheet Data Office of Banco de Portugal,[14] profitability, which had declined slightly in 2005, improved in the course of 2006. According to the quarterly survey sample, profitability improvements were observed in most corporations (typically large corporations) (Chart 3.3.7), with particular focus on the case of manufacturing corporations, most of them with sales to external markets. Nevertheless, in a context of deceleration in private consumption, profitability and turnover in the services sector (incompletely covered by the information of the Central Balance Sheet Data Office) were probably lower than in the corporate sector as a whole. It is worth noting, though, that the above-mentioned data does not make it possible to clearly gauge the factors underlying the decline in non-financial corporations' savings as a percentage of GDP as a whole in 2006.

As previously mentioned, borrowing requirements of non-financial corporations were chiefly met in 2006 by financial debt (whose net flows accounted for 5.3 per cent of GDP) and equity issuance (totalling, in net terms, 3.3 per cent of GDP) (Chart 3.3.8). The financing structure of Portuguese non-financial corporations does not differ significantly from the average in the euro area (Chart 3.3.9), and is characterised by approximately similar weights of financial debt (chiefly as bank loans) and equity.[15] According to data available, the debt-to-equity ratio declined in 2006, keeping the downward trend observed after 2001 (Chart 3.3.10a).

In spite of the acceleration observed in loans granted by resident financial institutions to non-financial corporations, according to the replies of the five banking groups that participated in the Bank Lending

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(14) For a more detailed characterisation of the sample of corporations participating in the Central Balance Sheet Data Office of Banco de Portugal (in annual and quarterly surveys), and of the basic results used in this chapter, see Banco de Portugal, Supplement No 5/2005 to the *Statistical Bulletin, December 2005*. However, the mentioned samples have a significant bias for large corporations. This applies in both cases but more particularly in the Quarterly Survey.

(15) Financial debt comprises loans, including those granted intra-group to foreign direct investment corporations, and securities other than shares (commercial paper, bonds and other debt securities).

Chart 3.3.8

CHANGE IN FINANCIAL ASSETS AND LIABILITIES OF NON-FINANCIAL CORPORATIONS

As a percentage of GDP

Change in assets

Change in liabilities
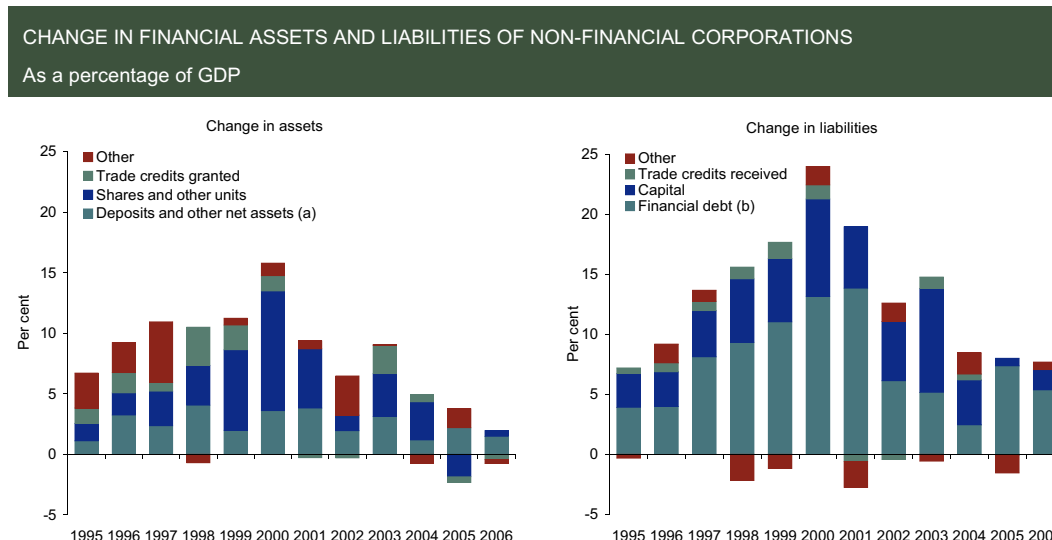
Sources: *INE* and Banco de Portugal.
Notes: (a) Including deposits, securities other than mutual fund shares/units. **(b)** Including loans and securities other than shares.

Chart 3.3.9

COMPOSITION OF FINANCING OF NON-FINANCIAL CORPORATIONS IN THE EUROPEAN UNION

Positions at end 2005
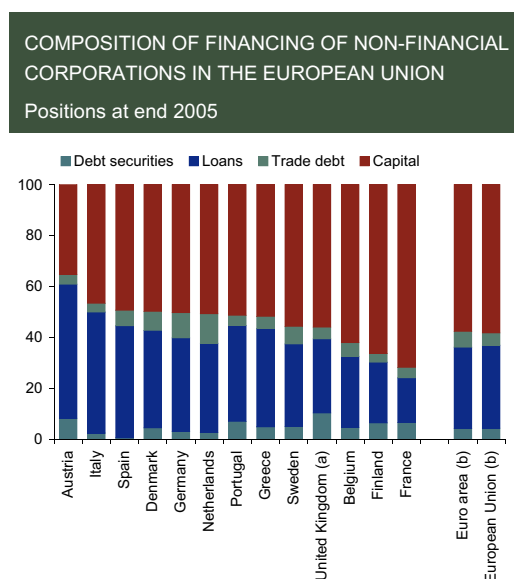
Sources: Eurostat and Banco de Portugal.
Notes: (a) Non-consolidated values. **(b)** EU15, excluding the United Kingdom, Ireland and Luxembourg. The last two are also excluded from the euro area aggregate.

Survey, demand for credit by non-financial corporations has not changed significantly since mid-2005 (Chart 3.3.11). This stands in clear contrast to developments in the euro area, where demand for bank credit by non-financial corporations have shown a sustained increase since the third quarter of 2005. The slower recovery of economic activity in Portugal than in most European economies is the major factor behind this difference in behaviour.

This stands out when examining the factors with an impact on demand for loans by non-financial corporations (Chart 3.3.12). Debt restructuring – chiefly reflected in the consolidation of credits and replacement of traditional credit products by new standardised products – and, to a lesser extent, the

Chart 3.3.10a

DEBT-TO-EQUITY RATIO OF PORTUGUESE
NON-FINANCIAL CORPORATIONS

Debt-to-equity ratio (a)
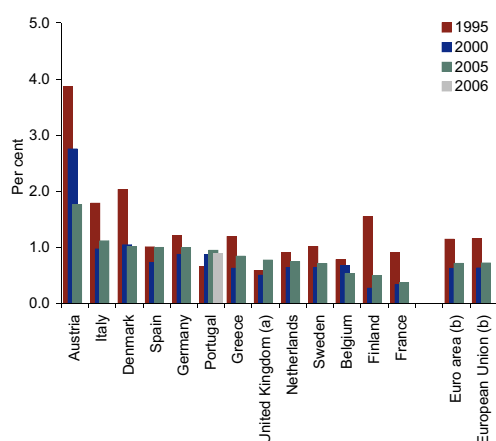
Sources: Eurostat and Banco de Portugal.
Notes: (a) Ratio of total debt, including trade credits and other accounts payable, to capital and reserves at market value. Consolidated values, excluding the United Kingdom. (b) EU15, excluding the United Kingdom, Ireland and Luxembourg. The last two are also excluded from the euro area aggregate.

Chart 3.3.10b

FINANCIAL STRUCTURE OF NON-FINANCIAL
CORPORATIONS IN THE EUROPEAN UNION
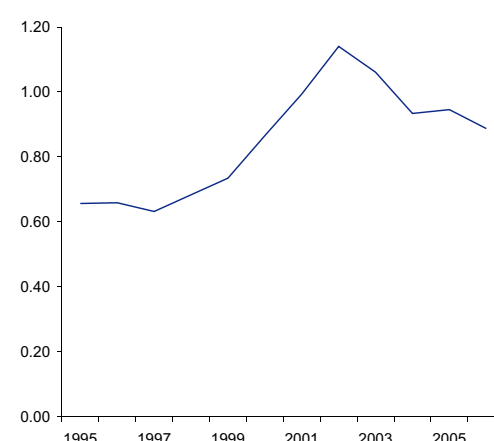
Source: Banco de Portugal.

Chart 3.3.11

TRENDS IN DEMAND FOR LOANS
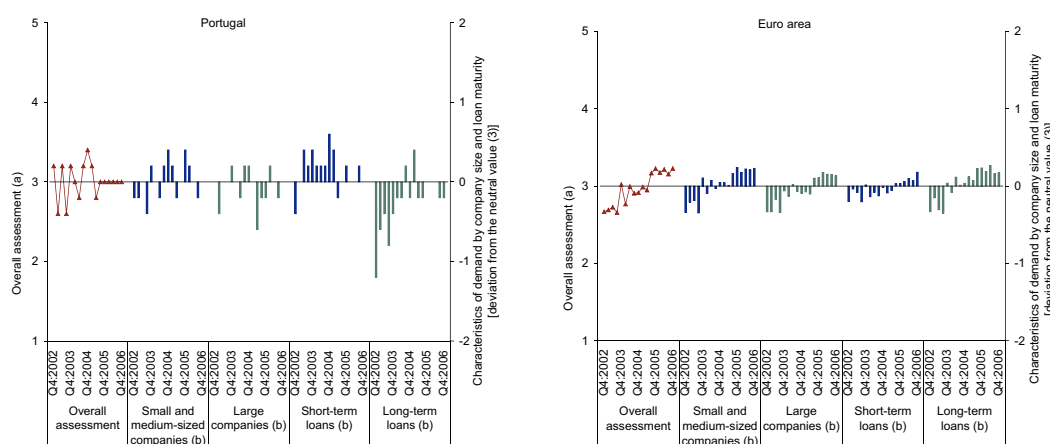
Notes: (a) Average responses of the five Portuguese banking groups to the euro area bank lending survey. Figures below 3 correspond to factors contributing to the decline in demand for credit compared to the previous quarter, while figures above 3 account for factors prompting an increase in demand for credit. (b) Right-hand scale.

Notes: (a) Average responses of the 85 national banks to the euro area bank lending survey. Figures below 3 correspond to factors contributing to the decline in demand for credit compared to the previous quarter, while figures above 3 account for factors prompting an increase in demand for credit. (b) Right-hand scale.

financing of current business activity continued to be the major factors indicated by surveyed Portuguese banks as having contributed to the increase in demand for credit by corporations, in 2006. As regards debt restructuring, surveyed banks point to two different causes. On the one hand, changes in contractual conditions at the initiative of corporations themselves, such as maturities or collateral required, as well as the consolidation of liabilities with a view to reducing the overall costs of financing; this situation assumes some relevance in the case of large corporations with important bargaining power, which thus obtain more favourable conditions in their operations with banks. On the other hand,

Chart 3.3.12

FACTORS INFLUENCING DEMAND FOR LOANS BY NON-FINANCIAL CORPORATIONS

Note: **(a)** Average responses of the five Portuguese banking groups to the euro area Bank Lending Survey. Figures below 3 (neutral value) correspond to factors contributing to the decline in demand for credit compared to the previous quarter, while figures above 3 account for factors prompting an increase in demand for credit.

Note: **(a)** Average responses of the 85 national banks to the euro area Bank Lending Survey. Figures below 3 (neutral value) correspond to factors contributing to the decline in demand for credit compared to the previous quarter, while figures above 3 account for factors prompting an increase in demand for credit.

another cause consists in the renegotiation of conditions at the initiative of banks, which occurs in case corporations face difficulties in ensuring the debt service, i.e. corporations in default or which are risking imminent default; the latter situation seems to be the most frequent occurrence and is mainly related to loans granted to small and medium corporations.

In Portugal as well as in the euro area as a whole, financing of mergers and acquisitions and business restructuring were also reported as factors contributing to the increase in demand for loans by non-financial corporations. Actually, 2006 saw a marked increase in the number and amounts of mergers and acquisitions announced by Portuguese corporations.

In 2006, investment financing was again the main factor reported by Portuguese banks as contributing to a decrease in demand for credit by non-financial corporations. In turn, in the euro area as a whole, investment financing gained relevance during 2006 (chiefly to the detriment of debt restructuring) as inducing higher demand for credit by non-financial corporations. In effect, the increase in indebtedness of Portuguese non-financial corporations in recent years has not been associated with significant growth in investment by the sector. In turn, financing conditions of corporations, both in terms of credit cost and quantity, have not been reported by corporations participating in the Investment Survey conducted by the National Statistical Institute as significantly restraining investment.[16] According to the results of this Survey, the percentage of corporations reporting difficulties in obtaining credit as a factor limiting investment continued to be relatively low in 2006 (Chart 3.3.13). In turn, the number of corporations reporting the interest rate level as a factor limiting investment increased only slightly in 2006. In the course of the year, the interest rate on outstanding bank loans to non-financial corporations increased markedly, totalling 100 basis points, in spite of the bank margins continued to narrow over the year (Chart 3.3.14). Reflecting this increase, interest payable by non-financial corporations rose by approximately 0.5 percentage points of GDP, to around 4 per cent of GDP in 2006 (Chart 3.3.15).

(16) The Investment Survey is sent to a sample of corporations with more than 4 employees, with a yearly turnover equal to or above €125,000, covering most sectors in manufacturing and services. Corporations in the economic branches comprised with more than 199 employees are exhaustively surveyed (INE, October 2006).

Chart 3.3.13

MAIN FACTORS LIMITING INVESTMENT BY
NON-FINANCIAL CORPORATIONS [(a)]
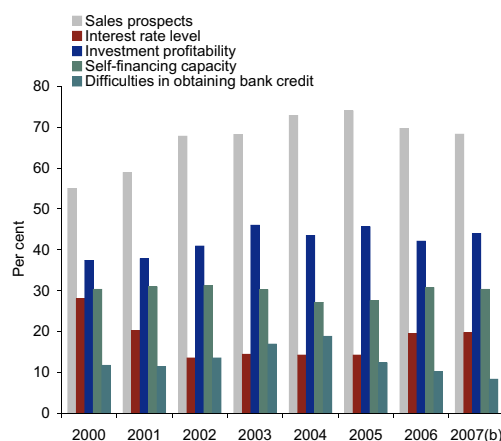
Source: *INE*, Investment Survey.
Notes: **(a)** Percentage of corporations indicating each of the factors limiting investment, from among the whole of corporations indicating restrictions on investment. **(b)** Intentions.

Chart 3.3.14

MONEY MARKET INTEREST RATES, INTEREST
RATES ON BANK LOANS TO NON-FINANCIAL
CORPORATIONS AND RESPECTIVE SPREADS
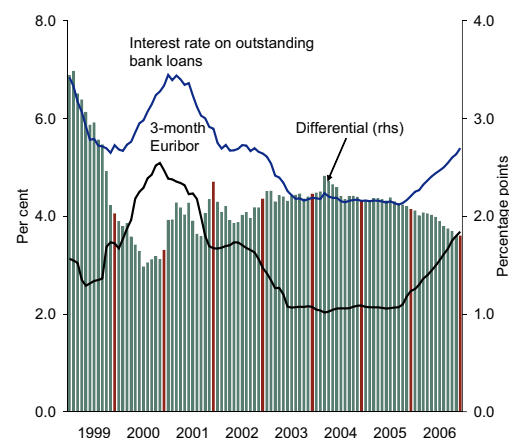
Source: Banco de Portugal.
Notes: Rates and spreads refer to end-of-period outstanding balances. Up to December 2002, interest rates on outstanding balances are estimates. Spreads are calculated as the difference between the interest rate on outstanding balances and the three-month moving average of the three-month Euribor. Red bars refer to December each year.

Chart 3.3.15

INTEREST PAYABLE BY NON-FINANCIAL
CORPORATIONS

As a percentage of GDP
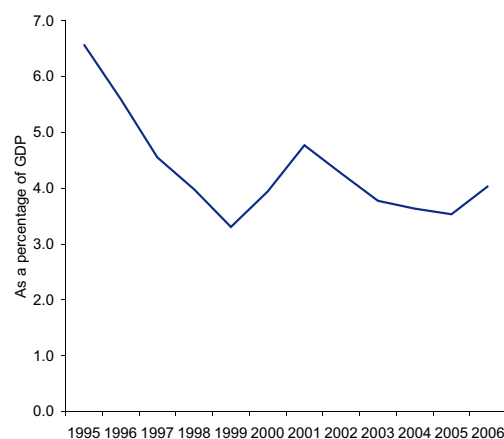
Source: Banco de Portugal.
Note: Estimates for interest payable on loans and debt securities.

Chart 3.3.16

FINANCIAL STRUCTURE OF INVESTMENT
ACCORDING TO THE RESULTS OF THE
INVESTMENT SURVEY
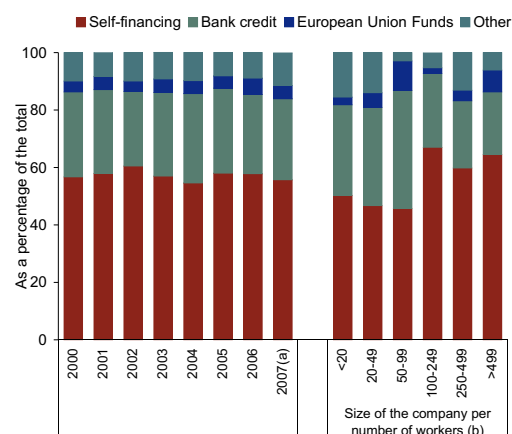
Source: *INE*, Investment Survey.
Notes: **(a)** Intentions. **(b)** Structure referring to 2006.

Also according to the Investment Survey, slightly more than one fourth of the investment in 2006 was financed by bank credit, wherefore most investment was financed through own funds. Moreover, small and medium-sized corporations have reported the largest share of bank credit in the total financing of investment projects (Chart 3.3.16).

In a context in which financial leverage is, in general, higher than in previous business cycles, interest rate rises may have a significant impact on financial costs of indebted corporations. Evidence available

indicates that the group of corporations in a more fragile situation, defined in terms of the capacity to cover interest charges by operational income, will probably be the first to experience the most significant spillovers affecting their capacity to expand activity and the non-compliance levels (see "Box 3.1 *Stilised facts on the financial situation of Portuguese non-financial corporations*"). In effect, latest data of the Investment Survey suggest that the present indebtedness levels are not constraining the utilisation of future investment opportunities and are not a significant limitation to the economy upturn. However, in the present framework of adjustment of the Portuguese economy macroeconomic imbalances as well as of sector restructuring related to the worldwide process of changes in comparative advantages, some deterioration is to be expected in the capacity of some firms to meet the debt service, particularly those more negatively affected in their operational profitability by such processes.

Box 3.1. Stylised facts on the financial situation of Portuguese non-financial corporations

In Portugal, non-financial corporations indebtedness increased very significantly in the second half of the 1990s, chiefly reflecting the convergence process of nominal (and real) interest rates in the run-up to the euro (Chart 1). The new economic system, characterised by structurally lower interest rates levels and volatility, sustains a higher indebtedness level than in the past, which can be illustrated by the fact that the weight of interest payments as a percentage of GDP stands at relatively low levels (Chart 2). In that context, indebtedness increased very swiftly.

Monitoring the financial situation of the corporate sector is relevant for the conjunctural analysis, since the emergence of financial fragilities in this sector may constrain corporate expenditure decisions, such as investment, and, in extreme cases, may result in default situations of the respective responsibilities. These effects may be reflected in aggregate economic activity, either through liquidity constraints which are liable to hinder investment projects, or through indirect impacts that may be induced by broadly based default in the regular operation of the financial system.

The capacity of a corporation to carry on its activity without financial constraints may be measured by the relative weight of interest payments on total gross operating results, i.e. the financial burden on the corporation. This indicator makes it possible to evaluate the capacity of a corporation to meet its interest liabilities by resorting to resources generated in the performance of its main activity. Simultaneously, this indicator synthesises some items that characterise the financial situation of the corporation, namely the financing costs, the financial leverage level, and (gross) operating profitability, whereas the interest payment indicator may be broken down into these three variables (equation 1).

$$\frac{IP}{GOR} \quad \frac{IP}{FD} \quad \frac{FD}{NA} \quad \frac{NA}{GOR} \tag{1}$$

IP – Interest Payable   FD – Financial Debt [1]

GOR – Gross Operating Results [2]   NA – Net Assets

The analysis of the indicator in aggregate terms makes it possible to characterise the financial pressure of the corporate sector as a whole. However, given that corporations can be rather heterogeneous, central measures may be insufficient, per se, to evaluate potential risks for the economy. Annual data of the Central Balance Sheet Database of Banco Portugal provide economic and financial information on an accounting basis at the micro level and, as a result, make it possible to examine the behaviour of corporations in a more fragile financial position.[3]

Chart 3 shows the distribution of the interest payment indicator for the 1991-2005 period.[4, 5] Overall, the weigh of interest payments in corporations' total (gross) operating results declined gradually during the 1990's, to remain relatively stable in the following period. The decline of the indicator in the 1990's was particularly apparent in corporations with heavier financial burden, represented by the highest distribution percentiles. Also, these corporations should have been more sensitive to interest-rate movements in the most recent period. Reflecting its pro-cycle component, the percentage of corporations presenting negative gross operating results attained maximum levels at 1993 and 2003 (Chart 4).

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(1) *Financial debt is defined as the sum of bank loans, demand deposits (credit balance) and loans through bonds and equity.*

(2) *Gross operating results correspond to the sum of operating results, depreciations and provisions.*

(3) *Annual data in the Central Balance Sheet Database is obtained from an annual survey conducted by Banco de Portugal to a relevant group of Portuguese non-financial corporations. The sample presents a higher coverage of larger corporations and, as regards small and medium-sized corporations, it shows some bias for corporations with better financial performance. In 2000, in sectoral terms, changes were introduced in the criteria for collecting data from the Central Balance Sheet Database, with a view to covering all sectors of economic activity, except financial activities, general government, activities of household with domestic workers and household production activities for their own use and international organisations and other domestic institutions. The activity sectors "manufacturing", "electricity, gas and water" and "transports and communications" are those with the better coverage. In line with the above-mentioned base characteristics, the considerations regarding this set of corporations shall not be linearly extrapolated for the corporate sector of the economy as a whole. Detailed information on the Central Balance Sheet Database is available in Booklet No 7 of Banco de Portugal.*

(4) *With a view to breaking down the developments of the interest payment indicator into the above-mentioned components of equation (1), which will be presented later in this box, observations reporting nil interest payable and financial debt were eliminated from the sample.*

(5) *As a result of the above-mentioned changes in the criteria for collecting data from the Central Balance Sheet Database, there is a break in the series from 1999 to 2000 in indicators analysed.*

Chart 1

FINANCIAL DEBT OF NON-FINANCIAL CORPORATIONS

As a percentage of GDP
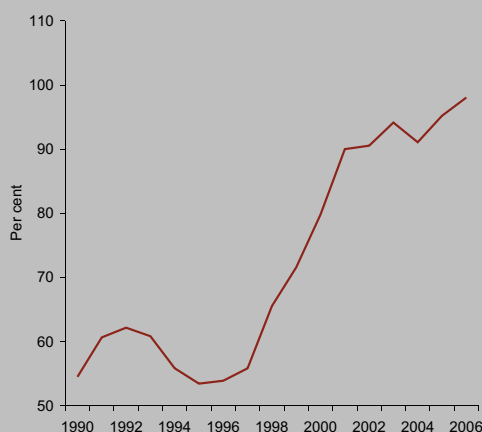
Sources: INE and Banco de Portugal.
Note: Debt is defined as the sum of loans and securities other than shares. For the period prior to 1995, debt was estimated using the annual rate of change of bank loans to non-financial corporations, which was the main external financing source in the period under review.

Chart 2

INTEREST PAID BY NON-FINANCIAL CORPORATIONS

As a percentage of GDP
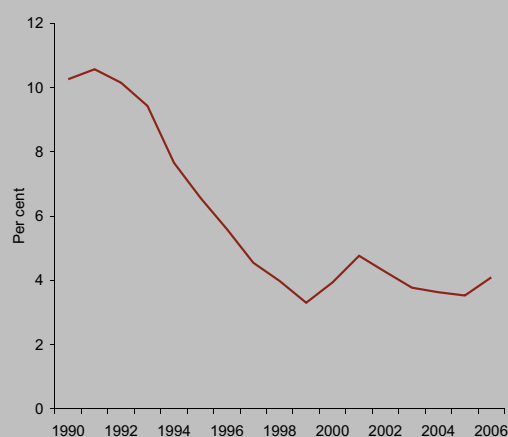
Sources: INE and Banco de Portugal (estimates).

Chart 3

DISTRIBUTION OF THE INTEREST PAYMENT INDICATOR

Corporations with positive gross operating results
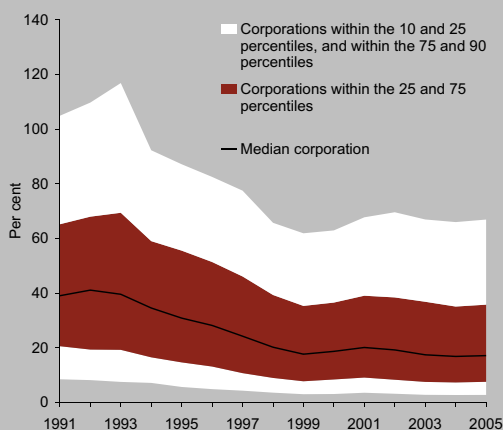
Source: Banco de Portugal (Central Balance Sheet Database).
Note: The exclusion of corporations with negative gross operating results influences the levels of the distribution.

Chart 4

CORPORATIONS WITH NEGATIVE GROSS OPERATING RESULTS

Relative weight
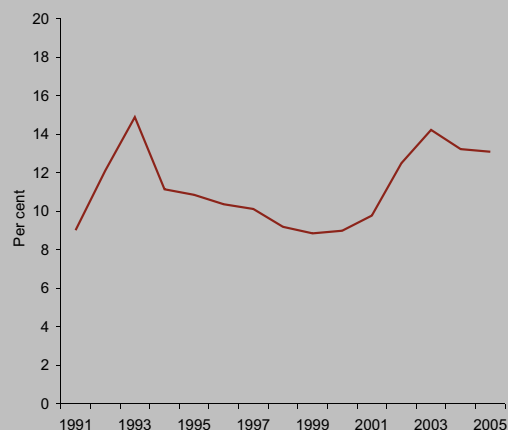
Source: Banco de Portugal (Central Balance Sheet Database).

Charts 5, 6 and 7 show the behaviour of the three components contributing to developments in the interest payment indicator, as presented in equation 1, for three groups of corporations defined in line with the respective indicator. Therefore, each Chart presents the median value of the variable under analysis for corporations in the first decile, in the central decile (within the 45 and 55 percentiles) and in the last decile of distribution of the financial burden indicator. This type of cross-linking between the distribution values of the ratio associated with interest pay-

Chart 5

FINANCING COST

Source: Banco de Portugal (Central Balance Sheet Database).
Note: Cost of financing defined as the ratio of interest payable to financial debt.

Chart 6

INDEBTEDNESS

Source: Banco de Portugal (Central Balance Sheet Database).
Note: Indebtedness defined as the ratio of financial debt to total net assets.

Chart 7

PROFITABILITY

Source: Banco de Portugal (Central Balance Sheet Database).
Note: Profitability defined as the ratio of (gross) operating results to total net assets.

ments and the levels of the variables that contribute to its development makes it possible to obtain a first analysis of the most critical factors in the identification of corporate fragilities.

Corporations with heavier financial burden presented a cost of financing close to that observed for corporations with median financial burden. During the 1990s, this cost was considerably higher than in corporations with lower financial burden, but it moved significantly closer in recent years. These developments stress that corporations with heavier financial burden should have benefited more noticeably from the decline in interest rates during this period, in particular through the component of risk premium payable in financial debt. As regards the indebtedness level, it is also possible to observe some closeness in the indebtedness ratios of corporations with heavier or median financial burden, whereas corporations with lower financial burden revealed a substantially lower indebtedness ratio. In turn, the profitability and relative position of corporations in terms of the financial burden reveal a monotonous relationship, i.e. a heavier financial burden level is associated with lower profitability. In particular, it is

worth noting that corporations with heavier financial burden stand out significantly among the other corporations in terms of profitability, posting operating losses, in median terms, throughout the whole period under analysis.

Finally, Charts 8 and 9 illustrate the relationship between the interest payment indicator of a corporation and the respective investment rate, as well as the registration of default situations in loans granted by financial institutions[6]. For the purpose, as previously, corporations in the central and extreme deciles of distribution of the financial burden were selected. One case presents the median of the investment rate (investment as a percentage of the capital stock), while the other case presents the ratio of corporations entered as defaulting corporations in the Central Credit Register, for each of the mentioned deciles of the interest payment indicator.[7, 8] As regards the investment rate, corporations with heavier financial burden are clearly differentiated from the remaining corporations, with a significantly lower investment rate. The highest investment rate was related to corporations with lower financial burden, but was closer to the rate for median corporations as a whole, in particular in the period with higher economic growth, during the second half of the 1990s. As regards default, the percentage of corporations with payments in arrears in terms of their liabilities was higher for corporations with heavier financial burden.

Empirical evidence for the corporations under appraisal, as a whole, suggests that the cost of financing and, in particular, the profitability of a corporation are fundamental elements to determine the financial burden, measured by the interest payment indicator, faced by a given corporation. In parallel, for the same corporation sample, after a given level, the financial burden tends to influence corporation decisions more sharply and to affect the probability of occurrence of default situations more considerably. Therefore, in the context of the high indebtedness level of non-financial corporations, a less favourable development of operational profitability, and an increase in the cost of financing would be reflected in a deterioration of the financial situation of corporations. This would be particularly relevant when considering that in Portugal most loan contracts are short-term or are indexed to money market rates, which implies that the financial situation of Portuguese non-financial corporations is more sensitive to the development of short-term rates than corporations in most euro area countries. In case financial deterioration is significant and affects an expressive number of corporations, this would have a bearing on the development of investment and on new default situations.

However, it seems that only corporations in a more fragile financial situation are likely to show financial constraints to their activity. Therefore, according to the results obtained, the present situation for the corporations under appraisal, as a whole, would not tend to foster the emergence of a significant share of corporations for which the re-

Chart 8

INVESTMENT
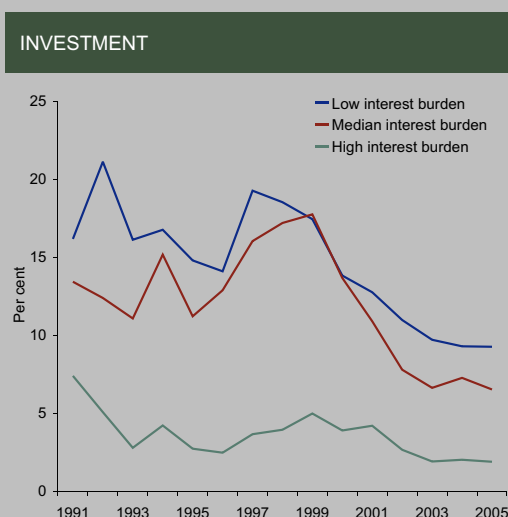
Source: Banco de Portugal (Central Balance Sheet Database).

Chart 9

DELINQUENCY
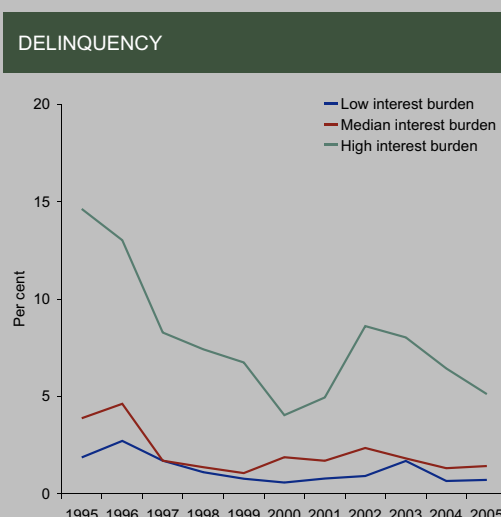
Source: Banco de Portugal (Central Balance Sheet Database and Central Credit Register).

(6) *The default rate corresponds to the proportion of corporations that in each cohort, at end- of- year, presented payments in arrears (at least by 90 days) higher than €500, on average, in the last quarter.*

(7) *The capital stock corresponds to tangible and intangible assets, adjusted for revaluations.*

(8) *The Central Credit Register database of Banco de Portugal contains data on loans granted by reporting financial institutions, namely institutions granting credit in Portugal, specifying the settled and defaulting amounts. For further information on this database, see Booklet No 5 of Banco de Portugal.*

spective financial pressure would be a key element in the exercise of their activity[9]. Indeed, the interest payment indicator points to relatively low levels for a significant share of corporations and the Portuguese economy shows signs of economic recovery, albeit less expressive than in the previous recession. In turn, although interest rates have started to increase at the end of 2005, nominal interest rate volatility, at the current juncture, is much lower than in the period prior to participation in the euro area. Finally, it is worth stressing that recourse to own funds continues to be a major source of financing of Portuguese corporations in the exercise of their activities, notwithstanding the current relevance of financing in debt markets.

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(9) *It is worth mentioning again that the analysis was based on Central Balance Sheet Database, which corresponds to a sample of corporations whose credit quality is higher, on average, than that of the corporate sector as a whole.*

4. BANKING SYSTEM[1]

4.1. Overall assessment

Over the past few years, the Portuguese banking system carried out its activity against the background of a less favourable macroeconomic conditions, but it continued to show a remarkable capacity to perform with efficiency its intermediation functions. In fact, despite the persistence of relatively moderate economic growth, Portuguese banks continued to expand their activity, which was mainly supported by the growth of credit to customers. These developments were accompanied by a gradual improvement in the solvency indicators, as well as by the maintenance of high profitability levels.

The strong rise in non-financial private sector indebtedness over the last decade was largely underpinned by an increased recourse by Portuguese banks to international financial markets, as deposits taken from customers continued to grow at moderate rates. Banks' market financing has also diversified by instrument type, maturity and investor base, including money market financing, the issuance of medium to long term debt securities and the securitisation of loans. In this context, Portuguese banks become sensitive to changes in financial market sentiment. This may imply unexpected rises in financing costs or difficulties in the renewal of very short-term liabilities. In turn, banks are also exposed to changes in financial market sentiment through their own portfolios of securities and financial investments and, mainly, through the financial assets held by the bank employees' pension funds.

In 2006, developments in international financial markets were broadly favourable. This translated into substantial valuation gains in some asset classes held by banks, as well as in rather positive results associated with financial operations. Even though these gains were in part offset by losses booked in derivative instruments, this result is positive in terms of financial stability, as it suggests that banks' positions in derivative instruments seem to contribute to limit the impact of fluctuations in the value of bank's portfolios of financial assets. Bank employees' pension funds, in which the exposure to financial market developments is far higher than in the banks' own portfolio, have also benefited from the broadly favourable environment observed throughout the year.

Overall, the assessment made by financial market participants of the Portuguese banking system was rather favourable, with a remarkable valuation of the shares of Portuguese listed banks, and a significant decline in the risk premia implied in debt issued by banks. Although securities issued by other European banks recorded a similar performance, the rise in the prices of securities of Portuguese banks was comparatively higher. Moreover, rating agencies made several upgrades of the major Portuguese banks.

In 2006, overall developments in the indicators that take into account the residual maturity of short-term assets and liabilities point to a slight deterioration of the liquidity of the banking system. These developments strengthen the need to preserve robust liquidity risk internal assessment, control

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(1) The International Accounting Standards (IAS) were implemented in 2005, and introduced significant changes in the accounting of some of the main on-balance-sheet and off-balance-sheet items of financial institutions, giving rise to new financial statement presentations in the banking system. However, the adoption of IAS did not extend to the whole Portuguese banking system, given that in the course of 2005 and 2006 different accounting systems coexisted among institutions. The difficulty in preparing robust compared analyses among the different accounting regimes required a redefinition of the universe of banking institutions to be analysed. Hence, and similarly to the criterion adopted in the 2005 Financial Stability Report, institutions under review in this report correspond to the thirteen banking groups that adopted IAS (or the Adjusted Accounting Standards) in the preparation of their financial statements in 2005. For more details on the universe of institutions under review, as well as the sources used in this report, see "Box 1.1 *Banking system data used in the 2005 Financial Stability Report*", *Financial Stability Report 2005*. Due to the implementation of the new accounting standards and the consequent change in the group of institutions under review, there is a break in the series between 2004 and 2005. Hence, the analysis of developments in indicators for a longer period should take this into account. For clarity purposes, whenever necessary, in this chapter's charts a vertical line divides the period that corresponds to the total banking system from the most recent period, where the banking groups that adopted IAS are analysed. These groups accounted for 87 per cent of total assets of the banking system in December 2004.

and management systems, involving inter alia contingency plans to deal with periods of heightened difficulty to access international debt markets. Such reduction of liquidity may be market-wide and independent from the intrinsic financial situation of banks. Therefore, it is desirable that the liquidity indicators remain at levels that can smoothly accommodate potential shocks, avoiding the need to mobilise assets of a more permanent nature or to resort to alternative financing sources, to ensure that the regular intermediation activity of banks is not significantly affected.

The strong growth of credit granted by the banking system in the past few years implied an increased exposure to the non-financial private sector. Thus, the high household indebtedness level may be a potential source of risk for Portuguese banks, given the still incipient improvement of the labour market and rising interest rates, which have been translating into an increase in the household debt burden. In turn, non-financial corporations have also recorded significant financing flows, which have not been matched by substantial increases in corporate investment. However, default rates in the credit portfolio of banks have remained at historically low levels, reflecting steady improvements in credit risk control and management systems, as well as the introduction of new financial products and contractual forms, which enable the lengthening and postponement of loan redemptions.

In turn, the profitability of Portuguese banks, which is high compared with other euro area countries, increased further in 2006, chiefly reflecting an improvement in the set of banking groups whose profitability levels had been lower in the previous year, contributing to the stability of the financial system as a whole. The growth of profitability reflected the continued improvement in the efficiency indicators of banks, as well as the favourable performance of the financial margin, which seems to have benefited from the widening of the differential between lending and deposit rates, in a context of rising rates on the main refinancing operations of the Eurosystem. In fact, the rise in interest rates, on the one hand, may imply less favourable developments in credit risk, but on the other hand, may have a positive effect on the profitability of the banking system. The latter, which is largely a mechanical effect, results from the low sensitivity of the remuneration of demand deposits to changes in money market interest rates. Finally, in line with the low default levels, in 2006, net impairment charges and provisions declined, having a positive impact on the evolution of banks' profitability indicators.

With regard to the solvency of the Portuguese banking system, there was a slight decline in the overall capital adequacy ratio, although different developments were observed in the sample of banking groups analysed in this report. In this context, it should be noted that the solvency of banks, whose capital ratios were closer to the minimum regulatory levels, recorded an improvement. This increased their capacity to absorb unexpected shocks without jeopardising the smooth performance of their activity. In addition, it should be noted that developments in the solvency ratio were largely due to changes in prudential regulations, which were tightened as regards the eligibility of provisions for general credit risks as an own funds item and to take into account a wider set of deductions to own funds, in particular holdings in insurance corporations. Finally, the base own funds adequacy ratio – Tier I – increased strongly in 2006. Despite the improvement in solvency indicators over the past few years, Portuguese banks continued to record on average capital adequacy ratios that are lower than but closer to those recorded in the majority of euro area countries.

In 2006 the International Monetary Fund (IMF) concluded the Financial Stability Assessment Programme (FSAP) of the Portuguese financial system. The IMF made public a rather positive assessment of the supervision of the Portuguese financial system, as well as of the resilience of Portuguese banks to the protracted period of subdued economic growth. The results of several stress-testing exercises conducted within the scope of this assessment confirmed that the banking system is prepared to withstand adverse shocks (see "Box 4.1 *Results of the Portuguese banking system stress-testing exercise*"). The main vulnerabilities of the banking system identified in this exer-

cise are related on the one hand to the stock price sensitivity, in particular through the exposure of bank employees' pension funds and, on the other, to the credit risk arising from the high indebtedness of the private sector and the concentration of exposures to risks in the real estate sector and in a small number of large companies. It should be noted however that under any of the extreme, but plausible, scenarios, Portuguese banks proved resilient and capable to maintain adequate solvency and profitability levels.

4.2 Activity and profitability

Activity

In 2006, activity in banking institutions under analysis, assessed in terms of total assets on a consolidated basis, grew considerably further, by 10.3 per cent (Table 4.2.1). Similarly to previous years, this growth was mainly supported by the expansion of credit to customers, reflecting the national market buoyancy but also higher loans granted abroad, due to the growing relevance of international activity for a number of banking groups. However, the weight of international activity is lower than in other European Union countries.

Credit to customers continued to be one of the most buoyant items, with growth above 11 per cent, and contributed around 8 p.p. to the increase in activity (Chart 4.2.1). In the Portuguese market, the segment of loans to households for house purchase continued to be very active, with growth close to 10 per cent at end-2006, despite the gradual deceleration observed throughout the year. At the same time, the segments of loans to households for consumption and other purposes and to non-financial corporations expanded strongly, and the respective annual rates of change increased from 6.8 to 9.7 per cent and from 4.1 to 5.5 per cent.[2] The acceleration in credit continued to reflect, namely, the supply of new financial products and more favourable contract conditions. Such conditions seem to have helped mitigate the debt burden and allowed a better match with the risk profile of each customer, which, together with the improvement in internal risk management and control systems, is likely to have contributed to a reduction in credit default indicators over the past few years, which again recorded favourable developments in 2006.[3]

The equity and debt instruments portfolio held by banking groups (included in the portfolio of financial assets measured at fair value and of the available-for-sale financial assets) also grew strongly in 2006, by around 20 per cent. The equity portfolio seems to have benefited from favourable developments in equity markets, while the increase in the debt instruments portfolio, in a context of rising long-term interest rates (with a negative impact on the value of the fixed-rate securities portfolio), should mainly have reflected net purchases of securities.

Resources from customers accelerated somewhat in 2006, recording a 5 per cent growth. In line with developments in the past few years, growth in these resources was lower than in credit (Chart 4.2.2). The moderate growth observed in resources from customers seems to be reflecting the decline in the savings rate, as well as the reallocation of part of the customers' financial assets to other financial products offered by banks. These products make it possible for customers to have a more diversified range of alternative investments with higher potential profitability and risks than bank deposits, and are often associated with fidelity premia. For banking groups, such products are a source of alternative in-

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(2) The annual growth rate of loans by institutional sector is based on data from monetary and financial statistics. The calculation took into account loans granted by resident financial institutions adjusted for credit securitisation operations conducted through non-resident special purpose vehicles. The financial institutions aggregate includes other resident monetary financial institutions and other credit institutions included in the other resident financial intermediaries and financial auxiliaries sector.

(3) For a more detailed analysis of the quality of the portfolio of credit, see "Section 4.6 *Credit risk*".

Table 4.2.1

BALANCE SHEET OF THE BANKING SYSTEM On a consolidated basis	EUR millions		Annual rate of change (per cent)		Structure (as a percentage of assets)	
	2005	2006	2005	2006	2005	2006
Cash and claims on central banks	6 205	6 906	-17.9	11.3	2.0	2.0
Claims and investment in other credit institutions	30 876	31 490	23.3	2.0	10.1	9.3
In the country	5 748	5 773	n.a.	0.4	1.9	1.7
Abroad	25 127	25 718	n.a.	2.3	8.2	7.6
Financial assets at fair value through profit or loss	18 150	20 266	40.7	11.7	5.9	6.0
Equity	853	1 305	n.a.	53.1	0.3	0.4
Debt instruments	12 221	12 712	n.a.	4.0	4.0	3.8
Other	5 076	6 248	n.a.	23.1	1.7	1.9
Available-for-sale financial assets	14 037	17 876	-5.2	27.4	4.6	5.3
Equity	4 169	6 021	n.a.	44.4	1.4	1.8
Debt instruments	8 909	11 485	n.a.	28.9	2.9	3.4
Other	959	371	n.a.	-61.4	0.3	0.1
Net credit to customers	199 873	222 942	9.4	11.5	65.3	66.1
Investment held to maturity	718	663	38.0	-7.6	0.2	0.2
Hedging derivatives	816	953	17.8	16.9	0.3	0.3
Securitised non-derecognised assets	14 186	15 450	16.7	8.9	4.6	4.6
of which: credit to customers	14 186	15 372	16.7	8.4	4.6	4.6
Investment in subsidiaries	3 475	4 080	33.0	17.4	1.1	1.2
Tangible and intangible assets	3 886	4 301	7.6	10.7	1.3	1.3
Other assets	13 768	12 544	40.5	-8.9	4.5	3.7
Total assets	**305 989**	**337 473**	**12.3**	**10.3**	**100.0**	**100.0**
Resources from central banks	6 215	1 739	75.5	-72.0	2.0	0.5
Resources from other credit institutions	38 840	42 941	16.6	10.6	12.7	12.7
In the country	5 384	4 078	n.a.	-24.3	1.8	1.2
Abroad	33 457	38 863	n.a.	16.2	10.9	11.5
Resources from customers and other loans	149 139	156 606	4.5	5.0	48.7	46.4
Liabilities represented by securities	62 807	81 184	12.8	29.3	20.5	24.1
Subordinated liabilities	9 973	9 893	0.9	-0.8	3.3	2.9
Financial liabilities held for trading	4 306	5 776	66.3	34.1	1.4	1.7
Hedging derivatives	956	1 471	70.1	53.9	0.3	0.4
Liabilities for non-derecognised assets in securitisation operations	2 363	4 130	n.a.	74.8	0.8	1.2
Other liabilities	13 608	11 998	35.9	-11.8	4.4	3.6
Total liabilities	**288 208**	**315 738**	**11.5**	**9.6**	**94.2**	**93.6**
Capital	17 782	21 735	26.8	22.2	5.8	6.4
Total liabilities and net wealth	**305 989**	**337 473**	**12.3**	**10.3**	**100.0**	**100.0**

Source: Banco de Portugal.
Note: n.a. - not available.

come to the more traditional financial intermediation and may foster, at the same time, the retention of customer funds in the financial group.

With regard to alternative sources of financing, liabilities represented by securities increased considerably, by close to 30 per cent, reflecting the maintenance of favourable financial market conditions. This change reflected not only the continued issuance of securities abroad through branches and subsidiar-

Chart 4.2.1
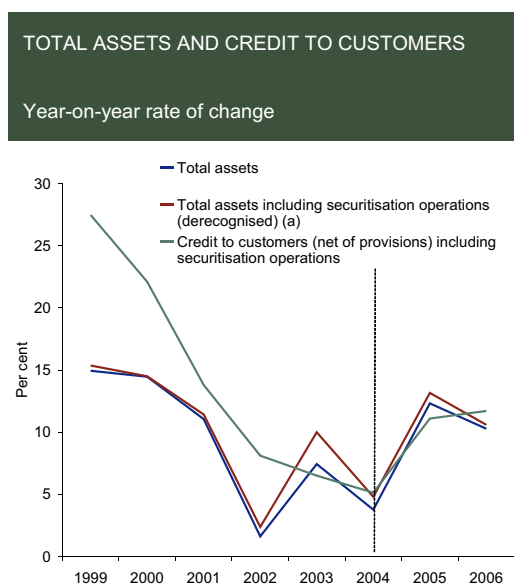
TOTAL ASSETS AND CREDIT TO CUSTOMERS

Year-on-year rate of change

- Total assets
- Total assets including securitisation operations (derecognised) (a)
- Credit to customers (net of provisions) including securitisation operations

Source: Banco de Portugal.
Notes: The break in the series corresponds to the change in accounting standards, which also implied a redefinition of the group of banking institutions under analysis. **(a)** The IAS introduced stricter criteria for the full derecognition of securitised assets. The derecognition shall only occur when all the rights and obligations associated with those assets are fully transmitted.

Chart 4.2.2

CREDIT TO CUSTOMERS AND RESOURCES FROM CUSTOMERS

Year-on-year rate of change

- Resources from customers and other loans
- Credit to customers (net of provisions) including securitisation operations

Source: Banco de Portugal.
Note: The break in the series corresponds to the change in accounting standards, which also implied a redefinition of the group of banking institutions under analysis.

ies, but also the issuance by one of the main banking institutions of a new type of debt instrument, namely mortgage bonds, in the second half of 2006.[4] Moreover, part of the increase in resources represented by securities reflected the accounting effect of the sale of securitised bonds by a non-domestic banking group. Between 2003 and 2005, that banking group maintained on the asset side of its balance sheet securities resulting from credit securitisation operations. Hence, although there was no immediate monetary flow, this institution transformed a gross asset in marketable and eligible securities functioning as collateral in monetary policy operations. In 2006 the banking group under review sold those securities, leading, through a simple accounting movement, to an increase in liabilities represented by securities. Indeed, through the consolidation of the securitisation vehicle that issued securities in securitisation operations, these liabilities were cancelled out by securities on the bank's asset side, and therefore were not visible in the group's liabilities in consolidated terms.

The recourse to other credit institutions to obtain financing was again significant in 2006, and corresponded to a 10.6 per cent increase in liabilities towards these institutions, in particular with institutions abroad. In contrast, resources from central banks declined significantly, mainly reflecting the behaviour shown by the above-mentioned non-domestic banking group, which used the liquidity obtained through the sale of securitised bonds to reduce these liabilities.

Hence, in 2006 the banking sector continued to intermediate inflows of external funds into the economy, through the issuance of securities, the recourse to the money market, and credit securitisation operations, in order to fund the granting of credit to the non-financial private sector. The growing importance of (mainly international) capital and money markets in the financing structure of banks highlights the need to maintain sufficient liquidity levels so that the change in market sentiment does not hamper the ability of the banking system to continue to perform its intermediation function in the economy.

(4) The first issuance of mortgage bonds amounted to €2 billion and is included in a strategic programme of financing in the capital market by this banking group. This programme envisages the issuance of mortgage bonds in a total of €10 billion, with a 10-year maturity.

Profitability

In 2006 profitability on a consolidated basis in the banking institutions under review increased further. However, developments in profitability were strongly conditioned by non-recurring operations done in 2006 by one of the main Portuguese banking groups, in the context of a restructuring of participating interests in insurance companies that are part of the group (Table 4.2.2). Therefore, developments in profitability should be evaluated. Adjusted for the impact of that restructuring, the return on assets (ROA) increased from 1.03 to 1.18 per cent, while the return on equity (ROE) decreased somewhat, from 19.4 to 18.9 per cent (Chart 4.2.3).[5] Compared with some euro area countries, available data for 2005 suggest that the return on assets of the institutions under analysis is among the highest in the euro area (Chart 4.2.4).[6]

With regard to the distribution of ROA, the increase in profitability was mainly observed in institutions that recorded lower profitability levels in 2005, which, in principle, is favourable in terms of financial stability. Hence, the distribution of institutions' profitability became more concentrated, in contrast to markedly bi-modal distributions that characterised previous years (Chart 4.2.5).

Regarding contributions to profitability, the situation in 2006 was similar to that seen in the previous year, with operational costs and the financial margin being particularly relevant. Moreover, the increase in profitability (adjusted for the impact of the above-mentioned restructuring of participating interest) was particularly associated with the decline in cost components (Chart 4.2.6).

Chart 4.2.3
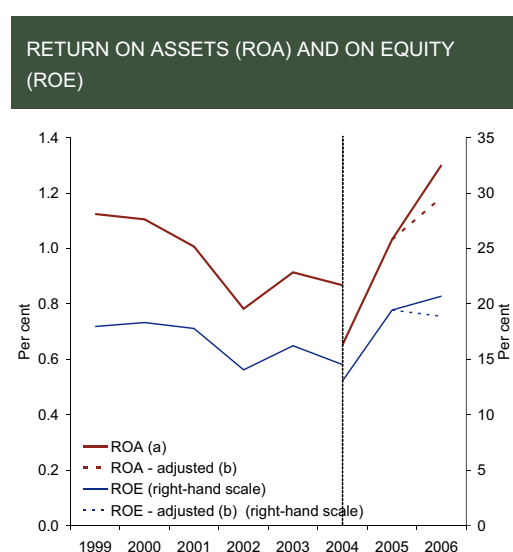
RETURN ON ASSETS (ROA) AND ON EQUITY (ROE)

Source: Banco de Portugal.
Notes: The break in the series corresponds to the change in accounting standards, which also implied a redefinition of the group of banking institutions under analysis. **(a)** Return on assets in 2004 was strongly conditioned by the concentration of some costs in that year, particularly regarding staff costs, in the context of a change in the accounting regime in 2005. **(b)** Adjusted profitability indicators are obtained ded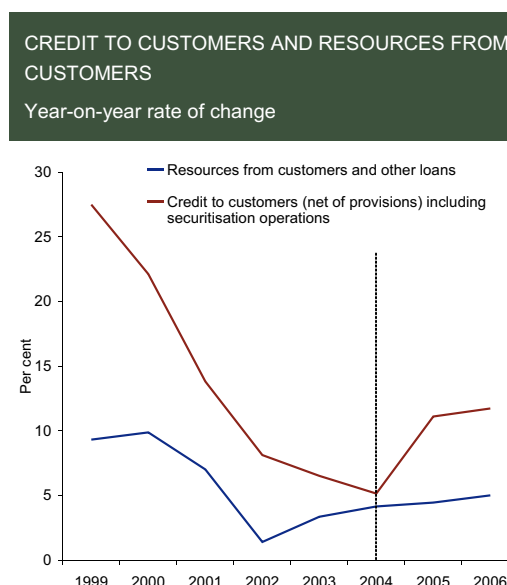ucting from profit and loss account the impact of the restructuring of participating interests in companies (namely in the insurance sector) by one of the major banking groups considered in the analysis.

Chart 4.2.4
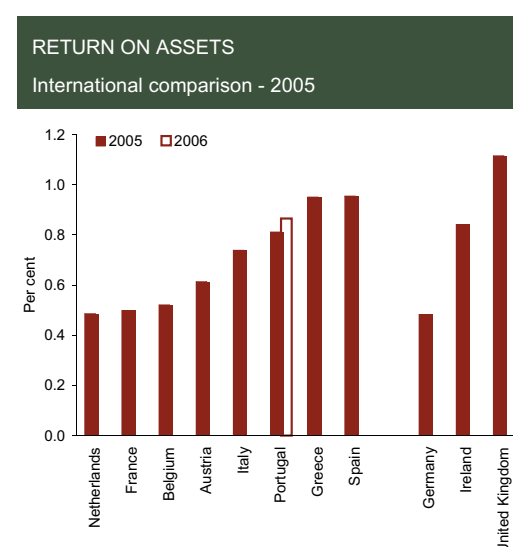
RETURN ON ASSETS

International comparison - 2005

Sources: IMF "Financial Soundness Indicators – Coordinated Compilation Exercise" and Banco de Portugal.
Note: The profitability indicator for most countries under analysis was calculated, due to data availability, taking into account income before minority interests and end-period total assets. For Germany, Ireland and the United Kingdom "income" corresponds to income before taxes and minority interests. Return on assets for Portugal in 2006 was obtained deducting from profit and loss account the impact of the restructuring of participating interests in companies (namely in the insurance sector) in one of the major banking groups considered in the analysis.

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(5) The profitability level in 2004 was significantly affected by the concentration of some costs in that year, in particular staff costs, in the context of the implementation of the new accounting standards in early 2005. This considerably conditioned profitability developments in 2005. For a detailed analysis of such operations, see the *2005 Financial Stability Report* of Banco de Portugal.

(6) The indicator of return on assets shown on the basis of an international comparison is different from the indicator analysed in this section, given that the former, due to data availability, takes into account end-of-period assets and income after taxes, while the indicator analysed takes into account average assets and income before taxes.

Table 4.2.2

PROFIT AND LOSS ACCOUNT						
On a consolidated basis						

	EUR millions		As a percentage of average assets		Annual rate of change (per cent)	
	2005	**2006**	**2005**	**2006**	**2005**	**2006**
1. Interest income	13 977	17 278	4.84	5.46	10.7	23.6
2. Interest expenses	8 601	11 291	2.98	3.57	14.6	31.3
3. Financial margin (1-2)	**5 375**	**5 987**	**1.86**	**1.89**	**5.0**	**11.4**
4. Income from capital instruments	217	162	0.08	0.05	34.4	-25.4
5. Income from services and commissions (net)	2 212	2 478	0.77	0.78	15.1	12.0
6. Income from financial assets and liabilities measured at fair value	505	-9	0.17	0.00	46.0	-
7. Income from available-for-sale financial assets	663	455	0.23	0.14	539.1	-31.4
8. Income from foreign exchange revaluation	53	496	0.02	0.16	-74.5	834.1
9. Income from the sale of other financial assets	366	743	0.13	0.23	404.5	103.1
9.a) Income from the sale of other financial assets - adjusted	*366*	*433*	*0.13*	*0.14*	*404.5*	*18.5*
10. Other operating profit and loss	417	624	0.14	0.20	-30.6	49.5
10.a) Other operating profit and loss – adjusted	*417*	*604*	*0.14*	*0.19*	*-30.6*	*44.8*
11. Gross income (3+4+5+6+7+8+9+10)	**9 809**	**10 936**	**3.40**	**3.45**	**14.9**	**11.5**
11.a) Gross income - adjusted (3+4+5+6+7+8+9+10.a)	***9 809***	***10 606***	***3.40***	***3.35***	***14.9***	***8.1***
12. Staff costs	3 300	3 349	1.14	1.06	-10.0	1.5
13. General administrative costs	1 956	2 026	0.68	0.64	3.4	3.6
14. Depreciation and amortisation	465	449	0.16	0.14	-17.3	-3.5
15. Provisions net of restitutions and annulments	187	133	0.06	0.04	-33.2	-28.9
16. Impairment losses and other net value adjustments	1 138	1 091	0.39	0.34	12.5	-4.1
17. Appropriation of income from associates and joint ventures (equity method)	217	233	0.08	0.07	-65.2	7.1
17. a) Appropriation of income from associates and joint ventures (equity method) - adjusted	*217*	*191*	*0.08*	*0.06*	*-65.2*	*-12.3*
18. Income before taxes and minority interests (11-12-13-14-15-16+17)	**2 981**	**4 121**	**1.03**	**1.30**	**70.5**	**38.2**
18 a) Income before taxes and minority interests - adjusted (11-12-13-14-15-16+17.a)	***2 981***	***3 750***	***1.03***	***1.18***	***70.5***	***25.8***
19. Taxes on profit	401	724	0.14	0.23	75.6	80.5
20. Income before minority interests (18-19)	**2 580**	**3 398**	**0.89**	**1.07**	**69.7**	**31.7**
20.a) Income before minority interests - adjusted (18.a-19)	***2 580***	***3 026***	***0.89***	***0.96***	***69.7***	***17.3***
21. Minority interests (net)	383	576	0.13	0.18	62.2	50.2
22. Net profit and loss (20-21)	**2 197**	**2 822**	**0.76**	**0.89**	**71.1**	**28.5**
22.a) Net profit and loss - adjusted (20.a-21)	***2 197***	***2 451***	***0.76***	***0.77***	***71.1***	***11.6***

Source: Banco de Portugal.
Note: The adjustment in some of the items refers to the deduction of the effect of the restructuring of participating interests in corporations of the insurance sector carried out by one of the major banking groups considered in the analysis. However, the corresponding adjustment was not made in the items of taxes on profits and (net) minority interests (19 and 21).

Chart 4.2.5

RETURN ON ASSETS

Empirical distribution

—— Dec-04   —— Dec-05   - - - Dec-06   —— Dec-06 (adjusted)

Source: Banco de Portugal.
Note: Empirical distribution obtained through recourse to a Gaussian kernel that weighs institutions by their assets; indicator calculated taking into account income before taxes and minority interests. The adjusted indicator is obtained deducting from profit and loss account the impact of the restructuring of participating interests in companies (namely in the insurance sector) in one of the major banking groups considered in the analysis.

Chart 4.2.6

RETURN ON ASSETS - ROA

Breakdown of contributions

■ Financial margin
■ Commissions (net)
■ Income from the sale of other financial assets [a]
▨ Other income [a]
▨ Staff costs
▨ Other operational costs [b]
▨ Provisions and impairment (net)
▨ Income from associates [a], [c]
■ Impact of the restructuring of participating interests in companies in the insurance sector by one of the major banking groups
—— ROA
- - - ROA - adjusted [a]

Source: Banco de Portugal.
Notes: Return on assets is calculated by taking into account income before taxes and minority interests. **(a)** Excludes income associated with a restructuring of participating interests in companies (namely in the insurance sector) by one of the major banking groups considered in the analysis. **(b)** Other operational costs include general administrative costs and amortisation and depreciation. **(c)** Income from associates and joint ventures (equity method).

In 2006 the financial margin as a percentage of average assets increased slightly, in contrast to the decline seen since 2001 (Chart 4.2.7). Developments in the financial margin mainly reflected the increase in the differential between average interest rates applied in bank lending and deposit operations with customers.

In international terms, data available for 2005 show that the contribution of the financial margin to the profitability of the banking institutions under review was among the highest in the euro area (Chart 4.2.8).[7] Taking into account the financial margin as a percentage of risk-weighted assets, which makes it possible to assess returns adjusted for the average degree of risk in lending operations, the Portuguese banking system was in a median situation within the euro area countries in 2005 (Chart 4.2.9).

The widening of the interest rate differential in operations with customers resulted from the increase in the margin obtained in deposits, which more than offset the narrowing of the differential in lending operations (Chart 4.2.10). With regard to deposits, as usual in periods of rising reference interest rates, the widening of the total differential was due, on the one hand, to the lower rise in interest rates on time deposits compared with money market rates and, on the other hand, to the increase in the contribution of demand deposits, whose return is very low and modestly sensitive to changes in money market interest rates. The compression of the interest rate differential in lending operations was recorded across different loan segments. However, special mention should be made to loans to households for house purchase and to loans to non-financial corporations, given that, as a whole, both segments accounted for more than 80 per cent of loans to the non-financial private sector (Chart 4.2.11). These developments are likely to have resulted from the lagged pass-through of rises in money market rates to interest rates on balances of operations with customers. Moreover, according to the results of the Bank Lending Survey, the current intense competition between banking institutions also contributed to the narrowing of differentials.

Chart 4.2.7
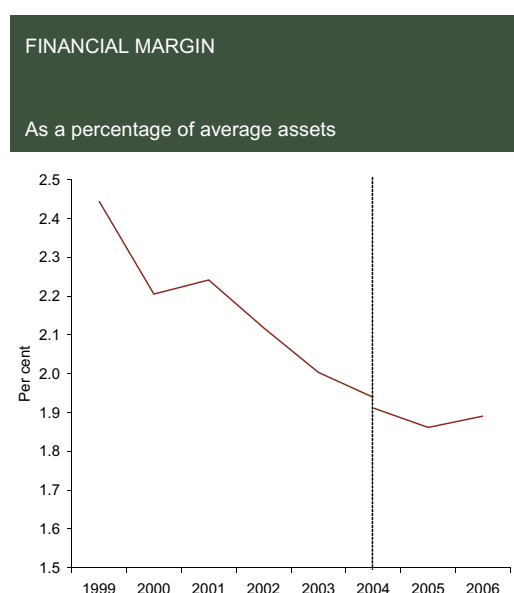
FINANCIAL MARGIN

As a percentage of average assets

Source: Banco de Portugal.
Note: The break in the series corresponds to the change in accounting standards, which also implied a redefinition of the group of banking institutions under analysis.

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(7) In terms of an international comparison, the financial margin is shown as a percentage of assets at the end of the period, due to data availability, in contrast to an intertemporal analysis for Portugal, in which average assets are analysed. A similar procedure was adopted for the income from services and commissions and the gross income.

Chart 4.2.8

FINANCIAL MARGIN

As a percentage of end-period assets

International comparison - 2005
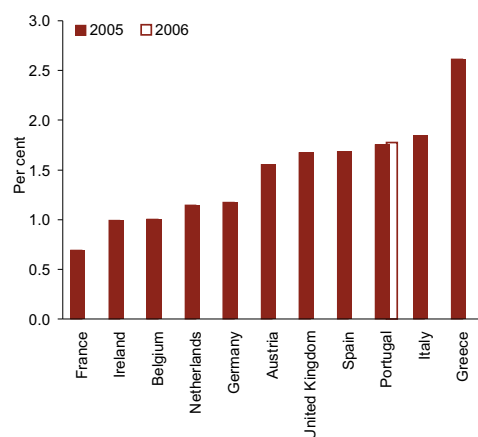
Sources: IMF "Financial Soundness Indicators - Coordinated Compilation Exercise" and Banco de Portugal.

Chart 4.2.9

FINANCIAL MARGIN

As a percentage of assets weighted by risk

International comparison - 2005
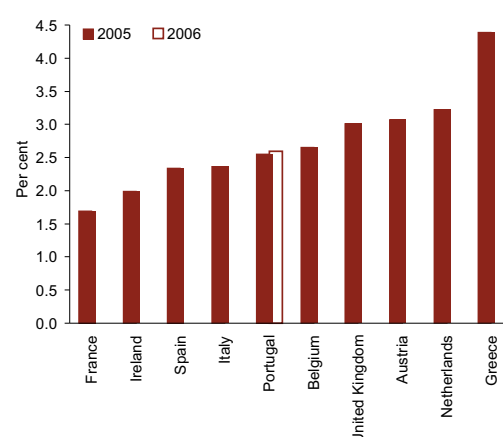
Sources: IMF "Financial Soundness Indicators - Coordinated Compilation Exercise" and Banco de Portugal.
Note: Germany is not included in this comparison due to data unavailability.

Chart 4.2.10

INTEREST RATE DIFFERENTIALS IN OPERATIONS WITH CUSTOMERS
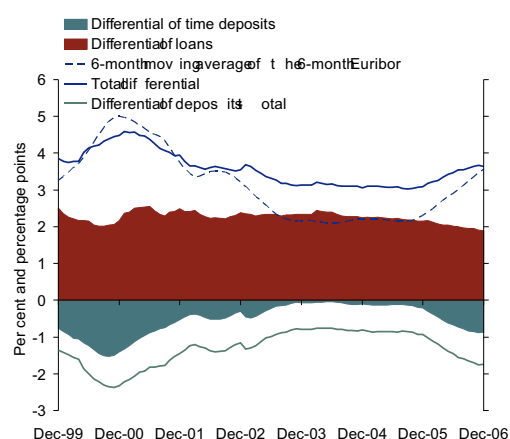
Source: Banco de Portugal.
Note: Differentials by type of operation were calculated as the difference between interest rates on balances and a 6-month moving average of the 6-month Euribor. The total differential corresponds to the difference between the interest rate on loans and the interest rate on deposits.

Chart 4.2.11

INTEREST RATE DIFFERENTIALS IN LENDING OPERATIONS WITH CUSTOMERS
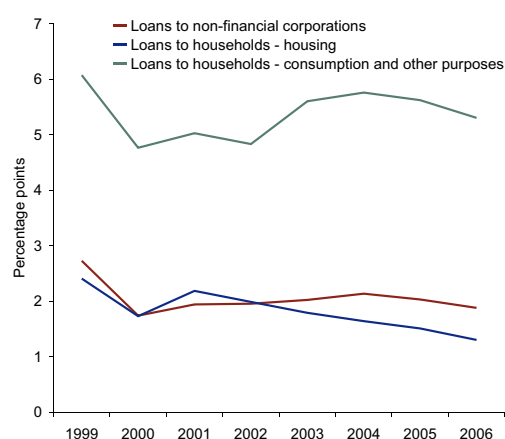
Source: Banco de Portugal.
Note: Differentials calculated as the difference between annual averages of interest rates on balances and the annual average value of the 6-month moving average of the 6-month money market interest rate (Lisbor up to December 1998 and Euribor as from January 1999).

Net income from services and commissions grew by 12 per cent, and their contribution to profitability increased further, in line with the growing importance of this type of income in terms of institutions' profitability (Chart 4.2.12).

The remaining income items (assessed in net terms), adjusted for the impact of the above-mentioned restructuring of participating interests (which particularly affected the results of the sale of other financial assets), contributed negatively to changes in profitability. In this context, special mention should be made to the similar behaviour of results in financial assets and liabilities, measured at fair value and available for sale, and of currency revaluation, which seems to be largely reflecting the fact that banks are using derivatives to eliminate some of the risks associated with fluctuations in the market value of assets.[8] Reflecting this, there was a fall in the contribution of the gross income to profitability (Chart 4.2.13).

In 2006 the rise in asset profitability was therefore strongly related to the decline in operational costs, similarly to developments in the previous year. In fact, staff costs, general administrative costs and amortisation, which only increased by 1.8 per cent, were the key contributors to the rise in ROA. Therefore, in 2006 banking institutions continued to follow an increased efficiency trend, assessed through the cost to income[9] indicator, reflecting, in particular, a continued decline in the relative weight of staff costs (Chart 4.2.14).[10] The very slight increase in staff costs (by 1.5 per cent) mirrored the reduction in compulsory social charges related to pension funds, given that compensation of employees, excluding social charges, grew by 2.6 per cent over the same period.

Chart 4.2.12
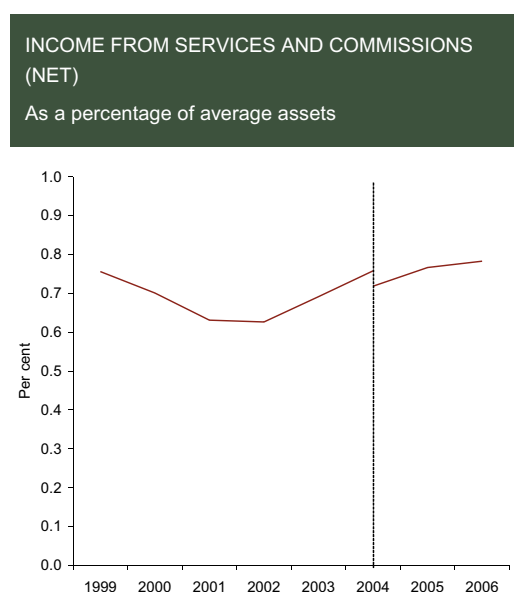
INCOME FROM SERVICES AND COMMISSIONS (NET)

As a percentage of average assets

Source: Banco de Portugal.
Note: The break in the series corresponds to the change in accounting standards, which also implied a redefinition of the group of banking institutions under analysis.

Chart 4.2.13

GROSS INCOME

As a percentage of average assets

Source: Banco de Portugal.
Notes: The break in the series corresponds to the change in accounting standards, which also implied a redefinition of the group of banking institutions under analysis. (a) The adjusted indicator is obtained deducting from profit and loss account the impact of the restructuring of participating interests in companies (namely in the insurance sector) by one of the major banking groups considered in the analysis.

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(8) For a more detailed analysis of the banks' asset portfolio and its impact on results of banking institutions, see" Section 4.4 *Market risk*".

(9) Calculated as the ratio of operational costs (defined as the sum of staff costs, general administrative costs and amortisation) to gross income.

(10) In 2004 the greater weight of staff costs as a percentage of gross income reflects the concentration of this type of cost in that year, in the context of the introduction of new accounting standards in 2005. The level of the cost to income ratio, as well as its distribution, also reflects the concentration of costs in 2004. For more details on these operations, see the 2005 issue of the *Financial Stability Report* of Banco de Portugal.

Chart 4.2.14

EFFICIENCY RATIO – COST-TO-INCOME

Breakdown by type of cost

- Staff costs
- General administrative costs
- Depreciation and amortisation
- Impact of the restructuring of holdings in companies in the insurance sector by one of the major banking groups
- Cost to income
- Cost to income - adjusted [(a)]

Source: Banco de Portugal.
Notes: The break in the series corresponds to the change in accounting standards, which also implied a redefinition of the group of banking institutions under analysis. **(a)** The adjusted indicator is obtained deducting from profit and loss account the impact of the restructuring of participating interests in companies (namely in the insurance sector) by one of the major banking groups considered in the analysis.

The improved efficiency ratio was common to several institutions relevant in terms of gross income, and the distribution of the cost to income ratio shifted to the left (Chart 4.2.15). In international terms and according to data available for 2005, the efficiency of institutions operating in Portugal compares favourably with most euro area countries (Chart 4.2.16).

Chart 4.2.15

COST-TO-INCOME RATIO

Empirical distribution

— Dec-04   — Dec-05   ···· Dec-06   — Dec-06 (adjusted)

Source: Banco de Portugal.
Note: Empirical distribution obtained through recourse to a Gaussian kernel that weighs institutions by gross income; indicator calculated as the quotient between the sum of staff costs, general administrative costs and depreciation and gross income. The adjusted indicator is obtained deducting from profit and loss account the impact of the restructuring of participating interests in companies (namely in the insurance sector) in one of the major banking groups considered in the analysis.

Chart 4.2.16

EFFICIENCY RATIO – COST-TO-INCOME

International comparison - 2005

■ 2005   ▨ 2006

**Sources:** IMF "Financial Soundness Indicators - Coordinated Compilation Exercise" and Banco de Portugal.
Note: The indicator for Portugal for 2006 is obtained deducting from gross income the impact of the restructuring of participating interests in companies (namely in the insurance sector) in one of the major banking groups considered in the analysis.

The reduction in provisioning and impairment also contributed positively to the rise in profitability. This decline, which had been seen in the previous year and is similar to developments in other European Union countries in the recent past, seems to have resulted from an improvement in risk management and control systems and in the portfolio risk profile, as well as from favourable developments in financial markets in 2006. These factors have contributed to favourable developments in default credit in banks' portfolios, which stands at historically low levels. Despite this decline in provisioning, it remains above the minimum regulatory levels by around 22 per cent.[11]

Finally, with regard to international activity, and according to available data for four of the main Portuguese banking groups, the financial margin resulting from operations conducted abroad increased strongly in 2006, translating into a positive contribution to (net) income growth for the institutions under review. International gross income as a whole also had a positive impact, albeit at a smaller degree. In turn, net results from international activity, which already have a significant weight in the consolidated profit and loss of the institutions under review, of around 8 per cent, were lower than in the previous year. Thus, results from operations conducted abroad should reflect the prevalence of financial intermediation, which explores less mature markets. Investments in such markets, which are expanding strongly, seem to be responsible for a higher pace of growth in operational costs than that of the domestic market.

In general, in 2006 the rise in profitability may be considered favourable to the maintenance of the system's financial stability, given that institutions are capable of generating stable income, in a context where the cost structure compares favourably in international terms. Also, the dispersion of profitability b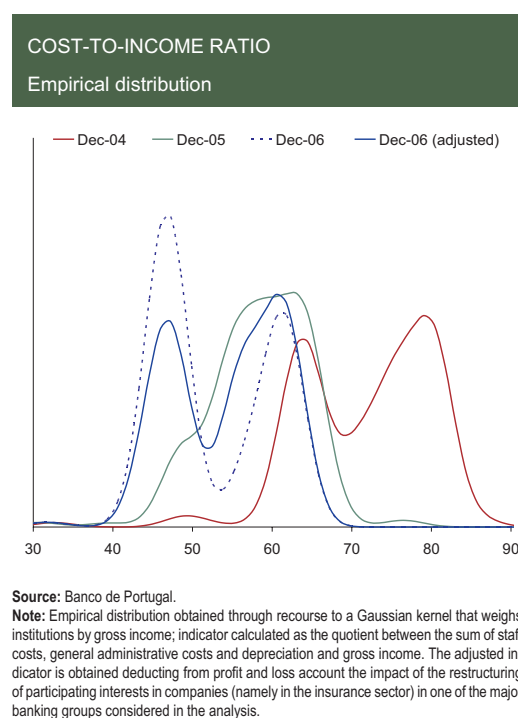etween institutions declined, which implies a decrease in the number of institutions with lower profitability and, consequently, in a potentially more fragile situation.

4.3 Capital adequacy

The overall capital adequacy ratio for all institutions under analysis, on a consolidated basis, declined by 0.3 p.p. in 2006, to stand at 10.9 per cent. This slight decline resulted from the 10.5 per cent increase in total own funds requirements, which was not offset by developments in total own funds. These funds increased by 7.1 per cent, significantly conditioned by changes in the prudential rules introduced in the course of the year (Table 4.3.1). Taking only into account original own funds – Tier I – the capital adequacy ratio improved significantly (0.6 p.p.), standing at 7.7 per cent, i.e. a level rather close to the regulatory minimum required for total own funds (Chart 4.3.1).

The increase in total own funds chiefly reflected the increase in original own funds, since additional own funds declined by 7.7 per cent and deductions from own funds rose by 23.4 per cent. Underlying the increase in original own funds was the rise in minority interests (with special focus on one of the major domestic banking groups) and in legal, statutory and other reserves composed of distributable profits, as well as the decrease in contributions to pension funds not yet recorded as cost. In turn, changes in additional own funds and in deductions from own funds mainly reflected regulatory changes introduced by Banco de Portugal in the course of 2006, as regards the recognition of provisions for general credit risks and participating interests in financial conglomerates (impacting on addi-

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(11) Default and provisioning of the credit portfolio are analysed in detail in "Section 4.6 *Credit risk*".

Table 4.3.1

CAPITAL ADEQUACY On a consolidated basis					
	EUR millions			**Annual rate of change**	
	2004	**2005**	**2006**	**2005**	**2006**
				Per cent	
1. Own funds					
1.1. Original own funds	13 729	14 891	17 874	8.5	20.0
1.2. Additional own funds	8 337	10 776	9 942	29.3	-7.7
1.3. Deductions	2 092	1 948	2 405	-6.9	23.4
1.4. Supplementary own fund	1	0	0	-100.0	n.a.
Total own funds	19 975	23 719	25 411	18.7	7.1
2. Own funds requirements					
2.1. Solvency ratio	15 096	16 213	17 960	7.4	10.8
2.2. Position risks	488	493	468	0.9	-5.1
2.3. Settlement and counterparty risks	53	67	70	26.7	5.0
2.4. Foreign exchange rate risks	41	57	92	38.9	60.8
2.5. Other requirements	1	1	2	-34.8	239.0
Total own funds requirements	15 679	16 830	18 591	7.3	10.5
				Percentage points	
3. Ratios (per cent)					
3.1. Own funds / Total requirements	127.4%	140.9%	136.7%	13.5	-4.2
3.2. Own funds / (Total requirements x 12.5)	10.2%	11.3%	10.9%	1.1	-0.3
3.3. Original own funds / (Total requirements x 12.5)	7.0%	7.1%	7.7%	0.1	0.6

Source: Banco de Portugal.
Note: n.a. - not applicable.

tional own funds and deductions respectively).[12] The impact on the overall capital adequacy ratio as a result of these regulatory changes was negative and is estimated to have stood at slightly above 1 p.p.[13] Finally, developments in total own funds requirements were a reflection of the increase in the various requirement components, with the exception of position risk-related requirements. Requirements associated with the solvency ratio continued to make the main contribution to developments in total requirements, rising by 10.8 per cent. This was in line with strong credit growth and reflects the greater importance of the segments of loans to non-financial corporations and households for consumption and other purposes, as well as the buoyancy which is still noticeable in the segment of loans to households for house purchase.

Developments in the overall capital adequacy ratio were rather different across the banking institutions under consideration, with a decrease in the dispersion among them. In particular, there was a decrease in the weight of institutions with adequacy ratios close to the regulatory minimum, thereby increasing their capacity to absorb unexpected shocks without jeopardising normal business (Chart 4.3.2). In all banking groups with a higher relevance in terms of own funds, from among the factors un-

(12) In accordance with the change introduced by Notice No 2/2006, the amount of provisions for general credit risks eligible as an element of own funds only corresponds to the difference (when positive) between the value of regulatory provisions and the amount of credit impairment losses computed for the banking group. Pursuant to Notice No 12/2006, direct or indirect holdings of at least 20 per cent of voting rights or of the capital of insurance corporations, reinsurance corporations and holding companies in the insurance sector, as well as financial instruments covered by Article 96 (2) and Article 98 (2) of Decree-Law No 94-B/98 of 17 April, republished by Decree-Law No 251/2003 of 14 October, held with these entities, started to be deducted from total own funds, for the respective net value of entry on the assets side.

(13) This estimate assumed, on the one hand, that the prudential rules in question remained unchanged at the end of 2006 vis-à-vis 2005 and, on the other, that institutions did not change their decisions in the wake of the new regulations.

Chart 4.3.1

CAPITAL ADEQUACY RATIO
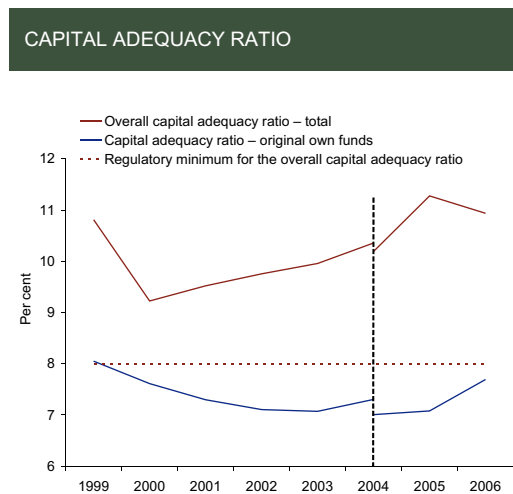
Source: Banco de Portugal.
Note: The break in the series corresponds to the redefinition of the banking institutions under analysis, consistent with the series shown on the yield charts.

derlying developments in the capital adequacy ratio it is worth mentioning the greater sensitivity of a number of institutions to the above-mentioned regulatory changes and the significant increase in the original own funds of one of the groups, through the rise in minority interests, in the wake of a capital increase in one of the institutions integrating the group (this operation by itself accounted for more than half of the change in the system's total own funds). The empirical distribution of the adequacy ratio of original own funds largely reflects this latter situation (Chart 4.3.3). In fact, the distribution of this indicator can be seen to shift to the right, with a very significant contribution from the increase in the ratio of the banking group in question.

Chart 4.3.2
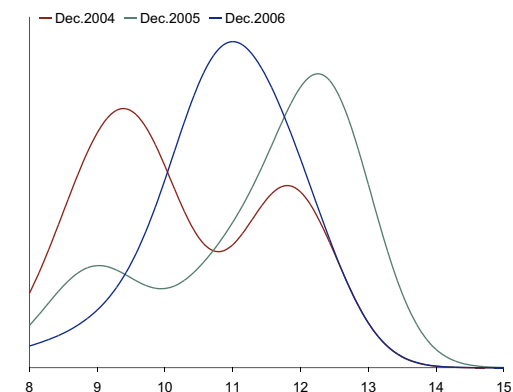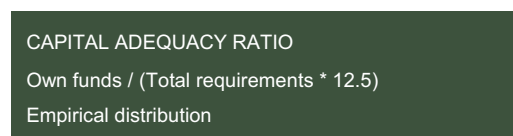
CAPITAL ADEQUACY RATIO

Own funds / (Total requirements * 12.5)

Empirical distribution

Source: Banco de Portugal.
Note: Empirical distribution obtained through resources to a Gaussian Kernel that weights institutions by their own funds.

Chart 4.3.3
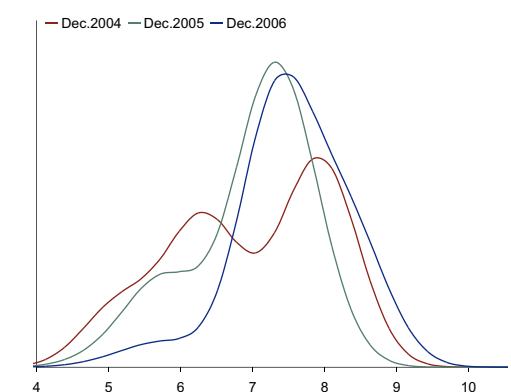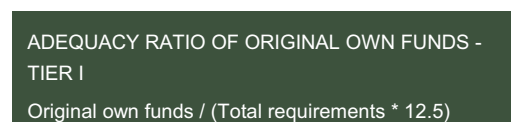
ADEQUACY RATIO OF ORIGINAL OWN FUNDS - TIER I

Original own funds / (Total requirements * 12.5)

Source: Banco de Portugal.
Note: Empirical distribution obtained through resources to a Gaussian Kernel that weights institutions by their original own funds.

Chart 4.3.4

Chart 4.3.5
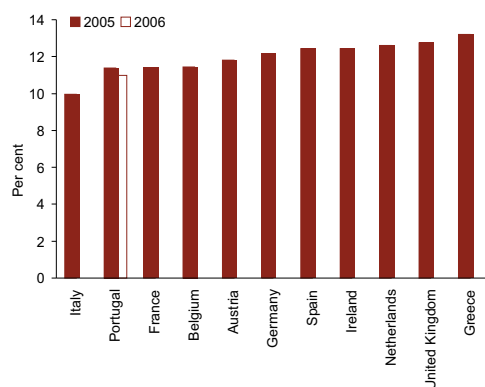
CAPITAL ADEQUACY RATIO	ADEQUACY RATIO OF ORIGINAL OWN FUNDS - TIER I
International comparison - 2005	International comparison - 2005
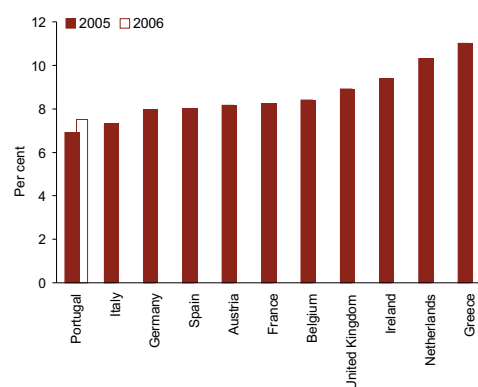
Sources: IMF "Financial Soundness Indicators - Coordinated Compilation Exercise" and Banco de Portugal.

Sources: IMF "Financial Soundness Indicators - Coordinated Compilation Exercise" and Banco de Portugal.

The international comparison of the overall capital adequacy ratio for 2005 suggests that, despite the gradual improvement that has been characterising developments in this indicator in recent years, banking institutions operating in Portugal continue to show solvency ratios lower than those seen in most euro area countries (Chart 4.3.4). This is associated with the unfavourable relative position in terms of original own funds, notwithstanding the improvement seen in 2006 (Chart 4.3.5). However, the international comparison of solvency ratios may be reflecting differences in prudential regulations among countries, on the one hand and, on the other, differences in the characteristics of banking systems that influence the building-up of capital above the regulatory minimum, among which the return on assets and the relative weight of larger banks in the total banking system.[14]

In 2007 the capital adequacy minimum requirement regime applicable to Portuguese banking groups changed significantly, as a result of the transposition of two Community directives, which reflect the new prudential framework underlying the New Capital Accord, also known as Basel II (see "Box 4.2 *The adoption of Basel II rules in Portugal*").

4.4. Market risk

Assessment of the banking system from a financial market perspective

Financial market participants' assessment of the banking system may provide relevant information on their views as regards risks and future developments in banking business. In 2006 developments in market indicators on Portuguese banks were generally very positive, with strong growth in stock prices and the maintenance of financing costs in international debt markets at historically low levels. In addi-

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(14) For a revision of the literature and an empirical approach to the determinants of capital in excess of the regulatory minimum in the Portuguese case, see Boucinha, M. "The Determinants of Portuguese Banks' Buffer Capital", which will be published during 2007 in Working Paper series of Banco de Portugal.

tion, rating agencies reviewed positively the ratings given to some of the major Portuguese banking groups.

The strong valuation seen in the Portuguese stock market partly reflected very favourable developments in the prices of Portuguese banks' shares. In fact, the Financial Services PSI index recorded the main contribution to the change in the PSI Geral index, increasing by around 35 per cent in the course of 2006 (Chart 4.4.1). Over the year, the prices of listed Portuguese banks' shares generally followed the trend of the PSI Geral index (Chart 4.4.2). The announcement of the takeover bid launched by Sonaecom on Portugal Telecom in February 2006 resulted in a very significant valuation of Portuguese banks' shares, possibly reflecting the gains that the banks involved in this operation could eventually earn. In turn, the announcement of the takeover bid launched by Millennium BCP on BPI in early March 2006 had an even stronger effect on the price of banking sector's shares, since the price offered by the acquiring group was much higher than the price of the BPI's shares before the announcement of this operation (the price of BPI's shares rose by around 26 per cent on the announcement day) (Chart 4.4.3). Despite the important contribution of the announcement of these two operations to the behaviour of share prices of Portuguese banks, their strong valuation was also supported by the very positive performance of the Portuguese banking system, which, even in a context of subdued economic growth in the past few years, has been able to maintain very positive profitability levels. Strong growth in the price-to-earnings ratio of listed Portuguese banks suggests that financial market participants consider that these banks should continue to be able to maintain relatively high profitability levels (Chart 4.4.4).

The valuation of Portuguese banks' shares was much higher than that recorded by banks in the euro area and especially in the United States. The shares of the euro area banking sector continued to record strong valuations, in line with the trend seen in the previous year. This valuation was higher than that of the Dow Jones Euro Stoxx, as a reflection of positive developments in European banks profitability, as well as of the dynamics underlying the announcement of several mergers and acquisitions in the euro area (Chart 4.4.2). In the United States, the valuation of bank shares was clearly higher than that of the previous year, although lower than in Portugal and in the euro area. The periods of abrupt volatility increase in May/June 2006 and February/March 2007 (see "Box 2.1 *Volatility in international financial markets: a comparison of the May 2006 and February 2007 episodes*") affected bank share prices negatively, albeit asymmetrically: whereas, in May 2006 euro area banks recorded more significant losses, in February 2007 US banks experienced far greater losses. The fall in US banks share prices in this latter period, significantly stronger than that of the S&P 500 index, resulted from the greater sensitivity of the financial sector to the deterioration of the real estate market in the United States.

In 2006, banks continued to benefit from overall favourable financing conditions in financial markets. The persistence of such conditions is quite relevant for Portuguese banks, since a very important share of the financing needed to sustain the strong expansion of credit activity relies on the issuance of debt securities in international financial markets (see "Section 4.5 *Liquidity risk*"). In general terms, spreads on debt securities issued by European banks stood at persistently low levels by historical standards, although having increased slightly in the wake of the turmoil observed during the May/June 2006 period, which affected mostly bonds with higher degrees of subordination (Chart 4.4.5). Contrary to the stock market, where the losses for that period were quickly reversed, European bank spreads continued to stand at levels quite above those seen before this episode. In turn, the period of strong volatility in early 2007 translated into a much more limited increase in the financing costs of European banks in debt markets. Overall, spreads on securities issued by Portuguese banks accompanied developments in debt securities of other European banks (Chart 4.4.6 and 4.4.7), although the available information for a wider sample of securities suggests that the risk premium underlying issues of Portuguese banks may have declined slightly more, especially in securities without subordination clauses

Chart 4.4.1

STOCK PRICE INDICES OF THE BANKING SECTOR
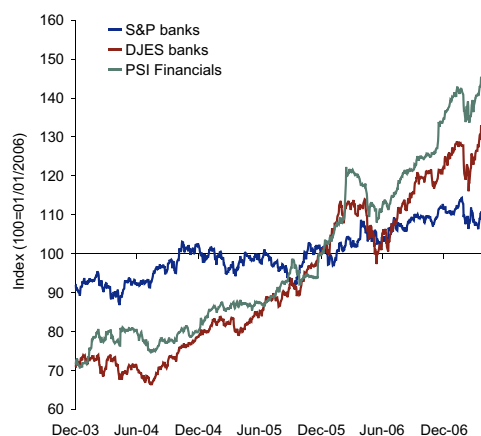
Source: Bloomberg.

Chart 4.4.2

RELATIVE DEVELOPMENTS IN STOCK PRICES OF THE BANKING SECTOR COMPARED WITH THE RESPECTIVE STOCK MARKET [(a)]
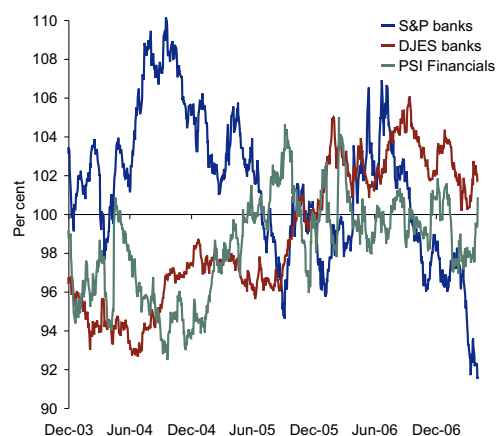
Source: Bloomberg.
Note: (a) Ratio of the stock price index of the banking sector (based on 1 Jan. 2006) to a general stock index of the respective market (also based on 1 Jan. 2006). The market index used was S&P500 for the US market, DJES for the euro area and PSI Geral for Portugal.

Chart 4.4.3

DEVELOPMENTS IN THE STOCK PRICES OF THREE PORTUGUESE BANKS AND IN THE INDEX COMPRISED OF THE SAME BANKS
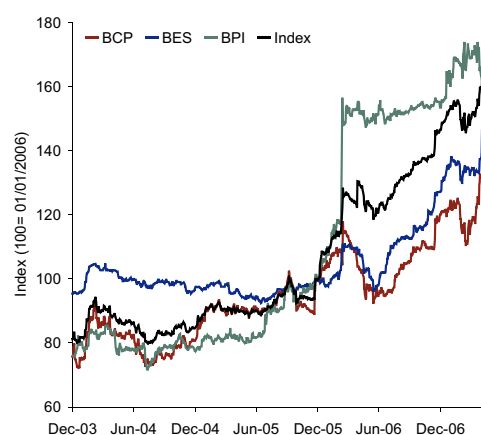
Sources: Bloomberg and Banco de Portugal.
Note: The index is calculated by keeping unchanged in the denominator the capitalisation as at 1Jan. 2006.

Chart 4.4.4

PRICE-TO-EARNINGS RATIO OF THE BANKING SECTOR
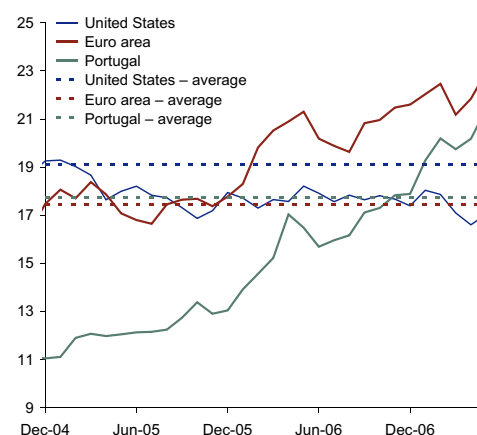
Sources: Thomson Financial Datastream and Banco de Portugal.
Note: Historical averages for the period between January 1995 and December 2006. PER calculated as the ratio of the price index to the moving average of earnings in the previous five years.

Chart 4.4.5

SPREADS BETWEEN SUBORDINATED
SECURITIES ISSUED BY EUROPEAN BANKS
(DENOMINATED IN EURO) AND GOVERNMENT
BONDS
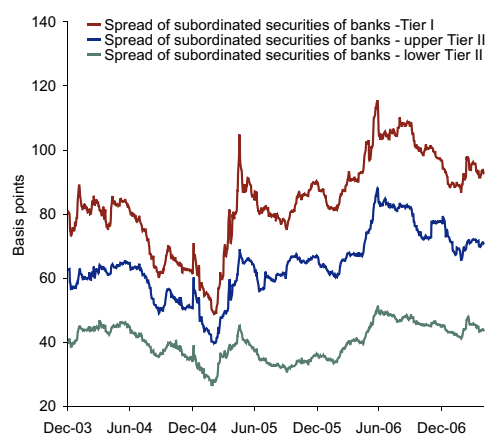
Sources: Bloomberg and JP Morgan.
Note: Spreads refer to three distinct levels of debt subordination. Tier I represents the highest degree of subordination (i.e. the riskier exposure), while lower Tier II represents the lowest degree of subordination.

(Table 4.4.1). This behaviour observed in the euro area reflects a certain reversal vis-à-vis the downward trend seen since early 2003. The reduction of the risk premium implied in the financing cost of Portuguese banks is likely to reflect, inter alia, the overall favourable profitability developments in these institutions in the past few years.

Chart 4.4.6

SPREADS OF SUBORDINATED FIXED-RATE DEBT
SECURITIES ISSUED BY EUROPEAN BANKS
Rating A
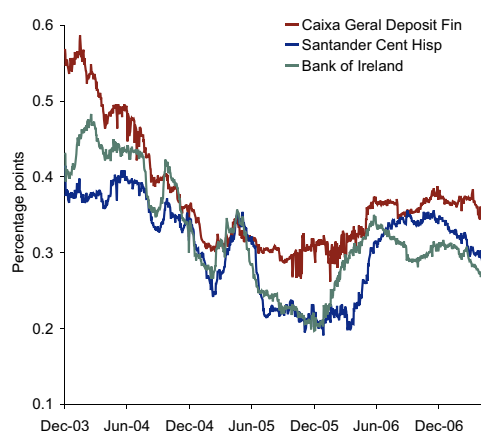
Source: Bloomberg.
Note: Spreads derived from the German government bond yield with comparable residual maturity.

Chart 4.4.7

SPREADS OF SUBORDINATED FIXED-RATE DEBT
SECURITIES ISSUED BY EUROPEAN BANKS
Rating A-
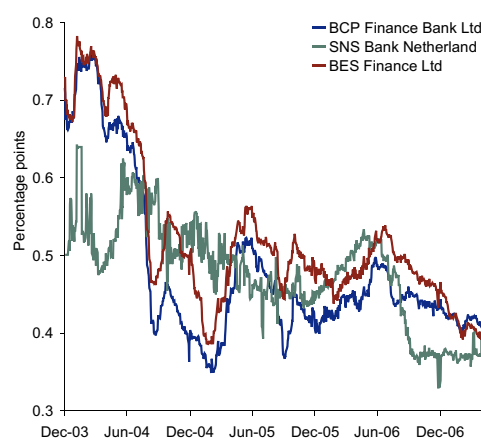
Source: Bloomberg.
Note: Spreads derived from the German government bond yield with comparable residual maturity.

Table 4.4.1

SPREADS OF FIXED-RATE SECURITIES ISSUED BY EUROPEAN BANKS [a]						
	Subordinated (Y/N)	Maturity	Bloomberg Composite Rating [b]	Spread 31 Dec. 2006 (p.p.)	Change since 31 Dec. 2005 (p.p.)	Change between the maximum and 31 Dec. 2006 [c]
BANCO DE SABADELL SA	N	15 Jun. 2015	AAA	0.28	0.06	-0.03
BANCO DE SABADELL SA	N	26 Jan. 2011	AAA	0.19	0.05	-0.07
BANCO DE SABADELL SA	N	29 Abr. 2013	AAA	0.24	0.07	-0.11
BANK OF IRELAND MTGE BNK	N	22 Sep. 2009	AAA	0.16	0.02	-0.05
BANCO SANTANDER CENT-HIS	N	08 Jul. 2013	AAA	0.19	0.07	-0.05
BANESTO SA	N	27 Jan. 2015	AA+	0.26	0.07	-0.05
BANESTO SA	N	16 Sep. 2014	AA+	0.24	0.05	-0.04
BANCO ESPANOL DE CREDITO	N	23 Feb. 2011	AA+	0.19	0.05	-0.08
BANESTO SA	N	12 May 2010	AA+	0.16	0.04	-0.08
BANCO SANTANDER CENT-HIS	N	07 Feb. 2012	AA+	0.21	0.07	-0.02
BANCO SANTANDER CENT-HIS	N	29 Jul. 2016	AA+	0.29	0.07	-0.03
BANCO SANTANDER CENT-HIS	N	15 Mar. 2009	AA+	0.23	0.01	-0.17
BANCO SANTANDER CENT-HIS	N	19 Dec. 2008	AA+	0.16	0.03	-0.13
BANCO SANTANDER CENT-HIS	N	10 Sep. 2010	AA+	0.15	-0.02	-0.15
CAIXA GERAL DE DEPOSITOS	**N**	**18 Jun. 2008**	**AA-**	**0.27**	**0.01**	**-0.35**
BANESTO ISSUANCES LTD	N	29 Jul. 2007	AA-	0.13	-0.15	-1.03
BBV INT'L FIN (CAYMAN)	N	24 Dec. 2009	A+	0.42	0.05	-0.24
BANK OF IRELAND	N	22 Oct. 2010	A+	0.34	-0.02	-0.27
BCP FINANCE BANK LTD	**N**	**31 Aug. 2007**	**A**	**0.20**	**-0.09**	**-1.13**
SNS BANK NEDERLAND	N	05 Nov. 2007	A	0.36	0.08	-0.69
SNS BANK NEDERLAND	N	14 Feb. 2008	A	0.27	0.00	-0.73
BCP FINANCE BANK LTD	**N**	**31 Mar. 2024**	**A**	**0.68**	**-0.14**	**-0.62**
BCP FINANCE BANK LTD	**N**	**22 Dec. 2008**	**A**	**0.33**	**-0.05**	**-0.32**
BES FINANCE LTD	**N**	**25 Mar. 2010**	**A**	**0.40**	**0.04**	**-0.41**
SNS BANK NEDERLAND	N	28 May 2014	A	1.96	-0.13	-0.80
SNS BANK NEDERLAND	N	12 Nov. 2014	A	0.38	0.24	-0.27
SNS BANK NEDERLAND	N	01 Dec. 2009	A	0.31	0.03	-0.05
BANCO POP VERONA NOVARA	N	21 Jan. 2009	A	0.33	0.05	-0.05
BANCO BPI SA CAYMAN	**N**	**31 Aug. 2007**	**A-**	**0.20**	**-0.09**	**-1.13**
EUROHYPO SA DUBLIN	N	12 Mar. 2009	A-	0.34	0.00	-0.53
BES FINANCE LTD	**N**	**12 Feb. 2009**	**A-**	**0.35**	**-0.05**	**-0.30**
BANCO SANTANDER CENT-HIS	N	12 Mar. 2006	NR	0.43	0.37	-0.08
ING BANK NV	Y	15 Jun. 2010	AA-	0.25	0.07	-0.66
BBV INTL FINANCE LTD	Y	25 Feb. 2010	A+	0.18	-0.10	-1.58
ABN AMRO BANK NV	Y	28 Jun. 2010	A+	0.31	0.15	-0.80
SANTANDER CENT HISP ISSU	Y	05 Jul. 2010	A+	0.34	0.13	-2.25
SANTANDER CENT HISP ISSU	Y	14 Mar. 2011	A+	0.37	0.12	-2.16
POPULAR CAPITAL SA	Y	29 Oct. 2049	A+	1.83	-0.35	-0.40
BANCO INTERCONTINENTAL	Y	29 May 2008	A+	1.20	0.32	0.00
BANKINTER SA	Y	18 Dec. 2012	A+	0.53	0.04	-0.38
BANKINTER SA	Y	18 Dec. 2028	A+	0.51	0.08	-0.55
BANCO INTERCONTINENTAL	Y	16 Jun. 2007	A+	0.24	-0.05	-0.77
CAIXA GERAL DEPOSIT FIN	**Y**	**12 Oct. 2009**	**A**	**0.37**	**0.07**	**-0.71**
BANK OF IRELAND	Y	10 Feb. 2010	A	0.30	0.11	-0.62
HYPOVEREINS FINANCE NV	Y	12 Mar. 2007	A-	0.46	0.04	-2.56
HYPOVEREINS FINANCE NV	Y	25 Feb. 2008	A-	0.38	-0.11	-2.43
BCP FINANCE BANK LTD	**Y**	**29 Mar. 2011**	**A-**	**0.43**	**0.03**	**-1.91**
SNS BANK NEDERLAND	Y	15 Apr. 2011	A-	0.33	-0.11	-0.66
BES FINANCE LTD	**Y**	**17 May 2011**	**A-**	**0.45**	**-0.02**	**-1.77**
SNS BANK NEDERLAND	Y	15 Apr. 2011	A-	0.33	-0.11	-0.66
Average				**0.39**	**0.02**	**-0.62**

Sources: Bloomberg and Banco de Portugal.
Notes: **(a)** Sample of banks defined by taking into account banks whose size is comparable to that of the Portuguese banks considered. In addition, the ratings and maturities of bonds considered in this table are close to those of the Portuguese banks analysed, to ensure the comparability of spreads. **(b)** Bloomberg Composite - average of Moody's and S&P's ratings.**(c)** Maximum observed since the beginning of 2002.

Developments in the credit risk premia implied in credit default swaps throughout 2006 confirm the overall positive assessment by financial market participants on risks underlying Portuguese banking business (Chart 4.4.8). In the euro area, these premia declined in a sustainable manner throughout the year, in line with the trend seen since mid-2005. The premia implied in Portuguese banks' securities, which continued to be lower than those of most European banks, declined even more significantly over the year, suggesting that financial market participants consider the credit risk underlying Portuguese banks' issues to be quite low.

In turn, rating agencies also made an overall positive assessment of the Portuguese banking system in the course of 2006. In March 2006 Standard & Poor's upgraded the ratings given to the Millennium BCP group, following the announcement of the takeover bid on BPI. Simultaneously, this agency placed the ratings given to BPI under review, thereby signalling a possible upgrade. In May, ratings given to Santander Totta were also positively reviewed by Standard & Poor's and Fitch, as a result of the upgrade of the ratings given to the Santander Central Hispano group. In March 2007, Standard & Poor's further upgraded the ratings given to Santander Totta and reviewed positively the ratings given to BES. This latter change occurred on the grounds of a reinforcement of the capital base of this financial group, as well as of the strengthening of its competitive position and the improvement of the quality of its assets. In addition, this rating agency attributed a positive outlook to the Millennium BCP group, due to the improved performance of this financial group and to its growing geographical diversification. In April 2007 Moody's revised the methodologies used in rating analysis,[15] which resulted in a positive review of the ratings of various Portuguese banks (CGD, Millennium BCP, Montepio Geral, BES, BPI, Santander Totta, BANIF, BPN). In May 2007, in the wake of the revision of the outlook for the Portuguese Republic from negative to stable, Fitch revised positively the outlook for CGD.

Chart 4.4.8

CREDIT DEFAULT SWAPS OF PORTUGUESE BANKS (SUBORDINATED DEBT)
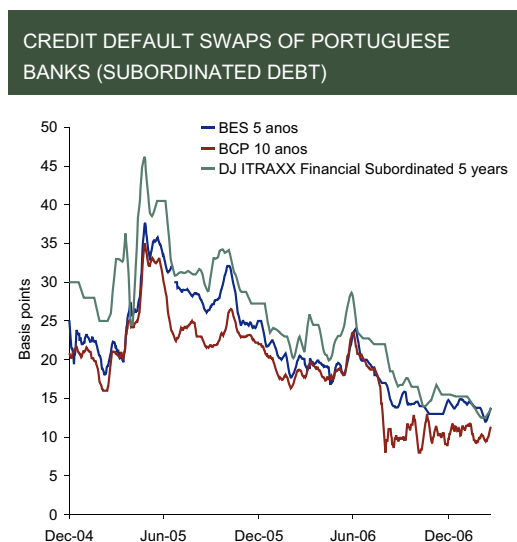
Source: Reuters.
Note: 10-day moving averages.

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(15) This new methodology incorporates the potential financial support by other entities, which may contribute to reduce the risk associated with the debt of banking institutions. Hence, this change intends to clearly distinguish the risk for each financial institution, after considering all external support possibilities, contrary to the Bank Financial Strength Rating, also of the responsibility of Moody's, which assesses the bank's intrinsic safety and stability, excluding external credit and support risk elements.

Impact of developments in capital markets on Portuguese banks

In 2006, the portfolio of securities and financial investments of banks showed a very positive behaviour, in line with the overall favourable developments in financial markets, having recorded a growth rate close to 15 per cent.[16] However, the contribution of the banking sector's securities portfolio for the banking sector's profits was lower than in 2005, both in absolute terms and as percentage of gross income. Gains from fees associated with financial operations evolved positively in 2006, essentially due to the contribution of fees charged for the trading of listed securities. Pension funds of bank employees also benefited from the favourable developments in financial markets, which contributed to an improvement in their coverage ratios.

In accordance with the International Accounting Standards (IAS), the portfolio of securities of banks is broken down into various items taking into account the purpose for which these securities are held. In this context, the portfolio of securities encompasses financial assets at fair value through profit and loss, financial assets available for sale, held-to-maturity investments and investments in subsidiaries. In addition, derivative instruments, previously considered to be off-balance-sheet items, started to be included in the balance sheet of financial institutions. Derivatives held for trading purposes are distinguished from hedging derivatives. The latter are explicitly targeted at covering specific risks assumed by banks in the exercise of its business activity. The adoption of these accounting rules in 2005 implied that most of the securities held by banks began to be measured at fair value.

In 2006, the value of the main items of the portfolio of securities of banks increased markedly, except for the portfolio of held-to-maturity investments (Chart 4.4.9). However, this item, which mainly includes government debt securities of non-resident issuers, has a very low weight in the portfolio of securities of banks (around 2 per cent). Financial assets measured at fair value through profit and loss (excluding derivatives), which account for nearly 40 per cent of the portfolio of securities of banks, grew

Chart 4.4.9

PORTFOLIO OF FINANCIAL ASSETS OF PORTUGUESE BANKS ACCORDING TO THE IAS CLASSIFICATION
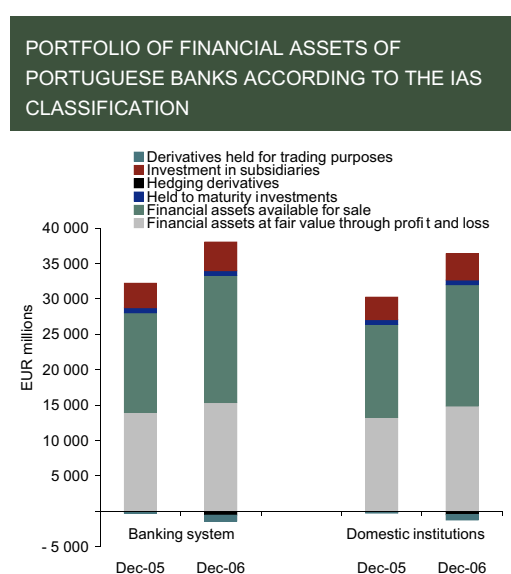
Source: Banco de Portugal.

(16) In this section the portfolio of securities and financial investments includes financial assets at fair value through profit and loss including trading derivatives (net of financial liabilities held for trading purposes), financial assets available for sale, held-to-maturity investments, investments in subsidiaries and hedging derivatives.

by around 10 per cent. This portfolio, which chiefly includes debt securities, made a positive contribution to banks profits, albeit to a lesser extent than in the previous year (Chart 4.4.10). In turn, the portfolio of financial assets available for sale, where most of shares and other capital instruments held by banks are included, grew by almost 30 per cent in 2006. Developments in this portfolio, which represents the main share of the portfolio of securities held by Portuguese banks, also made a favourable contribution to banking system's profits, albeit to a lesser extent than in 2005. Since unrealised gains and losses on these financial assets available for sale are recorded under reserves in equity, unlike what is done for financial assets assessed fair value through profit and loss, this positive impact on the banking system's profits resulted from gains on sales in this portfolio of securities.

Investments in subsidiaries, which can also be considered as financial assets held by banks, recorded a quite positive growth in 2006, and originated the main share of income from financial operations of the Portuguese banking system. This income is largely associated with one-off gains in the context of a restructuring of financial participations in insurance corporations by one of the major domestic banking groups. However, even excluding the impact of this restructuring, profits from investments in subsidiaries account for an important part of banks profits from financial operations and investments.

In turn, profits from exchange rate differences underwent a rather positive change in 2006. These profits reflect exchange rate changes in several items of the assets and liabilities of banks, and it is not possible to match them directly with the items comprising the portfolio of securities.

Although overall favourable developments in financial markets contributed positively to banking system's profits, income from trading and hedging derivatives was very negative. In fact, when derivatives are taken into account, it can be seen that profits from the portfolio of financial assets of banks decreased from the previous year. This suggests that banks may be using derivative instruments in order to cover a significant part of the risks underlying the performance of their activities. In fact, the implementation of the IAS as from 2005 brought about a greater exposure of banks to market fluctuations, given that a substantial part of assets started to be valued at fair value. Thus, the negative trend of income from financial operations in 2006, in a context of significant valuations in financial markets, may

Chart 4.4.10

INCOME FROM FINANCIAL OPERATIONS OF PORTUGUESE BANKS ACCORDING TO THE IAS CLASSIFICATION
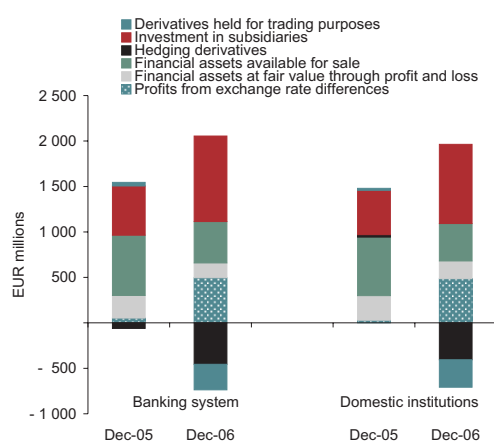
Source: Banco de Portugal.

be a reflection of a strategy to reduce the sensitivity of profits to swings in financial asset prices, by taking positions in derivative instruments.

As previously mentioned, with the implementation of the IAS the portfolios of securities and other financial assets of banks started to be classified according to the purpose of holding those securities, given that these purposes may have different impacts on the profit and loss account and on the reserves in equity. However, from the perspective of market risk assessment, it is useful to analyse these portfolios also based on a classification criterion according to the origin of risk. In this sense, financial assets held by banks were regrouped according to their main risk source, with a distinction among interest rate risk, capital market risk, exchange rate risk and risk associated with investments in subsidiaries. Around 3 per cent of assets are not liable of being classified in any of these items and, as a consequence, a residual item was defined for them.

According to this classification, the main risk source for the portfolio of securities and financial investments of banks relates to interest rate risk, which affects around two thirds of the portfolio (Chart 4.4.11). The predominance of interest rate risk reflects the weight of bonds and other notes in the debt securities portfolio of banks. Interest rate risk-sensitive assets increased by around 12 per cent in 2006, in spite of the negative effect on the valuation of bonds resulting from the rise in short and long-term interest rates. The portfolio component that is sensitive to changes in capital market prices, accounting for around 20 per cent of the portfolio of banks, rose remarkably in 2006 (more than 50 per cent). This is likely to reflect the very positive trend of stock markets at the national and international level (see Table 2.1.1 in "Chapter 2 *Macroeconomic and Financial Risks*"). The net position in shares associated with trading portfolios (including derivative positions) also increased in 2006, from 1.3 to 2.7 per cent of own funds, although its magnitude continued to be rather low compared with other European countries. In turn, the part of the portfolio affected by exchange rate risks is negligible in the total portfolio and recorded a negative change in 2006. However, exchange rate risk is also likely to affect those portfolios in which the interest rate risk and the equity risk predominate, since these portfolios include some securities denominated in foreign currency. Finally, the portfolio of investments in subsid-

Chart 4.4.11

PORTFOLIO OF FINANCIAL ASSETS OF PORTUGUESE BANKS ACCORDING TO RISK SOURCE
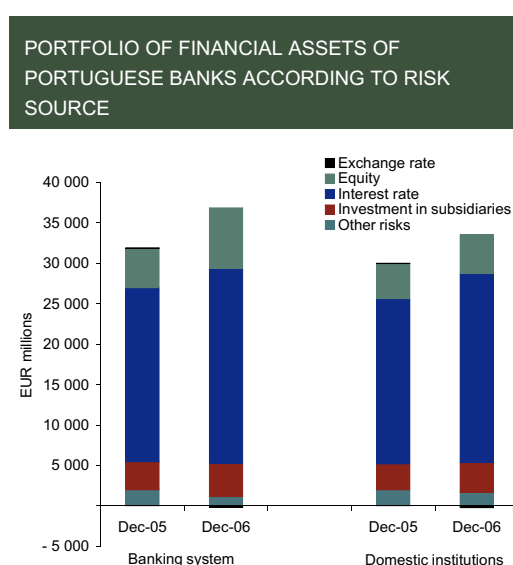
Source: Banco de Portugal.

iaries also evolved positively, which is likely to reflect the valuation of some financial participants, assessed at market value, in line with the strong rise in stock prices.

It should be taken into consideration that the banks' portfolio of securities and financial investments as a whole includes assets that are recorded differently in the profit and loss account. In fact, unrealised gains and losses on some assets are accounted against profit and loss accounts, while unrealised gains and losses on other assets – namely in the portfolio of assets available for sale, which includes most of the shares held by banks – are recorded against reserves in equity, being reflected in the profit and loss account only at the moment of sale (or in case of impairment). This fact conditions the analysis of the contributions of each of the above-mentioned risk factors to banking system's profits, insofar as these may not be contemporaneously reflected in the profit or loss for the year.

Against this background, the main contribution was associated with profits from investments in subsidiaries, which, as already discussed, partly resulted from the restructuring of the financial participations of one banking group (Chart 4.4.12). The second most important contribution to bank profits was associated with gains on shares. However, given that most of the shares held by banks are part of the portfolio of assets available for sale, the profit and loss account should not be significantly affected by changes in the valuation of shares, since these changes should be reflected as reserves in capital. In this vein, the positive contribution of shares to profits is likely to reflect the sale of these assets, in line with the above discussion. Income associated with exchange rate risks also made a positive contribution to banks profits, and rose significantly from the previous year. These developments were outlined by a substantial appreciation of the euro against the US dollar and the Japanese yen in the course of the year. Finally, profits associated with interest rate risk-sensitive securities followed a downward trend in 2006. The negative contribution of this item to profits mainly reflects losses recorded in interest rate derivatives.[17] In fact, as already mentioned, an important part of the overall positive results of banks as regards their portfolio of securities and financial investments is partly cancelled by losses on derivatives (Chart 4.4.13). As said, these derivative instruments allow banks to become less sensitive

Chart 4.4.12

INCOME FROM FINANCIAL OPERATIONS OF PORTUGUESE BANKS ACCORDING TO RISK SOURCE

Source: Banco de Portugal.

Chart 4.4.13

INCOME FROM FINANCIAL OPERATIONS OF PORTUGUESE BANKS ACCORDING TO RISK SOURCE
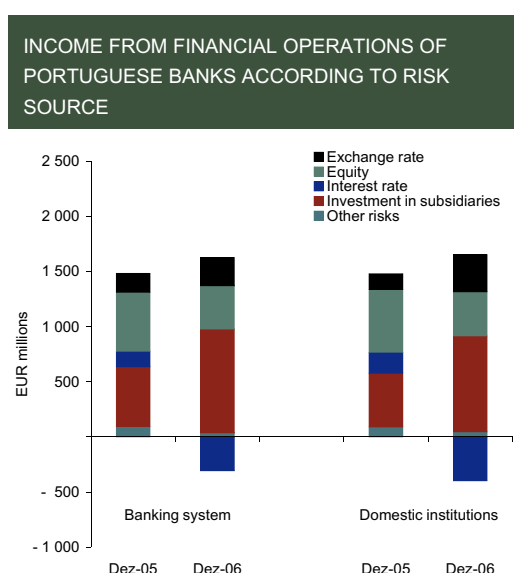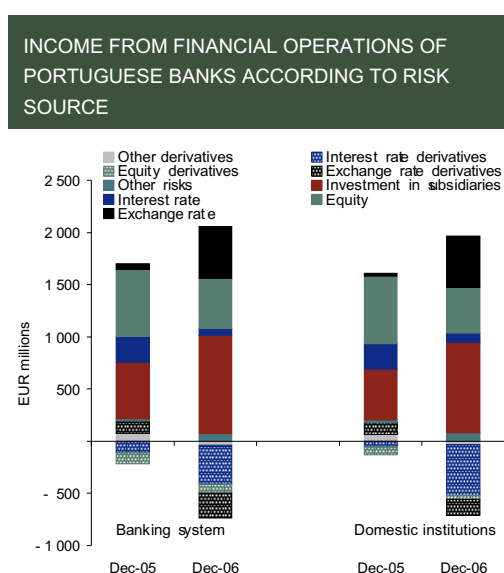
Source: Banco de Portugal.

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(17) Hedging derivatives for interest rate risk are not intended to only cover potential losses stemming from interest rate changes in the portfolios of securities of banks, but also potential losses on lending and deposit operations in banks' financial intermediation activities.

Chart 4.4.14

NET FEES ASSOCIATED WITH FINANCIAL
OPERATIONS
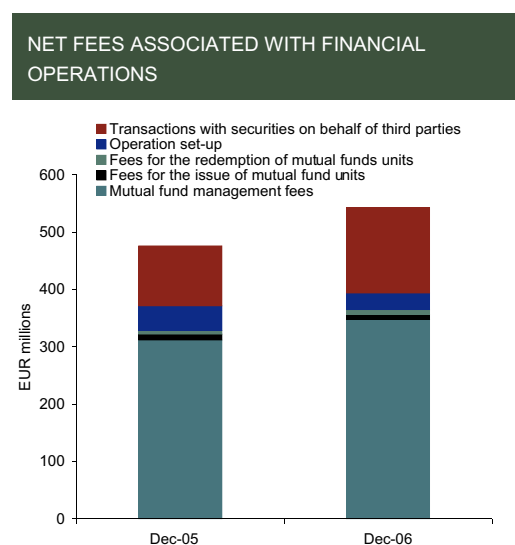
Source: Banco de Portugal.

to substantial fluctuations in the value of financial assets, which may avoid losses in years of less positive developments in financial markets.

An increasingly important part of bank profits comes from fees and commissions. Although most of these profits are associated with fees charged for financial intermediation operations, in particular credit granting, income from fees associated with other financial operations is also an important source of profits for banks. Income from this type of fee tends to move significantly with the performance and activity in financial markets. Hence, the buoyancy in financial markets in 2006 appears to have contributed positively to gains on fees in financial operations, which recorded a very positive change (Chart 4.4.14). The main contribution to these developments was associated with the purchase and sale of securities on behalf of third parties, which recorded a growth rate of above 40 per cent. These fees mainly relate to fees charged in the purchase and sale of listed shares, partly reflecting the high turnover seen in the Portuguese stock market. Fees associated with mutual fund operations, such as fees regarding the management, issuance and redemption of investment fund units, also evolved rather positively. In effect, mutual fund management fees represent the main share of fees associated with financial operations, having grown by over 10 per cent, which seems to have reflected an increase in the volume managed by these funds. In turn, fees charged by redemptions of mutual fund units also rose significantly, suggesting that the volume of redemptions increased from the previous year (see "Section 4.5 *Liquidity risk*"). Finally, operation set-up fees declined in 2006, despite the significant volume of mergers and acquisitions and the revival of the privatisation programme.

In 2006 the performance of pension funds of bank employees was very positive, largely reflecting the positive developments in financial markets. In fact, the coverage of these funds showed relatively high values, countering those seen since the beginning of the decade (Table 4.4.2). On the one hand, the strong market buoyancy allowed net income from pension funds to grow by around 50 per cent. Since the net yield of these funds was much higher than that estimated, contributions paid to pension funds

Table 4.4.2

PENSION FUNDS - BANKING SYSTEM EUR millions					
	2002	**2003**	**2004**	**2005**	**2006**
Annual increase in liabilities					
Actuarial gains and losses	784	264	635	1 203	-320
of which:					
Actuarial gains and losses arising from differences between assumptions and realised values	763	87	-26	-91	-247
Actuarial gains and losses arising from changes in assumptions and, where applicable, in the plans' conditions	22	177	660	1 294	-72
Increase in liabilities arising from early retirement programmes	235	242	369	242	212
Annual increase in liabilities	1 225	709	1 195	1 673	175
Liabilities					
Total liabilities	9 371	10 328	9 236	12 227	13 309
Minimum level of liabilities to be covered	**9 029**	**10 003**	**8 979**	**11 559**	**12 454**
Pension fund					
Pension fund value at the beginning of the year	**7 878**	**8 743**	**9 818**	**8 560**	**11 424**
Net income of the fund	-309	757	680	839	1 240
Contributions to the fund	1 640	816	1 107	2 328	975
Contributions made by the beneficiaries	40	42	43	44	49
Retirement pensions paid by the fund	454	498	533	521	560
Survivors pensions paid by the fund	21	23	20	26	28
Changes in the value of the fund resulting from termination	0	0	0	0	0
Other net changes	-42	-18	-2 430	200	290
Pension fund value at the end of the year	**8 732**	**9 819**	**8 664**	**11 424**	**13 388**
Coverage of the fund (pension fund value at the end of the year - Minimum liability level to be covered)	**-297**	**-184**	**-315**	**-135**	**934**
Other coverage	146	199	231	420	421
Coverage of the fund (pension fund value at the end of the year (incl. other coverage) - Minimum liability level to be covered)	**-151**	**15**	**-84**	**285**	**1 355**

Source: Banco de Portugal.

by banks were not as high as those seen in the previous year.[18] On the other hand, given that with the implementation of the IAS the discount rate used in the calculation of the current value of liabilities started to be associated with long-term bond yields, the rise in these yields in 2006 implied a decrease in the value of funds' liabilities.

The favourable developments in financial markets were rather important for the positive performance of pension funds in 2006. However, these developments also show that the overall situation of pension funds can be quite conditioned by the performance of financial markets. In effect, the IMF Financial Stability Assessment Program for the Portuguese financial system concluded that the pension funds of bank employees could be severely affected by abrupt drops in stock market prices (although the direct effect on the banks' own portfolio was of a rather low magnitude), as well as by substantial declines in interest rates in longer maturities (see "Box 4.1 *Results of the Portuguese banking system stress testing exercise*"). However, the results of this stress testing exercise showed that, even with very ad-

[18] In 2005 the implementation of the IAS had resulted in a rather substantial increase in the liabilities of pension funds of bank employees, requiring a strong increase in contributions paid to the fund. This increase in liabilities resulted from the decrease in the discount rates used in the calculation of liabilities to values close to long-term interest rates and from the revision of mortality tables used in these calculations. In addition, post-employment medical care and death grants started to be included in pension fund liabilities.

verse developments in the risk factors underlying exposure to shares and fixed-income securities, Portuguese banks would be able to uphold adequate solvency levels.

4.5 Liquidity risk

Financing of the banking system

In 2006, the financing structure of Portuguese banks remained broadly unchanged compared with the previous years (Charts 4.5.1 and 4.5.2). Resources from customers recorded a 5 per cent growth rate, up from 4.5 per cent in 2005. This aggregate, mainly composed of bank deposits from customers, represents the main financing source of banks' lending activity, although its relative importance continued to decline in 2006, in favour of financing in the capital market. On the one hand, the relative weight of financing in the interbank market (including central banks) decreased in net terms; on the other hand, debt securities increased its weight in the financing structure. Developments in net interbank financing of the total banking system were due to a sharp decline in borrowing from central banks by non-domestic banks (see "Section 4.2 *Activity and profitability*"). Focusing this analysis strictly on domestic institutions, it can be seen that the increase in liabilities to credit institutions abroad resulted in an increase in net interbank financing, although the respective net position was close to zero at end-2006 (Chart 4.5.2 and Table 4.5.1). The pace of new securitisation transactions remained broadly unchanged from the previous year, and its contribution to the financing of credit granted by the banking system remained virtually unchanged for the banking system as a whole, having increased slightly for domestic institutions.
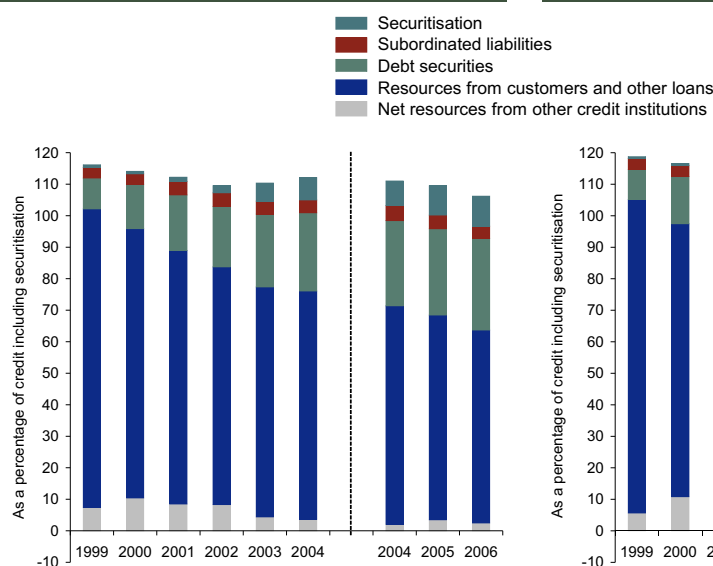
Chart 4.5.1

Chart 4.5.2

LIQUIDITY SOURCES OF THE BANKING SYSTEM	LIQUIDITY SOURCES OF THE BANKING SYSTEM - DOMESTIC BANKS

Securitisation
Subordinated liabilities
Debt securities
Resources from customers and other loans
Net resources from other credit institutions
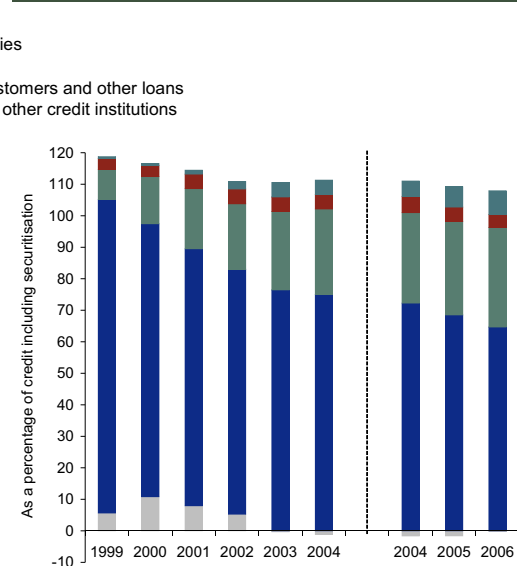
Source: Banco de Portugal.
Notes: Net resources from other credit institutions include net resources on central banks. Securitisations include derecognised and not derecognised transactions. The break in the series corresponds to the change in the accounting standards which implied a redefinition of the group of banking institutions under analysis.

Table 4.5.1

POSITION OF THE PORTUGUESE BANKS VIS-À-VIS OTHER CREDIT INSTITUTIONS AND CENTRAL BANKS					
	EUR millions			Rate of change (in percentage)	
Banking system	Dec-2004	Dec-2005	Dec-2006	2005	2006
Net resources from other credit institutions	**4 260**	**7 974**	**6 284**	**87.2**	**-21.2**
Cash and claims on central banks	**7 555**	**6 205**	**6 906**	**-17.9**	**11.3**
In the country	7 042	5 657	6 256		
Abroad	513	548	651	6.7	18.8
Claims and investment in other credit institutions	**25 041**	**30 876**	**31 490**	**23.3**	**2.0**
In the country	n.a.	5 748	5 773		
Abroad	n.a.	25 127	25 718		2.3
Resources from central banks	**3 542**	**6 215**	**1 739**	**75.5**	**-72.0**
In the country	3 233	5 464	8		
Abroad	309	751	1 731	142.9	130.6
Resources from other credit institutions	**33 315**	**38 840**	**42 941**	**16.6**	**10.6**
In the country	n.a.	5 384	4 078		
Abroad	n.a.	33 457	38 863		16.2
Domestic banks	Dec-2004	Dec-2005	Dec-2006	2005	2006
Net resources from other credit institutions	**-2 823**	**-3 036**	**- 290**	**-**	**-**
Cash and claims on central banks	**6 955**	**5 548**	**6 200**	**-20.2**	**11.8**
In the country	6 456	5 022	5 576		
Abroad	499	526	624	5.4	18.8
Claims and investment in other credit institutions	**21 629**	**25 780**	**27 085**	**19.2**	**5.1**
In the country	n.a.	4 795	4 709		
Abroad	n.a.	20 985	22 376		6.6
Resources from central banks	**1 010**	**851**	**1 736**	**-15.8**	**104.1**
In the country	699	110	8		
Abroad	311	740	1 728	138.0	133.4
Resources from other credit institutions	**24 751**	**27 441**	**31 258**	**10.9**	**13.9**
In the country	n.a.	4 610	3 570		
Abroad	n.a.	22 833	27 688		21.3

Source: Banco de Portugal.
Note: n.a. - Not available.

Resources from customers, as far as their stability and composition are concerned, should be analysed with particular care, given their weight in the financing structure and the fact that they are an important source of revenue for banks. In this sense, information from Monetary and Financial Statistics[19] and from the International Investment Position makes possible the analysis of developments in deposits made by residents (including emigrants) regardless of the region in which they are situated (either in Portugal or abroad). These deposits are the most natural financing basis of Portuguese retail banks, which are largely based on the domestic market (Chart 4.5.3). In turn, deposits made by non-residents in the national territory are typically transactions of wholesale markets, in which domestic banks should not have sizeable market power. The balances on these deposits are more volatile and tend to be concentrated in a more reduced number of depositors. These depositors are usually highly sensitive to the remuneration offered, and may include non-bank investors who invest funds at money market rates. In

[19] Information on Monetary and Financial Statistics of the Banco de Portugal concerns a broader group of banking institutions than that considered in the remainder of this section, which focuses only on the group of institutions that adopted the International Accounting Standards or the Adjusted Accounting Standards in 2005 and 2006.

Chart 4.5.3

DEPOSITS FROM THE NON MONETARY SECTOR

Contributions to the year-on-year rate of change

Legend:
- Non-financial corporations (resident) in Portugal and abroad
- Households (resident) including emigrants in Portugal and abroad
- Other (resident) in Portugal and abroad
- Non monetary sector (non resident) in Portugal
- Y-o-y rc in deposits in Portugal from the non-monetary sector (resident and non-resident) and deposits abroad (residents)[a]
- Memo: Y o-y rc in deposits in Portugal and abroad from the non-monetary resident sector[a]

Source: Banco de Portugal (Monetary and Financial Statistics; International Investment Position).
Note: (a) Excluding liabilities recorded as a counterpart of the liquidity received from not derecognised securitisation transactions, recorded as deposits (and deposit-like instruments) of other financial intermediaries and auxiliaries.

2006, as in the previous year, the share of deposits in Portugal by non-residents made a very low contribution to deposit growth, in contrast to the period between 2003 and 2004, in which the contribution from non-residents' deposits was particularly high given their weight in terms of the respective balances. This is consistent with the idea that these deposits are close substitutes for financing in the money market. With regard to residents' deposits, households (including emigrants) accounted for the highest share, by contrast with the previous year, in which growth in deposits of non-financial corporations was considerably higher. This contributed favourably to the stability of resources from customers as, on the one hand, household deposits tend to be smaller and to be held by a larger number of depositors and, on the other hand, household deposits tend to show relatively longer actual maturities, even in the case of short-term contractual maturities.

Over the past few years, the decreasing relevance of resources from customers as a financing source of banks has been associated with the fall in the households' savings rate, the maintenance of interest rates at low levels, and also with banks' strategies. In fact, banks have been trying to offer their customers investment opportunities that are an alternative to traditional deposits, namely investment funds and other structured products, which profitability is partly related to price developments in the financial markets. These alternative products bring benefits to the banking activity, as they contribute to a longer permanence of funds invested by customers, due to contractual conditions offering higher yields for longer investment maturities, and give rise to an increase in revenue from commissions and portfolio management fees (see "Section 4.4 *Market risk*"). However, in contrast to developments seen since 2001, net subscriptions of mutual funds domiciled in Portugal were negative in 2006. These concern mainly funds with lower profitability and risk, such as money market, cash and bonds funds, whose yields have remained relatively low (Chart 4.5.4). Nevertheless, Special Investment Funds attracted high subscription amounts like in 2005. There are several factors behind the increased importance of this type of funds. On the one hand, although some of these funds do not offer guaranteed capital, they provide both protection of the capital and potentially high profits in medium-term investments, attracting investors more adverse to risk in a context of low interest rates. On the other hand, some of these funds offer the possibility of risk diversification, by investing in assets which profitability is less correlated with the profitability of the traditional financial markets, namely real estate and other non-financial

Chart 4.5.4

BREAKDOWN OF NET SUBSCRIPTIONS OF
MUTUAL FUNDS AND MONEY MARKET FUNDS -
BY CLASS OF FUNDS
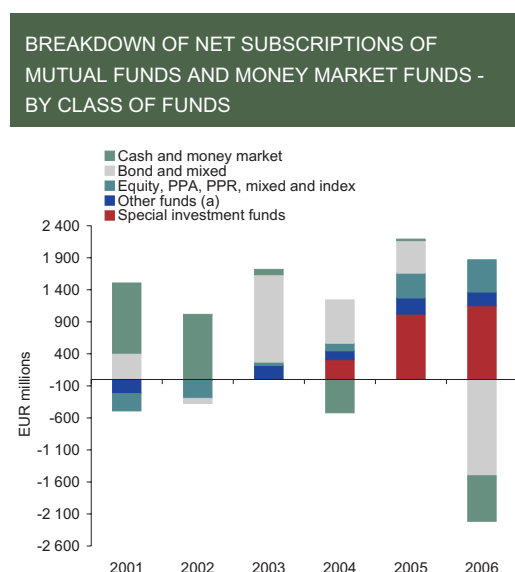
Source: APFIPP.
Notes: Adjusted for investment in national fund units since 2004. **(a)** Includes other funds, flexible funds and guaranteed capital funds.

assets. In addition, the supply and diversity of these funds increased significantly, resulting from a more competitive behaviour of mutual fund management entities.

The strong expansion of credit granted by the banking system, together with a relatively subdued growth in resources from customers, has been accommodated through an increase in its market financing, mainly through securities issuance (Chart 4.5.5). The recourse to market financing has been favoured by the participation of Portugal in the euro area, which led to the elimination of foreign ex-

Chart 4.5.5
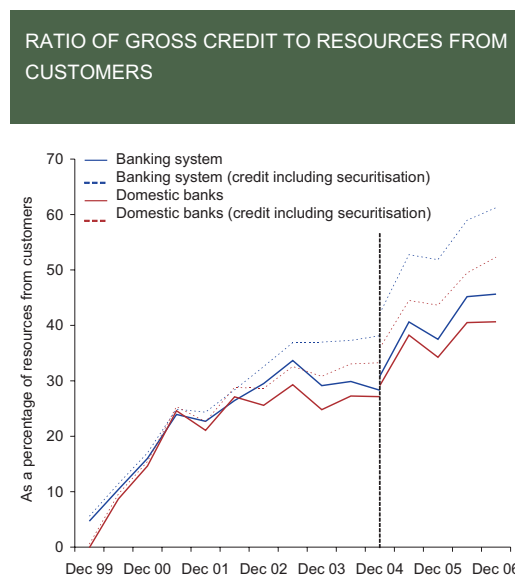
RATIO OF GROSS CREDIT TO RESOURCES FROM
CUSTOMERS

Source: Banco de Portugal.
Note: The break in the series corresponds to the change in the accounting standards which implied a redefinition of the group of banking institutions under analysis.

change risk in the financing in euro, by globally favourable financing conditions in international debt markets and, in general, by the increasing financial integration of the Portuguese economy, creating a broad market for the issuance of these instruments. However, it should be noted that the growing recourse to this type of financing increases the exposure of banks to shifts in financial market sentiment, as changes in financing conditions in these markets are reflected in both the cost and availability of funds for refinancing the components with shorter residual maturities (see "Chapter 2 Macroeconomic and financial risks"). Against this background, debt securities and interbank liabilities with a residual maturity of over 1 year have been increasing, accounting for around 65 per cent of this type of financing in 2006, thus allowing banks to limit their exposure to sudden shifts in market sentiment (Charts 4.5.6 and 4.5.7).

A significant part of financing through securities issuance is obtained through branches and subsidiaries abroad of Portuguese banking groups. In 2006 this type of issuance declined significantly, by contrast with the growth trend observed in the past few years (Chart 4.5.8). Net issuance, estimated as the difference between gross issuance and the outstanding amount of bonds with a residual maturity of up to 1 year at the end of the previous year, also declined. The large majority of bond issuance through branches and subsidiaries abroad was concentrated in maturities between 2 and 5 years, by contrast with what was seen in the past few years, in which longer maturities were preferred. However, although the share of debt with a residual maturity above 5 years has declined, around 80 per cent of total bonds issued through branches and subsidiaries abroad had a residual maturity of over 1 year at end-2006 (Chart 4.5.9). Debt issuance continues to be mainly at a variable rate, in order to adjust funding costs to asset profitability, as most credit continued to be contracted at variable interest rates (Table 4.5.2).

In 2006, Portuguese law concerning the issuance of covered bonds was revised, making easier for banks to issue securities backed by mortgages. These mortgages constitute autonomous wealth after the issuance, even though they remain in the balance sheet of the bank concerned. This type of issuance enables banks to obtain financing at lower costs than through other types of securities, such as bond issuance through the EMTN (Euro-Medium Term Notes) programme, since covered bonds have a lower credit risk premium, given the fact that a group of mortgages is assigned to each issuance, thus offering increased repayment guarantees. For the same reason, these securities have a quite favourable prudential treatment in terms of solvency under the new Community prudential regime, and are highly attractive financial instruments for banks as investors. At year-end Caixa Geral de Depósitos issued the first set of ten-year covered bonds amounting to EUR 2 billions (integrated in an issuance programme of EUR 10 billions). Further issuance of this type of securities is expected in 2007, which is likely to imply a decrease in the issuance through branches and subsidiaries abroad.

The recourse to securitisation transactions has been an additional source of financing of Portuguese banks. These transactions allow the conversion of credit claims recorded in the balance sheet into immediate liquidity or, if a bank purchases securities resulting from a securitisation transaction, the conversion of non-marketable assets into marketable assets. Considering the total value of securitisation,[20] Portuguese banks continued to rely on this type of transactions as a form of financing, albeit to a lesser extent than in previous years (Chart 4.5.10). Securitised claims are mostly composed of mortgage lending granted to households for house purchase. In December 2006 close to 20 per cent of this type of credit originally granted by banks was securitised.

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[20] It should be noted that the implementation of the International Accounting Standards (IAS) in 2005 implied a change in the criteria for the derecognition of assets involved in securitisation transactions. Hence, only where there is a true sale of the securitised asset, i.e. when the sale of the asset and the definitive transfer of the respective risks occur simultaneously, it should be derecognised on the credit portfolio of banks. Otherwise, assets should remain in the portfolio of banks. Both derecognised and not derecognised securitised credit provide additional liquidity.

Chart 4.5.6

STRUCTURE BY RESIDUAL MATURITY OF DEBT SECURITIES AND INTERBANK LIABILITIES

Chart 4.5.7

STRUCTURE BY RESIDUAL MATURITY OF DEBT SECURITIES AND INTERBANK LIABILITIES - DOMESTIC BANKS

- ☐ Over 1 year – debt securities
- ■ Over 1 year – resources from credit institutions and central banks
- ☐ Up to 1 year – debt securities
- ■ Up to 1 year – resources from credit institutions and central banks
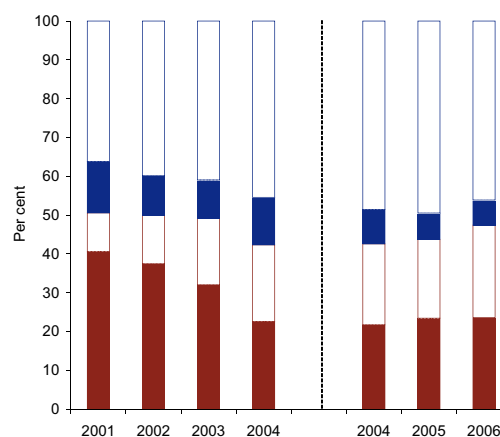
Source: Banco de Portugal.
Notes: Debt securities include subordinated debt and interbank liabilities include resources from central banks. The break in the series corresponds to the change in the accounting standards which implied a redefinition of the group of banking institutions under analysis.

Chart 4.5.8

INTERNATIONAL ISSUES OF BONDS BY BRANCHES AND SUBSIDIARIES ABROAD OF PORTUGUESE BANKING GROUPS

Structure by original maturity

- ■ Over 10 years or perpetual bonds
- ☐ 5 to 10 years
- ■ 2 to 5 years
- ■ 1 to 2 years
- ■ up to 1 year
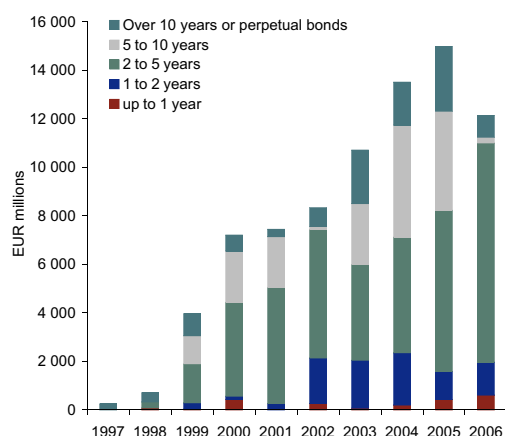
Sources: Bloomberg, Thomson Financial Datastream and Dealogic Bondware.

Chart 4.5.9

STRUCTURE BY RESIDUAL MATURITY OF BONDS ISSUED BY BRANCHES AND SUBSIDIARIES ABROAD OF PORTUGUESE BANKING GROUPS

Outstanding amount at the end of the year

- ■ Over 10 years or perpetual bonds
- ☐ 5 to 10 years
- ■ 2 to 5 years
- ■ 1 to 2 years
- ■ up to 1 year
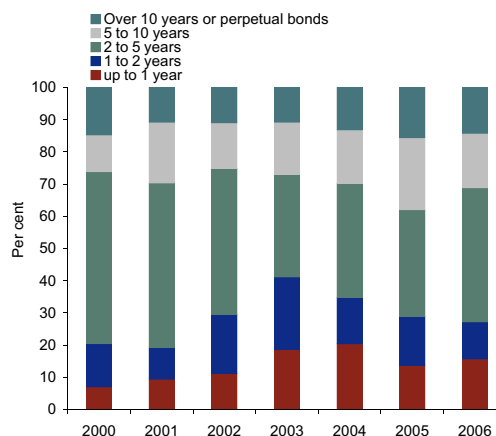
Sources: Bloomberg, Thomson Financial Datastream and Dealogic Bondware.

Table 4.5.2

STRUCTURE OF TOTAL OUTSTANDING AMOUNTS OF BONDS ISSUED BY BRACHES AND SUBSIDIARIES ABROAD OF PORTUGUESE BANKING GROUPS
By type of rate and residual maturity as at 31 December 2006
As a percentage of the total outstanding amounts

	Up to 1 year	1 to 2 years	2 to 5 years	5 to 10 years	Over 10 years or perpetual bonds	Total
Variable rate	14.3	9.2	34.8	8.2	5.6	72.1
Fixed rate and others	1.4	2.3	6.9	8.6	8.7	27.9
Total	15.7	11.5	41.7	16.9	14.3	100.0

Sources: Bloomberg, Thomson Financial Datastream and Dealogic Bondware.

Liquidity indicators[21]

As mentioned above, the growth of credit granted by the banking system continued to be higher than that of resources from customers in 2006. As a consequence, the credit-to-deposits ratio increased, standing close to 145 per cent for the banking system and around 140 per cent for domestic institutions (Chart 4.5.11). This ratio has been recording higher figures for non-domestic institutions, as the latter tend to concentrate their activity in granting credit rather than in taking deposits. This is due to several factors. On the one hand, the competition with domestic banks to obtain resources is probably more difficult, as domestic banks have a wide network of branches that allows them to establish long-term relationships with their customers. On the other hand, most non-domestic institutions belong to large banking groups and do not depend on deposits from domestic customers to expand their lending activity. The credit-to-deposit ratio has been increasing in the past few years in several European

Chart 4.5.10

DEVELOPMENTS IN THE OUTSTANDING AMOUNT OF LOANS SOLD IN SECURITISATION
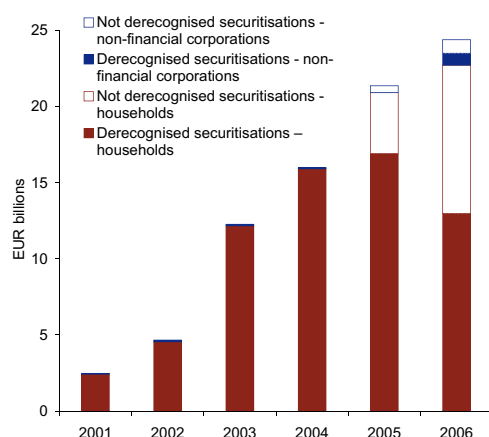
Source: Banco de Portugal.

Chart 4.5.11

RATIO OF CREDIT TO RESOURCES FROM CUSTOMERS
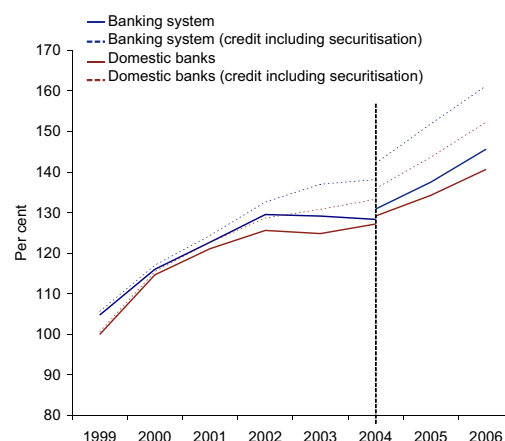
Source: Banco de Portugal.
Note: The break in the series corresponds to the change in the accounting standards which implied a redefinition of the group of banking institutions under analysis.

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(21) For a more detailed description of liquidity indicators used in this section see "Box 4.1 *Monitoring the banking system's liquidity risk*", in the 2004 issue of the *Financial Stability Report* of Banco de Portugal.

countries. This evolution was possible in part because of the increasing financial integration, which provides other forms of financing to banking institutions. In 2005, Portugal was among the euro area countries recording the highest figures in this indicator (Chart 4.5.12). However, it should be stressed that the analysis of this indicator is limited by changes in the form of financing of the banking system, namely in the way how banks attract savings from their customers through the issuance of debt securities that are subsequently placed with these customers. Taking this into consideration, it is possible to construct an indicator with a broader concept of resources from customers, which includes debt securities issued by banks and placed with customers (Chart 4.5.13). This broad liquidity indicator also increased in 2006, albeit to a lesser extent, as investment in this type of debt securities rose significantly. The distribution of the credit-to-deposit ratio (not adjusted for debt securities issued by banks and placed with customers) shifted to the right, reflecting an increase in most domestic institutions (Chart 4.5.14). The increase in this indicator was particularly significant to larger institutions with higher credit-to-deposit ratios.

In 2006, the coverage ratio of interbank liabilities by highly liquid assets (interbank assets and assets eligible for monetary policy operations) increased slightly for the banking system and declined in the group of domestic institutions (Chart 4.5.15). Although interbank assets and securities eligible as collateral for monetary policy operations have evolved positively in the group of domestic institutions, the increase in financing in the interbank money market was stronger, as mentioned above, resulting in a deterioration of this liquidity indicator. As in previous years, the coverage ratio of interbank liabilities by highly liquid assets of domestic institutions continued to record a bi-modal distribution (Chart 4.5.16). The decrease in the coverage ratio was associated with a shift to the left of the distribution of this indicator, although it was concentrated in a reduction of the coverage ratio of two institutions at the extreme ends of the distribution.

The analysis of liquidity gaps provides a further contribution to the characterisation of the Portuguese banks' liquidity position, as it takes into account the structure of short-term assets and liabilities broken down by residual maturity. It is therefore possible to assess the liquidity position of a bank through the gap between short-term assets and liabilities. The liquidity gaps of the banking system evolved differ-

Chart 4.5.12
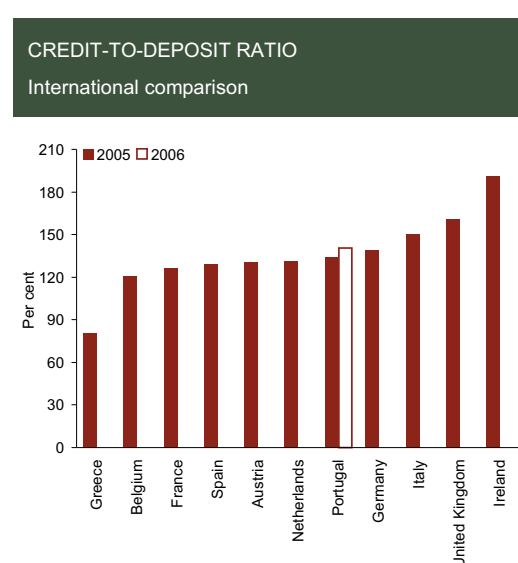
Sources: IMF (Financial Soundness Indicators – Coordinated Compilation Exercise) and Banco de Portugal.

Chart 4.5.13

RATIO OF CREDIT TO RESOURCES FROM
CUSTOMERS (INCLUDING SECURITIES ISSUED
AND PLACED WITH CUSTOMERS)
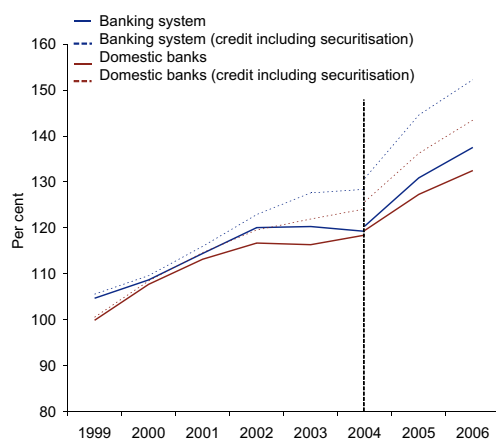
Source: Banco de Portugal.
Note: The break in the series corresponds to the change in the accounting standards which implied a redefinition of the group of banking institutions under analysis.

Chart 4.5.14

CREDIT-TO-DEPOSIT RATIO OF DOMESTIC
INSTITUTIONS
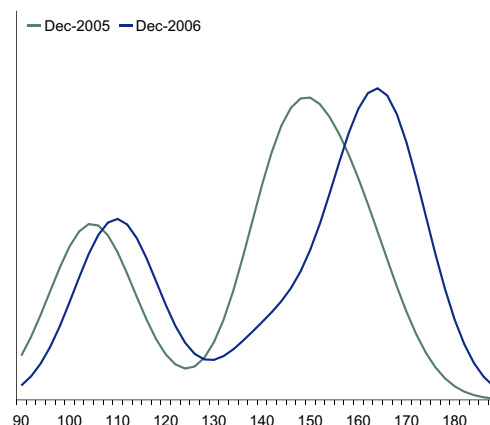
Empirical distribution

Source: Banco de Portugal.
Note: Empirical distribution obtained through recourse to non-parametric methods, namely to a Gaussian kernel that weights institutions by their assets.

Chart 4.5.15

COVERAGE RATIO OF INTERBANK LIABILITIES BY
HIGHLY LIQUID ASSETS
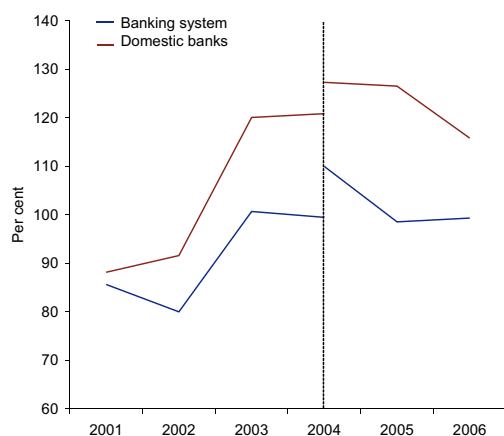
Source: Banco de Portugal.
Note: Coverage ratio is defined as the ratio of highly liquid assets (interbank assets and debt securities eligible for monetary policy operations) to interbank liabilities. The break in the series corresponds to the change in the accounting standards which implied a redefinition of the group of banking institutions under analysis.

Chart 4.5.16

COVERAGE RATIO OF INTERBANK LIABILITIES BY
HIGHLY LIQUID ASSETS OF DOMESTIC
INSTITUTIONS

Empirical distribution

Source: Banco de Portugal.
Note: Empirical distribution obtained through recourse to non-parametric methods, namely to a Gaussian kernel that weights institutions by their assets.

Chart 4.5.17
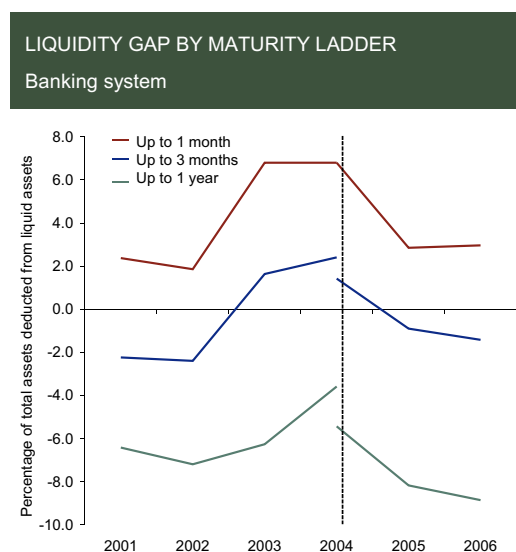
LIQUIDITY GAP BY MATURITY LADDER
Banking system

Source: Banco de Portugal.
Note: The liquidity gap is defined as (liquid assets-volatile liabilities)/(assets-liquid assets)x100 in each residual maturity ladder. The break in the series corresponds to the change in the accounting standards which implied a redefinition of the group of banking institutions under analysis.

Chart 4.5.18

LIQUIDITY GAP BY MATURITY LADDER
Domestic banks
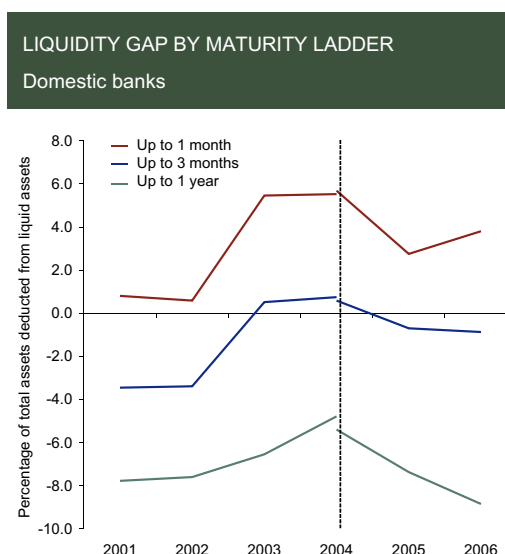
Source: Banco de Portugal.
Note: The liquidity gap is defined as (liquid assets-volatile liabilities)/(assets-liquid assets)x100 in each residual maturity ladder. The break in the series corresponds to the change in the accounting standards which implied a redefinition of the group of banking institutions under analysis.

ently across the maturity spectrum, having virtually stabilised for the up to 1 month maturity and deteriorated slightly for the remaining maturities (Chart 4.5.17). The gaps for the group of domestic institutions moved in line with those of the banking system, even though their evolution was slightly more pronounced (Chart 4.5.18). The reduction in the indicators with maturity up to 1 year resulted, to a large extent, from a strong increase in securities with a maturity between 3 months and 1 year of domestic institutions. This is consistent with the increase in the amount outstanding of bonds issued through branches and subsidiaries abroad with a residual maturity of up to 1 year. In sum, following the improvement in 2003 and 2004, the liquidity gaps of domestic institutions declined in the past two years, with the exception of the up to 1 month maturity indicator, which improved in 2006. The distribution of the liquidity gaps of domestic institutions considering maturities of up to 1 year remained bi-modal, but recorded some deterioration, which was concentrated mostly in two institutions (Chart 4.5.19).

All in all, Portuguese banks have financed the expansion of lending through a growing recourse to financing in international financial markets which, in turn, implied an increased exposure to changes in financial market sentiment. This type of changes may result in unexpectedly higher financing costs, or even in difficulties in obtaining refinancing in a context of tighter liquidity conditions in the markets. Against this background, it should be noted that the assessment of liquidity included in the stress-testing exercise carried out for the Portuguese banking system was quite positive, in the context of the Financial Stability Assessment Program conducted by the IMF in 2006. The general conclusion from this exercise was that the major Portuguese banking groups have in place the instruments required to deal with extreme market liquidity conditions, namely by keeping interbank credit lines and highly liquid securities. However, in 2006 liquidity indicators of Portuguese banks deteriorated somewhat. It is therefore crucial to continue to monitor the liquidity position of banks and to remain vigilant with regard to the robustness of the internal management and control systems that make it possible for Portuguese banks to be prepared for a marked reduction in liquidity in their financing markets.

Chart 4.5.19

LIQUIDITY GAP CONSIDERING MATURITIES OF UP
TO 1 YEAR OF DOMESTIC INSTITUTIONS
Empirical distribution

Source: Banco de Portugal.
Note: Empirical distribution obtained through recourse to non-parametric methods, namely to a Gaussian kernel that weights institutions by their assets.
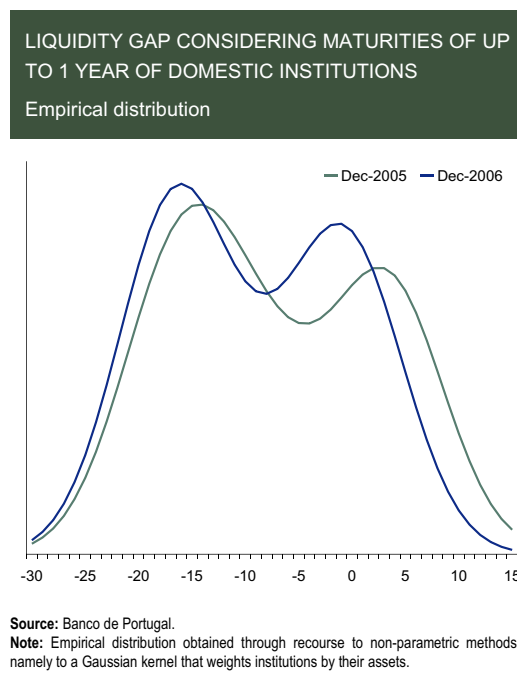
4.6. Credit risk

General developments in the exposure to the non-financial private sector

The exposure of the Portuguese banking system to credit risk is significant and its developments are mainly determined by the financial situation of the resident non-financial private sector. In fact, around two thirds of the total assets of the banking system, on a consolidated basis, correspond to credit to customers, and the share corresponding to residents in Portugal accounts for 87 per cent of total credit.[22]

Such exposure is also highly concentrated. On the one hand, a significant share of credit granted by resident credit institutions is associated with the real estate sector. In fact, around 47 per cent of loans granted by resident credit institutions to the non-financial private sector were loans for house purchase (mostly owner-occupied housing loans). Moreover, loans to non-financial corporations in sectors of construction and real estate services (with similar weights) accounted as a whole for around 18 per cent of total credit at end-2006 (Chart 4.6.1). The weight of the real estate sector – which since the late 1990s has recorded successive increases – stabilised in 2006, reflecting the deceleration in credit to households for house purchase and to companies in the construction sector, and the maintenance of the growth pace of credit to companies in real estate services at a far higher level than that of total non-financial corporations (see "Chapter 3 *Financial Situation of the Non-Financial Private Sector*").

On the other hand, credit to non-financial corporations is highly concentrated in relatively few and large firms. In fact, at end-2006, 80 per cent of credit extended by resident credit institutions to non-financial corporations was granted to companies with total debt over €1 million, which accounted for less than 5

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(22) However, mention should be made to the increasing importance of the exposure to non-resident non-financial sectors in the past two years, as a reflection of activity growth of subsidiaries abroad of several Portuguese banking groups.

Chart 4.6.1

EXPOSURE OF THE BANKING SYSTEM TO THE REAL ESTATE SECTOR
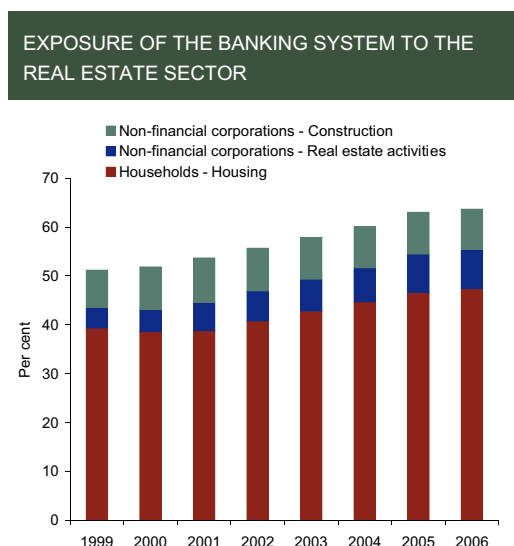
Source: Banco de Portugal.
Note: Loans to non-financial corporations of the construction and real estate sectors and to households for housing as a percentage of total loans granted to the non-financial private sector (adjusted for securitisation operations).

per cent of resident companies that resorted to such credit (Table 4.6.1).[23] Half of that amount (i.e. around 40 per cent of total credit granted to this sector) corresponded to liabilities of around 0.25 per cent of indebted companies towards the banking system. This concentration profile is broadly the same across the five major Portuguese banking groups.

The high concentration of the banking system's credit portfolio in the real estate sector and in large firms may be a risk element. However, several factors contribute to mitigate this risk in the case of the Portuguese economy. In fact, as mentioned above, exposure to the real estate sector mainly corresponds (by nearly three fourths of the total) to loans granted to households for house purchase, mostly owner-occupied housing loans. Such loans, as a rule, are collateralised by real assets, ensuring a high recovery rate in the event of default; moreover, their purpose is to meet a basic need of households, and therefore the probability of default in this segment of the credit market is very low.[24] In addition, available data suggest that, in the case of Portugal, real estate market prices are not overvalued, and therefore no significant corrections in the value of such assets are expected. With regard to the concentration of credit in large firms, the probabilities of default in general are also low.[25] However, although the expected loss of larger firms is much lower than the average, the cumulative effect on total losses may be significant in the event of default in a sufficiently high number of large loans, resulting in far higher unexpected losses than in the case of small and medium enterprises.[26] It should be noted, however, that large Portuguese companies have recorded very positive profitability levels over the past few years. Overall, these companies have taken advantage of the favourable financial environment to consolidate their balance sheets. Therefore, over the next few years, particularly serious finan-

(23) The different figures for 2003 to 2005 included in Tables 4.6.1 and 4.6.3, compared to Table 6.3.1 of the 2005 issue of the *Financial Stability Report*, reflect a change in the sample: in the 2005 Report, only liabilities of non-financial corporations to banks were considered, while in this issue debt refers to liabilities to all resident financial institutions participating in Central de Responsabilidades de Crédito (the Central Credit Register administered by Banco de Portugal).

(24) See "Box 6.1 *Housing prices in Portugal and macroeconomic fundamentals: Evidence of quantil regression*", *Financial Stability Report* 2005, Banco de Portugal.

(25) For more details, see the report entitled "Financial sector assessment programme Portugal: banking system stress-testing exercise" (April 2007), Banco de Portugal *Occasional Papers*, 1/2007.

(26) See Antunes, Ribeiro and Antão "The distribution of losses in credit to non-financial firms" in this Report.

Table 4.6.1

CONCENTRATION INDICATORS OF LOANS TO NON-FINANCIAL CORPORATIONS				
	Dec 2003	Dec 2004	Dec 2005	Dec 2006
Large exposures [a]				
Lower limit [b] (10^3€)	1 102	1 087	1 135	1 175
Weight of the number of borrowers in the total (%)	4.8	4.8	4.8	4.7
Average balance (10^3€)	6 830	6 632	6 905	7 285
of which: **larger exposures** [c]				
Lower limit [d] (10^3€)	21 537	20 064	20 139	22 609
Weight of the number of borrowers in the total (%)	0.21	0.24	0.24	0.23
Average balance (10^3€)	79 152	67 957	67 117	73 814
Retail exposures [e]				
Weight of the number of borrowers in the total (%)	95.2	95.2	95.2	95.3
Average balance (10^3€)	86	84	86	89

Source: Banco de Portugal.
Notes: (a) Exposures that as a whole account for 80 per cent of total credit granted by resident financial institutions to non-financial corporations. **(b)** Lower exposure within the large exposures as a whole, as defined in (a). **(c)** Exposures that as a whole account for 40 per cent of total credit granted by resident financial institutions to non-financial corporations. **(d)** Lower exposure within large exposures as a whole, as defined in (c). **(e)** Exposures below the lower limit of large exposures and that as a whole account for 20 per cent of total credit granted by resident financial institutions to non-financial corporations.

cial distress is not likely to emerge in larger non-financial corporations. Through the analysis of the statistical distribution of losses across the portfolio of loans to non-financial corporations (which takes into account the concentration of credit to firms), it is possible to conclude that, at a high degree of statistical confidence, the levels of capital in the banking system are adequate. This conclusion is valid even in the event of extreme unfavourable shocks to credit quality, characterised namely by a contraction in economic activity and a marked rise in interest rates4.

In 2006 default ratios of the bank loan portfolio granted to the resident non-financial private sector remained at low levels, declining compared with the previous year (Chart 4.6.2). Developments in this ratio for the five major Portuguese banking groups as a whole continued to determine the path of the total

Chart 4.6.2
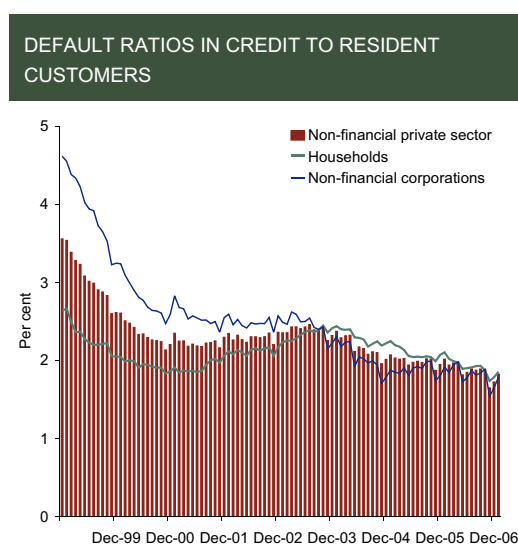
DEFAULT RATIOS IN CREDIT TO RESIDENT CUSTOMERS

Source: Banco de Portugal.
Note: Credit and interest overdue and other non-performing loans as a percentage of total credit to the sector in the banking portfolio.

Chart 4.6.3
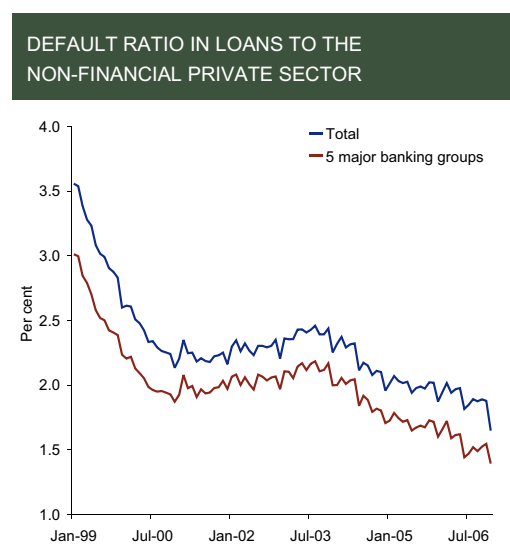
DEFAULT RATIO IN LOANS TO THE NON-FINANCIAL PRIVATE SECTOR

Source: Banco de Portugal.
Note: Credit and interest overdue and other non-performing loans as a percentage of total credit to the sector in the banking portfolio.

ratio (Chart 4.6.3). The smaller credit default ratio of these institutions reflects their larger relative share in the segment of loans for house purchase (in which the default ratio is lower than the total) (Chart 4.6.4).

The decline in the credit default ratio of the non-financial private sector continued to be supported by some adjustment of credit supply to the current ability, of both companies and households, to service debt, in a context where bank interest rates, although following a continued upward trend, remained at relatively subdued levels (Chart 4.6.5). Moreover, the sale by a number of banking groups of a share of credit overdue and other non-performing loans,[27] which involved more significant amounts and covered a wider group of institutions than in previous years, as well as the flow of write-offs of loans over the year (mainly in the loans to households segment) contributed significantly to the decline in the default ratio of the non-financial private sector. In the year as a whole, new credit overdue and other non-performing loans of the non-financial private sector amounted to 0.48 per cent of total credit to the sector (adjusted for securitisations), after 0.42 per cent in 2005, continuing to increase over the first months of 2007 (0.52 per cent in February).

The default profile of households and non-financial corporations was reflected in both a decline in the ratio of default credit to total credit of the banking system as a whole (Chart 4.6.6), to 1.28 per cent at end-2006, compared with 1.51 per cent in the previous year, and a reduction in their impairment and provisioning. Such developments did not affect the provisioning of delinquency situations by specific provisions (already observed or highly probable), which increased marginally to around 80 per cent (compared with 79 and 72 per cent in 2005 and 2004 respectively). In turn, the ratio of default credit, net of provisions for non-performing loans and credit overdue, to total credit, also net of the same provisions, declined slightly, to 0.26 per cent (after 0.32 per cent at end-2005) while dispersion between institutions decreased (Chart 4.6.7).

It should be noted that the current levels of default of credit to the non-financial private sector are particularly low when compared with those at similar stages of previous business cycles. In fact, the mod-

Chart 4.6.4

DISTRIBUTION OF BANK CREDIT TO THE RESIDENT NON-FINANCIAL PRIVATE SECTOR, BY PURPOSE
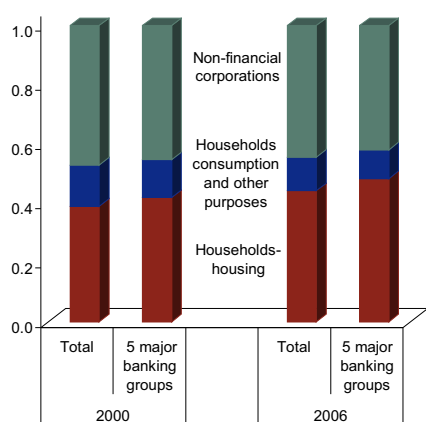
Source: Banco de Portugal.
Note: Outstanding amounts at the end of the period.

Chart 4.6.5

INTEREST RATES ON OUTSTANDING AMOUNTS OF CREDIT TO THE NON-FINANCIAL PRIVATE SECTOR
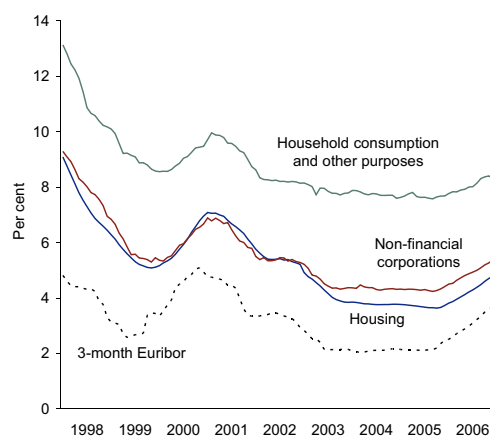
Source: Banco de Portugal.

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(27) Such operations involve loans with very high provisioning levels.

Chart 4.6.6
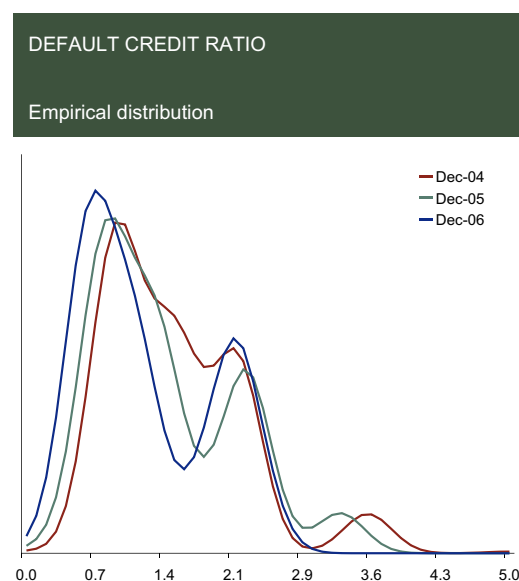
DEFAULT CREDIT RATIO

Empirical distribution

Source: Banco de Portugal.
Note: Empirical distribution obtained through recourse to a Gaussian kernel that weights institutions by their credit. Default credit includes credit overdue for more than 90 days and non-performing loans reclassified as credit overdue for provisioning purposes, pursuant to Notice No 3/95.

Chart 4.6.7
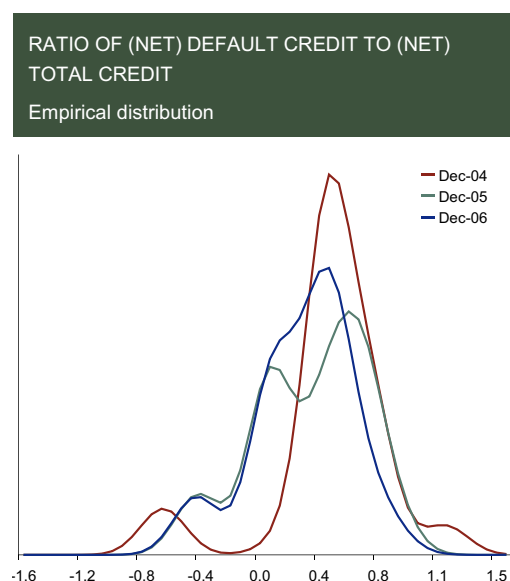
RATIO OF (NET) DEFAULT CREDIT TO (NET) TOTAL CREDIT

Empirical distribution

Source: Banco de Portugal.
Note: Empirical distribution obtained through recourse to a Gaussian kernel that weights institutions by their own capital. The (default) net credit concept is defined by deducting from the respective aggregate provisions for credit overdue and non-performing loans.

elling of default risk situations in the current environment points to less favourable developments in the credit default of households and non-financial corporations than those currently observed.[28] Such developments are generally shared by the other advanced economies and occur in a context where the degree of corporate financial leverage (and also household indebtedness) is higher than in previous business cycles. In Portugal, this aspect is particularly relevant due to the possible impact of the rise in interest rates on the financial costs of non financial corporations and households and, in particular, on the ability to ensure debt service by the more vulnerable segments of these sectors. From this perspective, the credit default ratio may increase somewhat over the next few years, although to a relatively limited extent. This should have a more heterogeneous impact on the non-financial corporate sector, mainly affecting companies operating in sectors of activity more negatively affected by the sector restructuring process of the Portuguese economy (see "Chapter 3 *Financial Situation of the Non-Financial Private Sector*"). In the case of households, the impact will tend to be particularly relevant for younger households and more seriously affected by sudden changes in income, namely as a consequence of transitions to unemployment.

Exposure to and default of the household sector

In 2006 credit granted by resident financial institutions to households continued to grow at a high rate, similarly to the previous year (of around 10 per cent).[29] However, the virtually unchanged growth rate of credit to households reflected mixed developments in both segments of lending, with a deceleration in loans for house purchase and a marked acceleration in loans for consumption and other purposes

(28) For other references in this Report, see Soares, "Modelling of an indicator for credit rating of non-financial corporations – Preliminary research based on discriminant analysis", Bonfim "Determining factors of credit risk: the contribution of corporate features and the macroeconomic environment", and Antunes, Ribeiro and Antão, "The distribution of losses in credit to non-financial firms". See also the report entitled "Financial sector assessment programme Portugal: banking system stress-testing exercise" (April 2007), Banco de Portugal *Occasional Papers*, 1/2007.

(29) Total household debt to resident financial institutions accounted for around 35 per cent of total financial assets of financial institutions at end-2006.

(see "Chapter 3 *Financial Situation of the Non-Financial Private Sector*"). Such developments occurred in a context where the successive rise in interest rates on these operations, observed since end-2005, had an impact on an already significant increase in the financial burden associated with the debt service of this sector. The narrowing of banks' margins in credit operations (mainly in the segment of loans for house purchase) and the supply of credit products adjustable to the current financial ability of households to service debt continued to support the higher indebtedness of this sector and to keep default at subdued levels (Chart 4.6.8).

Overall, developments in total loans to households were broadly based across the five major banking groups, whose market shares, in both segments of loans to this sector, remained virtually unchanged. In the case of loans for house purchase, the share of the five major banking groups has declined somewhat since 2003, with a marginal decrease in 2006, to around 81 per cent of the total (Chart 4.6.9). With regard to loans for consumption and other purposes, their market share reflects a marked downward trend since the end of the 1990s (of 73 per cent), stabilising at around 63 per cent of the total in 2006.

According to the results of the Bank Lending Survey, the competition between banking institutions, which was particularly intense in the segment of loans for house purchase, has led, over the past few years, to the easing of credit standards applied by banks for the approval of loans to households, despite the perception of risks on economic activity in general, the sector's high indebtedness and, more recently, housing market prospects. In the segment of loans for house purchase, less tight supply conditions have translated into the narrowing of interest rate spreads on medium-risk loans, the increase in loan-to value ratios and the lengthening of maturities, aiming at containing the financial burden of households associated with debt service (Chart 4.6.10). Also with regard to loans for consumption and other purposes, the credit standards applied to the approval of loans eased somewhat, mainly in the second half of 2006 (Chart 4.6.11). In this segment, where the ability of consumers to service debt is

Chart 4.6.8

Chart 4.6.9

MARGINS IN CREDIT TO HOUSEHOLDS
Calculated on interest rates of balances at the end of the period

MARKET SHARES IN THE LOANS TO HOUSEHOLDS SEGMENTS

Source: Banco de Portugal.
Note: Margins calculated as the difference between interest rates on balances (estimates, up to December 2002) and money market rates: 6-month moving average of the 6-month EURIBOR, in the case of housing, and 3-month moving average of the 3-month EURIBOR, in credit for other purposes. For the total, the margin corresponds to the average weighted by the end-of-period balances of margins by purpose. In this case, the red bars refer to the last month of the year.
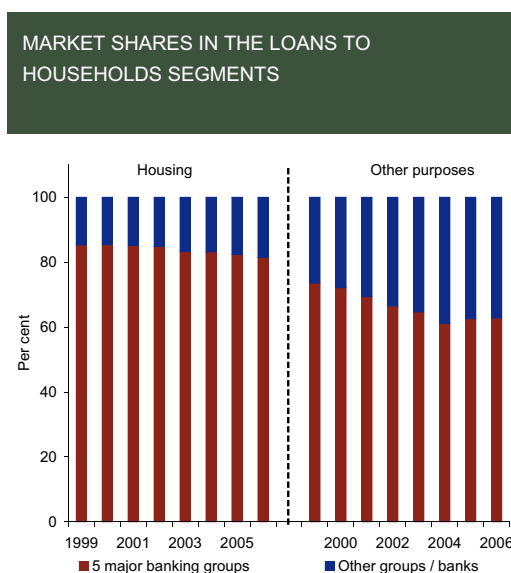
Source: Banco de Portugal.

Chart 4.6.10

BANK LENDING SURVEY

Loans to households - Housing

Source: Banco de Portugal.

Chart 4.6.11

BANK LENDING SURVEY

Loans to households - Consumption and other purposes
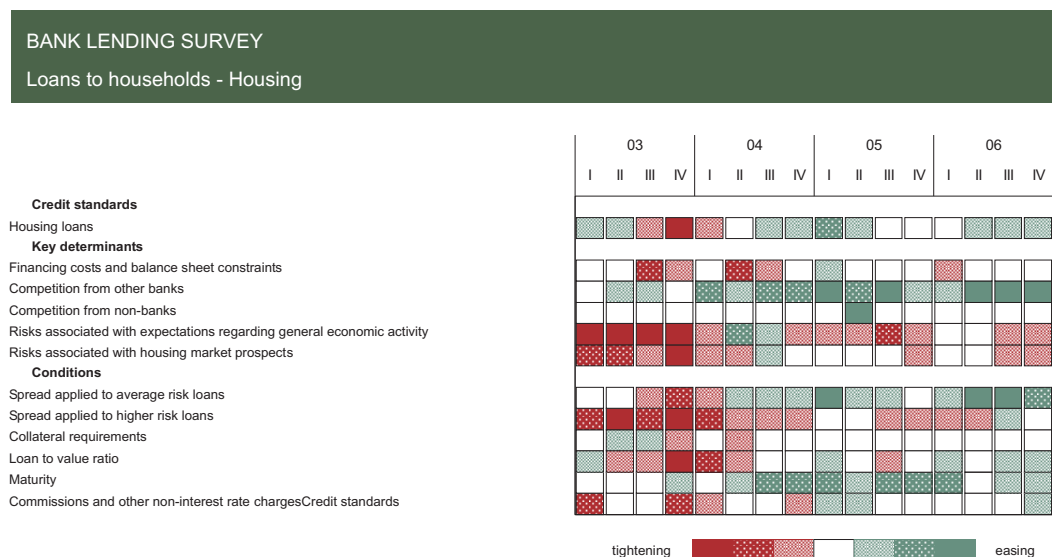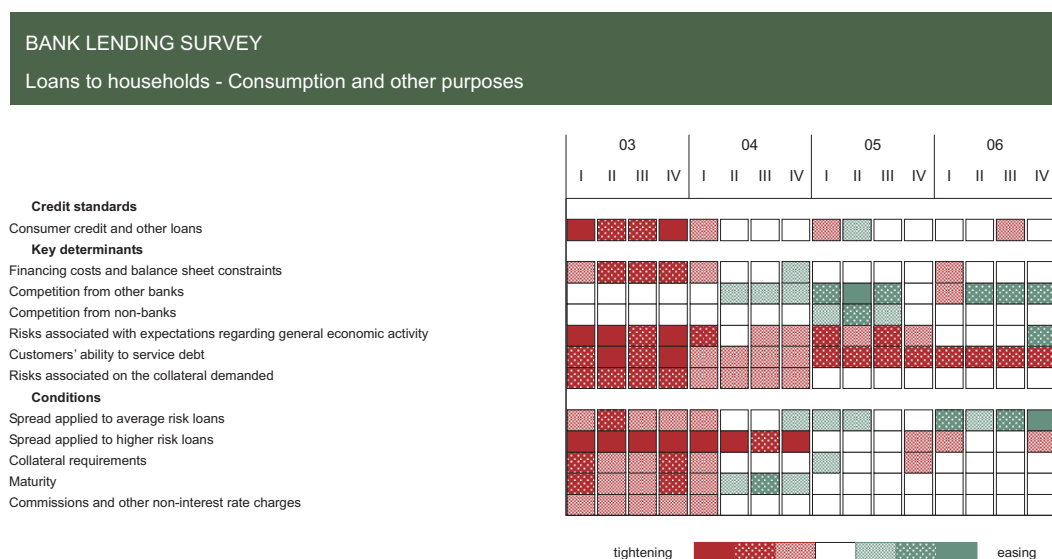
Source: Banco de Portugal.

the risk element considered as the main restrictive factor to the approval of loans, there was a very significant increase in the net flow of loans granted in the course of 2006 (see "Chapter 3 *Financial Situation of the Non-Financial Private Sector*"). Changes in the maturity composition of this segment of credit to households suggest that, also with regard to lending for consumption, the average maturity of loans is increasing, although the lengthening of maturities is not mentioned by the Portuguese banks as a factor behind the easing of the credit standards applied to the approval of these loans.

In 2006 the default ratio of loans to households declined compared with December 2005, accounting for around 1.75 per cent of total credit outstanding at the end of the year (Chart 4.6.12). However, in a context of gradual recovery in economic activity, where the unemployment rate remained at a high level and interest rates increased successively over the year, this reduction reflected both the write-off of loans from assets, higher than in previous years, and the sale of credit overdue to specialised institutions, which was also very significant. In fact, the flow of new credit overdue and other non-performing loans increased considerably in 2006, following the upward trend seen since mid-2005, to a level close to that seen in 2002 and 2003 (Chart 4.6.13).

In the near future, an increase is expected, albeit subdued, in the household debt service burden. This development will reflect the rise in the interest rates on loans to households, which has not been fully passed through to rates on outstanding amounts, the high level of debt contracted by the sector over the past few years and the progressive fading out of the effects of deferral in service debt payments made possible by some types of contract more recently made available by banks (such as grace periods in the early years of loans). Their effects will tend to be particularly significant in the more vulnerable segments of the household sector, namely households with lower financial wealth, lower income and a greater tendency to move into unemployment or into jobs with lower salary.

Chart 4.6.12
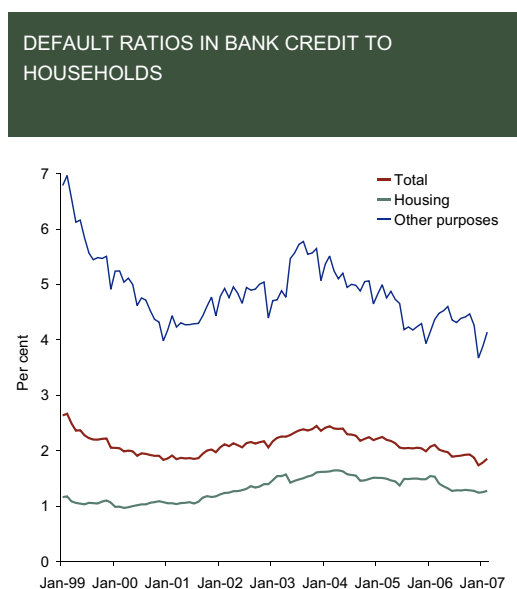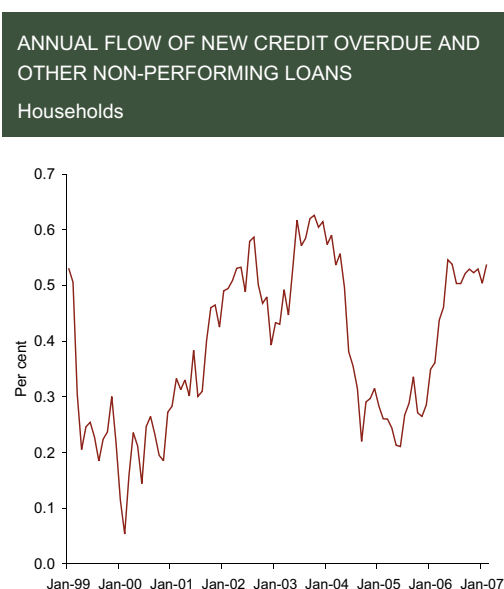
DEFAULT RATIOS IN BANK CREDIT TO HOUSEHOLDS

Source: Banco de Portugal.

Chart 4.6.13

ANNUAL FLOW OF NEW CREDIT OVERDUE AND OTHER NON-PERFORMING LOANS
Households

Source: Banco de Portugal.
Note: Estimate of the annual flow of new credit overdue and other non-performing loans (adjusted for write-offs and sale estimates for credit overdue and other non-performing loans other than write-offs) as a percentage of bank loans (adjusted for securitisation).

According to the stress-testing exercise conducted in the framework of the Financial Sector Assessment Program for Portugal (FSAP, on the initiative of the International Monetary Fund),[30] an increase in the probability of default of Portuguese households will tend to be particularly marked in the event of significant rises in interest rates in a context of weak economic activity, due to the effect of rising interest rates on debt servicing charges. Nevertheless, the extent of losses in the banking system does not seem to be very significant, due to the high share of loans for house purchase in total loans to households. On the one hand, the probability of default in this type of credit is low, reflecting the great importance of housing in the hierarchy of household needs. On the other hand, loans for house purchase are usually associated with real collateral whose value exceeds the total amount of the loan, which guarantees a high recovery rate in the event of default. In this sense, loan-to-value ratios associated with loans approved in recent years seem to have increased on average.[31] However, evidence suggests that there are no excessive valuations of real estate asset prices that may lead to negative corrections in the value of these assets in Portugal. In fact, over the past few years the change in housing prices has been relatively subdued, and therefore no substantial changes in these prices are expected (Chart 4.6.14).

Chart 4.6.14

DEVELOPMENTS IN HOUSING PRICES AND IN THE
AVERAGE VALUE OF CONTRACTED LOANS
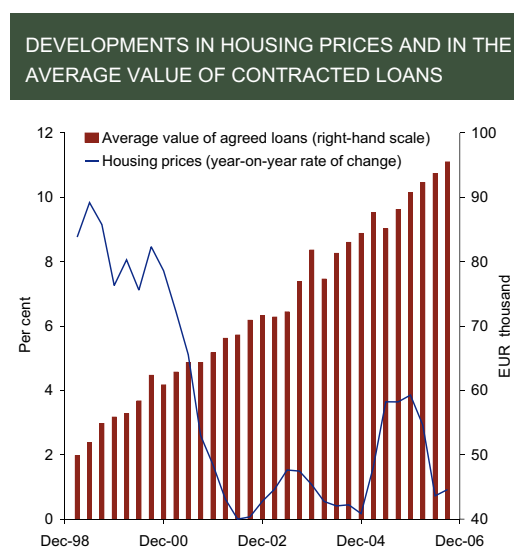
Sources: Directorate-General of the Treasury and Índice Confidencial Imobiliário.

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(30) For more details on the scenarios analysed in this exercise, see "Box 4.1 *Results of the Portuguese banking system stress-testing exercise*" and also the report "Financial sector assessment programme Portugal: banking system stress-testing exercise" (April 2007), Banco de Portugal *Occasional Papers*, 1/2007.
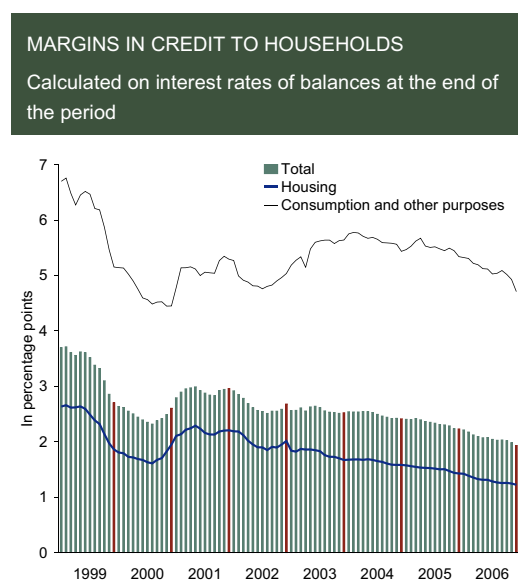
(31) On the one hand, in their responses to the euro area bank lending survey, the Portuguese banks have indicated an increase in loan-to-value ratios; on the other hand, the average value of new housing loan contracts, has consecutively increased in a context of moderate growth of housing prices. However, the latter factor seems to be also reflecting higher values of the houses purchased in the past few years, which are likely to be associated with a better quality of housing.

Exposure to and default of the non-financial corporate sector

Credit granted by resident financial institutions to non-financial corporations accelerated in 2006, with the annual rate of change of total loans increasing to around 6 per cent, being higher in the case of loans to large companies.[32] However, total debt grew slightly less than in the previous year, reflecting the replacement of commercial paper with bank loans (see "Chapter 3 *Financial Situation of the Non-Financial Private Sector*").

In 2006 developments in credit granted by the five major banking groups to non-financial corporations were, as a whole, similar to those seen in the total banking system, and their market share remained virtually unchanged (Chart 4.6.15). It should be noted that the participation of the five major banking groups in this credit market segment has declined consecutively since 2001.

According to the Portuguese banks participating in the Bank Lending Survey, behind developments in loans granted to non-financial corporations in 2006 were mainly two sets of factors that distinctively affected companies. The first is associated with sound financial situations, particularly in companies with higher technological content operating in the services sector and in some manufacturing industries, more competitive in terms of exports. The increased borrowing of these companies are partly related to the intensification of merger and acquisition activity in 2006, similarly to other European countries (see "Chapter 2 *Macroeconomic and Financial Risks*"). This path was mainly shown by large companies with high profitability. In parallel, companies with significant bargaining power with banks, due both to their size and their financial soundness, continued to consolidate their financial liabilities, renegotiating lending conditions with the aim of reducing their average costs, in a context of expected additional rises in interest rates.[33] Therefore, short-term debt (some taking the form of commercial paper) was replaced with loans with longer maturities. In parallel, the net flow of loans granted to companies with financial fragilities seems to have also increased. In this case, it led to the restructuring of credit overdue

Chart 4.6.15

MARKET SHARES IN THE LOANS TO NON-FINANCIAL CORPORATIONS SEGMENT
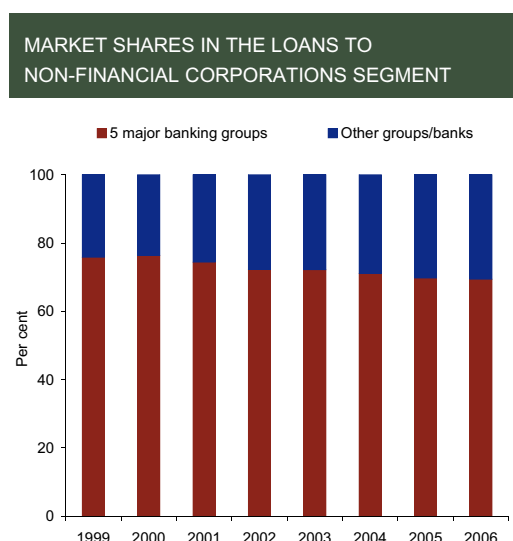
Source: Banco de Portugal.

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(32) At end-2006, direct exposure of the resident financial system to the non-financial corporate sector amounted to around 85 per cent of GDP, accounting for approximately 25 per cent of the financial assets of resident financial institutions.

(33) In Portugal, a significant share of the financial debt of companies has a variable rate and, therefore, is significantly exposed to interest rate risk.

or with high probability of default, and typically had an impact on smaller companies and on the sub-sectors more negatively affected by the sectoral restructuring processes of the Portuguese economy.

Such developments were observed in a context where credit supply conditions to non-financial corporations eased somewhat, mainly with regard to the interest rate spreads applied to average-risk loans and commissions and other costs not related to interest rates (Chart 4.6.16). However, in the case of riskier loans, conditions became tighter, mainly regarding spreads. Overall, in 2006 banks' margins narrowed in this credit market segment (see "Chapter 3 *Financial Situations of the Non-Financial Private Sector*"), partly reflecting the stepping-up of competition among banks.

In 2006 loans to companies operating in the "real estate services" and "other services provided mainly to companies" sectors (the latter includes holding companies) continued to grow at a higher pace than total lending to non-financial corporations (Table 4.6.2). By contrast, loans to the construction sector slowed down markedly. Similarly to the past few years, bank loans granted to manufacturing companies had a negative change, thus their share in total loans to non-financial corporations continued to decline (Chart 4.6.17).

The debt restructuring process involving companies with greater difficulties in ensuring debt service helped contain both the credit default ratio of this sector, which narrowed slightly compared with end-2005, and the amount of new credit overdue and non-performing loans, which was also lower in 2006 than in the previous year (Charts 4.6.18 and 4.6.19).

According to *Central de Responsabilidades de Crédito* data, the share of credit and interest overdue in total loans granted by resident financial institutions to non-financial corporations decreased to around 1.5 per cent (Table 4.6.3).[34] However, the relative share of total outstanding amounts of defaulters in the total loans granted to this sector did not change significantly, accounting for around 8 per cent at the end of the year. Lower default rates, as a percentage of total loans, were recorded for large expo-

Chart 4.6.16
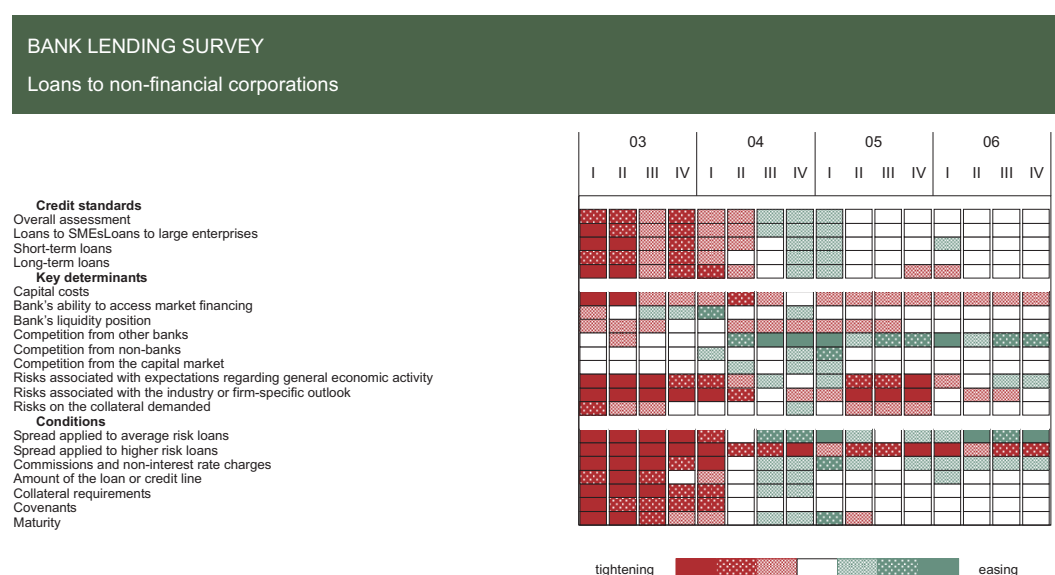
Source: Banco de Portugal.

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(34) See note 2 in this section regarding differences in values for 2003 and 2005 included in Table 4.6.3 (and also in Table 4.6.1, although less clearly), compared with Table 6.3.1 of the 2005 issue of the *Financial Stability Report*.

Table 4.6.2

LOANS GRANTED BY OTHER MONETARY FINANCIAL INSTITUTIONS TO NON-FINANCIAL CORPORATIONS Sectoral breakdown Annual rate of change at the end of the period (a)					
	2003	**2004**	**2005**	**2006**	**Weight in total loans – December 05**
Total loans to non-financial corporations	1.8	1.5	4.6	5.6	100.0
By sector of activity: (b)					
Agriculture, livestock, hunting, forestry and fishing	7.0	2.4	3.9	7.3	1.5
Mining	14.4	-8.0	0.2	-8.1	0.5
Manufacturing	-1.3	-5.7	-3.7	-1.9	14.0
Electricity, gas and water production and supply	4.5	-2.3	38.0	-11.7	2.5
Construction	3.1	4.9	10.3	3.9	20.1
Services	2.0	2.5	3.9	8.6	61.4
of which:					
Real estate activities	11.2	13.6	11.8	11.4	18.3
Other services provided mainly to corporations	-6.4	-2.0	6.5	13.7	13.4
Trade, hotels and restaurants	3.5	0.7	2.4	4.8	18.5
Transportation, posts and telecommunications	3.4	-4.8	-10.7	-0.2	5.8

Source: Banco de Portugal.
Notes: (a) Annual rates of change are calculated on the basis of the relation between end-of-period balances on bank loans and transactions, which are calculated from outstanding amounts adjusted for reclassification. **(b)** The allocation of loans by sector of activity is calculated on the basis of the structure of Central de Responsabilidades de Crédito.

Chart 4.6.17

LOANS TO NON-FINANCIAL CORPORATIONS By branch of activity As a percentage of GDP
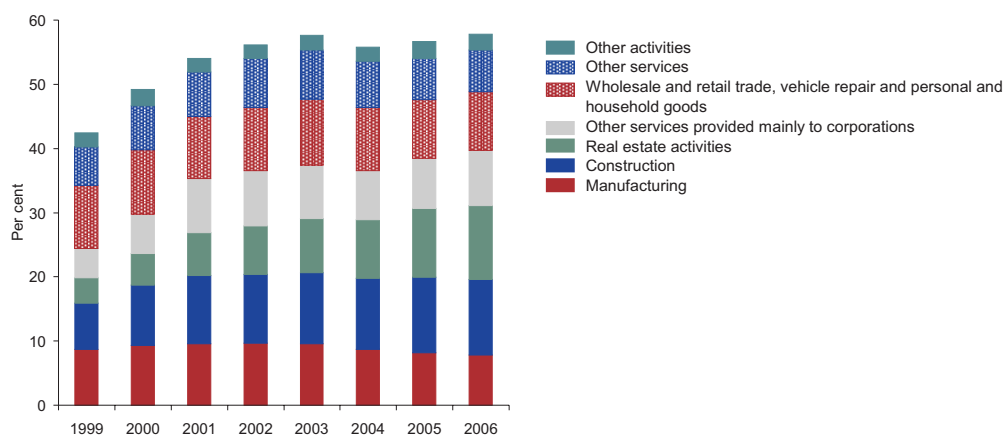
Source: Banco de Portugal.

Chart 4.6.18

DEFAULT RATIOS OF LOANS TO NON-FINANCIAL CORPORATIONS

— Credit overdue and other non-performing loans /
  Loans adjusted for securitisation
— Annual write-offs / Credit overdue and other non-
  performing loans (right-hand scale)
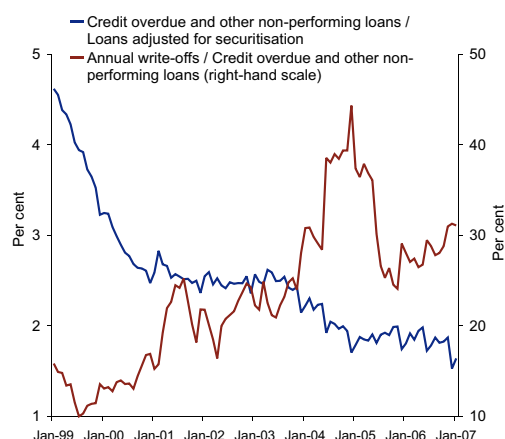
Source: Banco de Portugal.

Chart 4.6.19

ANNUAL FLOW OF NEW CREDIT OVERDUE AND OTHER NON-PERFORMING LOANS

Non-financial corporations
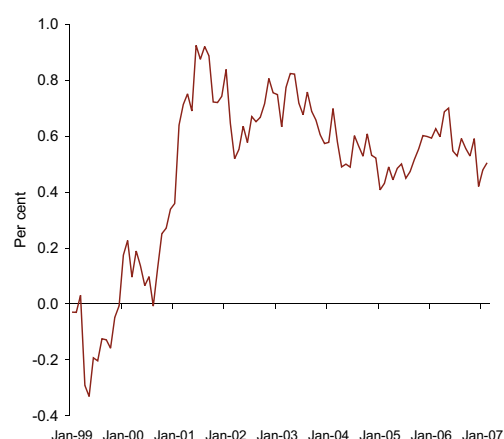
Source: Banco de Portugal.
Note: Estimate of the annual flow of new credit overdue and other non-performing loans (adjusted for write-offs and sale estimates for credit overdue and other non-performing loans other than write-offs) as a percentage of bank loans (adjusted for securitisation).

sures and retail exposures. In the case of large exposures (which as a whole account for 80 per cent of total loans granted by resident financial institutions to resident non-financial corporations), credit default accounted for around 0.8 per cent of total loans at the end-2006, reflecting a slight decline from the previous year. In turn, the total outstanding amount of loans of failed companies accounted for

Table 4.6.3

DEFAULT INDICATORS OF CREDIT GRANTED TO NON-FINANCIAL CORPORATIONS, BROKEN DOWN BY SIZE OF EXPOSURE

Per cent

	Dec 2003	Dec 2004	Dec 2005	Oct 2006
Total exposure				
Number of defaulters [a]	11.7	11.2	11.5	11.3
Credit and interest overdue [b]	2.2	2.0	1.8	1.5
Total balance of defaulters [b]	10.0	7.8	8.0	8.1
Large exposures [c]				
Number of defaulters [d]	10.7	9.0	8.4	9.1
Credit and interest overdue [e]	1.3	1.1	1.0	0.8
Total balance of defaulters [e]	9.3	7.0	7.2	7.3
Retail exposures [c]				
Number of defaulters [d]	11.7	11.4	11.7	11.4
Credit and interest overdue [e]	5.8	5.3	5.1	4.4
Total balance of defaulters [e]	12.7	11.4	11.1	11.1

Source: Banco de Portugal.
Notes: **(a)** As a percentage of the number of non-financial corporations indebted to resident financial institutions. **(b)** As a percentage of total credit granted by resident financial institutions to non-financial corporations. **(c)** Exposures that as a whole account for 80 per cent of total credit granted by resident financial institutions to non-financial corporations. The remaining exposures (accounting for 20 percent of the total) correspond to retail exposures. **(d)** As a percentage of the total number of debtors in this portfolio. **(e)** As a percentage of total credit in this portfolio.

slightly more than 7 per cent of total loans in this portfolio, increasing marginally since the end of 2004. With regard to retail exposures, credit default declined more markedly, accounting for nearly 4.5 per cent of total loans in this segment in December 2006. Also with regard to retail portfolio, total outstanding amounts of loans of defaulters have not recorded significant changes since the end of 2004.

In 2006 the contribution of the construction sector to the total credit default ratio of non-financial corporations increased (Chart 4.6.20). In this sector, where small and medium-sized companies have a significant weight, the number of companies facing difficulties in debt servicing seems to be increasing, due to unfavourable developments shown by investment in construction over the past few years. This situation was reflected in a slight rise in the default ratio of construction companies, to around 2 per cent, contrary to what has been observed in most other sectors whose ratio decreased.

According to the results of the stress-testing exercise conducted in the context of FSAP,[35] expected losses associated with the default of non-financial corporations in the case of economic recession may be significant. Such losses shall be more substantial in the case of an economic recession with a marked rise in interest rates. However, the estimated impact does not jeopardise the maintenance of capital adequacy above the minimum regulatory levels.

International exposure of the domestic banking system

In 2006, claims of domestic banking groups on non-residents increased by around 21 per cent, accounting for nearly 30 per cent of total assets at the end of the year (Table 4.6.4). Such developments resulted from increases in both international assets and local assets denominated in local currency,[36] which contributed by 17.5 and 3.5 percentage points respectively, to the total change. Special mention should be made to the increases in assets and liabilities denominated in local currency over the past few years, which seem to be reflecting the dynamics of the local activity of subsidiaries abroad of a

Chart 4.6.20

DEFAULT RATIO OF NON-FINANCIAL CORPORATIONS
By branch of activity
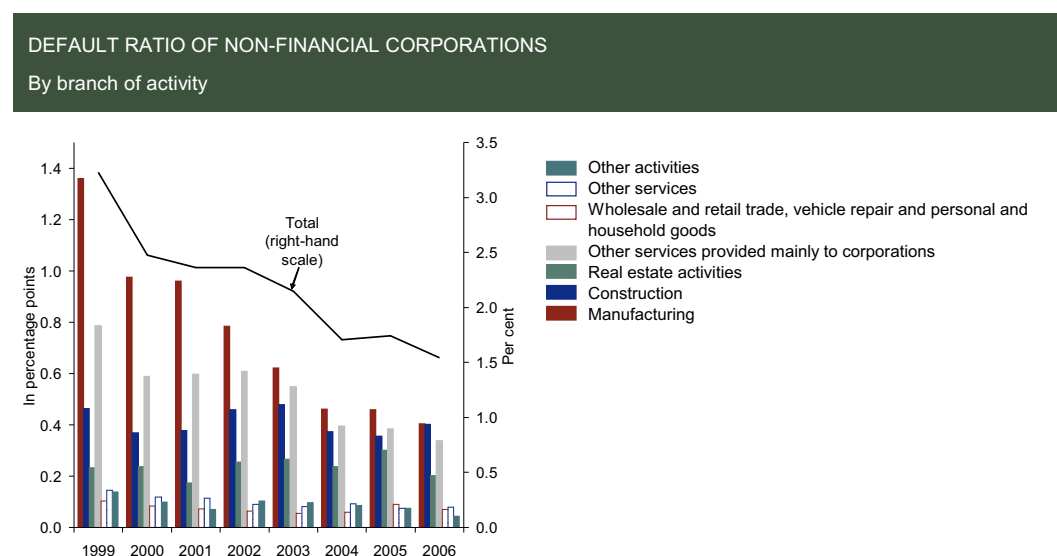
Source: Banco de Portugal.

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(35) See, Antunes, Ribeiro and Antão, "The distribution of losses in credit to non-financial firms" in this Report, and also the report entitled "Financial sector assessment programme Portugal: banking system stress-testing exercise" (April 2007), Banco de Portugal *Occasional Papers*, 1/2007.

(36) For more details, see "Box 5.3 *International exposure of the banking system*" in the 2004 issue of the *Financial Stability Report*.

number of Portuguese banking groups. However, their weight, in terms of the total consolidated assets of the domestic banking system, continues to be negligible and much lower than in other European countries.

In 2006 the risk profile of the international exposure of the domestic banking system remained virtually unchanged, as external assets continued to be concentrated in a relatively small number of countries or territories, mostly classified as developed and with high sovereign rating.

Table 4.6.4

CONSOLIDATED FOREIGN CLAIMS FROM THE PERSPECTIVE OF IMMEDIATE RISK Structure		
	2005	**2006**
Total (10⁶ €)	**77 253**	**93 791**
International claims	**76.7**	**77.8**
Maturity		
up to 1 year	44.5	45.3
from 1 to 2 years	3.1	2.7
more than 2 years	21.1	22.7
Other	8.0	7.0
Institutional borrower		
Banks	46.1	46.7
Public sector	3.5	3.3
Non-banking private sector	27.1	27.7
Other	0.0	0.0
Geographical borrower		
Developed countries	55.5	55.6
Offshore centres	10.8	10.5
Developing Europe	3.3	4.0
Other	7.2	7.6
By type of sovereign rating		
AAA and AA+	57.5	55.6
AA to A	7.4	9.3
A- to BB+	5.1	5.4
Other	6.7	7.5
Local claims in local currency	**23.3**	**22.2**
By geographical counterpart		
Developed countries	15.2	15.6
Offshore centres	0.6	0.5
Developing Europe	5.0	4.0
Other	2.5	2.1
By type of sovereign rating		
AAA and AA+	12.5	12.7
AA to A	3.3	3.4
A- to BB+	5.0	3.8
Other	2.5	2.3
Memo:		
Local claims in local currency (10⁶ €)	16 896	18 379

Source: Banco de Portugal.

Box 4.1. Results of the Portuguese banking system stress-testing exercise[1]

In 2006 the International Monetary Fund (IMF) carried out a Financial Stability Assessment Program (FSAP)[2] of the Portuguese financial system. One of the core elements for the implementation of the FSAP was the conduct of stress tests to the institutions that compose the financial system, namely banks and insurance corporations. The assessment of financial stability implies the identification of risks but its main focus is on the quantification of the risks and vulnerabilities to which the institutions/groups that compose the financial system are exposed. Therefore, a FSAP is based on the analysis made by the supervisory authorities in the identification and quantification of the impact of potential macroeconomic and/or institutional shocks on the robustness and stability of financial systems. In this context, Banco de Portugal conducted in 2006 a stress-testing exercise of Portuguese banks based on two different approaches. The first, the so-called top-down approach, is based on a consolidated overview of the banking system. The second, the bottom-up approach, aggregates the results calculated at individual banking group level.

The exercise enabled the assessment of the evolution of the financial situation of Portuguese banks under three macroeconomic scenarios for the Portuguese economy. These scenarios consist in projections of macroeconomic (and financial) variables for a period of three years and are based on the model developed by Banco de Portugal usually utilised for macroeconomic projection exercises. The projections in this box incorporate data available in December 2005.[3] The baseline scenario foresees a moderate recovery of the macroeconomic conditions throughout the projection exercise, including an acceleration of economic activity in a context of slightly rising interest rates (Table 1). Taking this scenario as a starting point, two stress scenarios have been developed. The first, the so-called disruptive adjustment scenario, assumes an abrupt adjustment of the global macroeconomic imbalances in early 2006. This adjustment is characterised by a sharp deceleration in US economic activity. This deceleration translates into lower global growth, implying a recession in the Portuguese economy. In this scenario, there is also a fall in short-term interest rates and a significant deterioration of financial markets in 2006. The second stress scenario, the so-called cyclical asynchrony scenario, involves an unexpected increase in productivity in the major euro area economies, which prompts higher domestic demand and imports in the euro area. However, the acceleration of activity in the euro area does not spill over into Portuguese economic activity, as projections assumed a significant loss in Portuguese export market shares compared with the baseline scenario. In a context of accelerating economic activity and inflationary pressures resulting inter alia from an increase in oil prices, the response function of the monetary authority incorporated in the model results in a rise in short-term interest rates. With the aim of achieving the fiscal targets for 2006 and 2007 set out in the Stability Programme additional fiscal consolidation measures have been included in the scenarios.

Table 1

SUMMARY OF MACROECONOMIC SCENARIOS										
		Baseline scenario			Disruptive adjustment scenario			Cyclical asynchrony scenario		
	2005	2006	2007	2008	2006	2007	2008	2006	2007	2008
GDP(a)	0.3	0.8	1.0	1.3	-1.0	-0.7	-0.1	-0.2	-0.6	-0.2
Inflation	2.3	2.6	2.2	2.2	2.7	2.4	1.4	3.2	3.6	2.8
3-month interest rate	2.2	2.2	2.3	2.4	1.0	0.8	0.9	3.6	4.2	4.9
10-year interest rate	3.5	3.7	3.8	3.8	3.4	3.3	3.3	4.2	4.5	4.8
USD/euro exchange rate(b)	0	-5.4	0	0	18.3	0	0	-5.4	0	0
Stock prices	-	0	0	0	-30	0	0	0	0	0

Notes: In percentage points. **(a)** Average rate of change. **(b)** A positive value corresponds to an appreciation of the euro.

(1) *For a more detailed description of the implementation and results of the stress test exercise, see Banco de Portugal (2007) "Financial Sector Assessment Programme Portugal: Banking System Stress-Testing", Occasional Paper 1/2007.*

(2) *For the final reports on the Financial Stability Assessment Programme carried out by the IMF in Portugal, see http://www.imf.org/external/country/PRT/index.htm.*

(3) *In the course of 2006 and in the beginning of 2007 Banco de Portugal published updated versions of its projections for the Portuguese economy in successive issues of the Economic Bulletin.*

Another fundamental element for the carrying out of the stress-testing exercise consisted in the projection of default probabilities for the several segments of the credit portfolio in each macroeconomic scenario (Table 2). As expected, default probabilities increase in both stress scenarios, compared with the baseline scenario. The rise in default probabilities is more significant in the cyclical asynchrony scenario, chiefly due to the rise in interest rates.

As referred to above, the exercise was based on two approaches. The first, which has been done by Banco de Portugal since 2002, is a top-down exercise, allowing the study of the impact of each scenario on the consolidated accounts of a group of institutions representative of the banking system. The second approach, the so-called bottom-up exercise, relies on the participation of the major six Portuguese banking groups (accounting approximately for 80 per cent of the total assets of the banking system in December 2004). Each banking group analysed the impact of these scenarios on its consolidated accounts. In both approaches, the exercise consisted in a projection of consolidated accounts as well as in a simulation of capital adequacy throughout the three-year period of the scenarios. Two large risk classes have been considered: credit risk and market risk. With regard to credit risk, account was taken not only of estimated default but also of the growth of each credit market segment. The market risk approach took into account changes in stock prices, interest rates and exchange rates. Developments in the coverage of bank employees' pension liabilities were also included in the exercise, given that the risk factors underlying each scenario might lead to the need of extraordinary contributions by banks to bank employees' pension funds and/or to unfavourable differences in capital accounts.

Results of the top-down approach

The results of the top-down exercise, which assessed the impact of fully-fledged macroeconomic scenarios on the consolidated accounts of the banking system, suggest that the banking system is resilient to very unfavourable, but still plausible, macroeconomic scenarios (Chart 1). The impact of credit risk is more significant in the cyclical asynchrony scenario, reflecting, in part, the increase in the debt burden of the private sector, in a context of rising interest rates and economic recession. In turn, in the disruptive adjustment scenario, the main risk factor is associated with a strong and broadly based fall in equity prices. This reduction of stock prices affects banks directly, through their own securities portfolio and chiefly through the valuation of the portfolio of bank employees' pension funds.

The profitability of Portuguese banks is strongly affected in the disruptive adjustment scenario, due to a drop in operating income, induced by the fall in interest rates and further aggravated by the decline in financial operations results arising from disturbances in stock markets. In the cyclical asynchrony scenario, profitability also declines in 2006 but to a lesser extent. However, it should be noted that banks' profitability remains positive in the period under review.

Turning to solvency, results are very different in each scenario. The disruptive adjustment scenario has a negative impact, chiefly due to the fall in stock prices. By contrast, the overall capital adequacy ratio improves in the cyclical asynchrony scenario, as a result of a deceleration in the growth of credit, implying a reduction in own funds requirements.

Table 2

DEFAULT PROBABILITIES						
Percentage changes against the baseline scenario figures						
	Disruptive adjustment scenario			Cyclical asynchrony scenario		
	2006	2007	2008	2006	2007	2008
Credit						
Non-financial corporations	29	65	111	20	71	139
Households – housing	1	11	19	45	80	119
Households – consumption and other purposes	4	19	30	57	106	158
Other	13	35	58	37	82	136

Chart 1

FINANCIAL VARIABLES OF THE BANKING SYSTEM AGGREGATE

NET INTEREST INCOME

As a percentage of average total assets
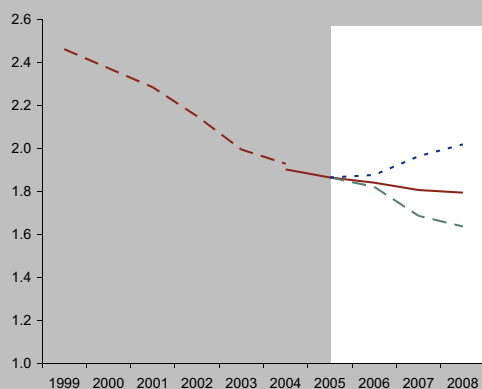
RETURN ON ASSETS

As a percentage of average total assets
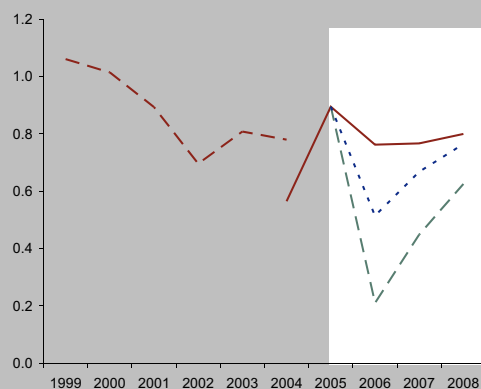
OVERALL CAPITAL ADEQUACY RATIO

Percentage points
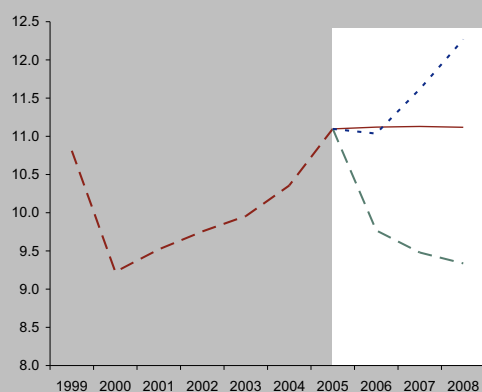
OVERDUE LOANS

As a percentage of total loans
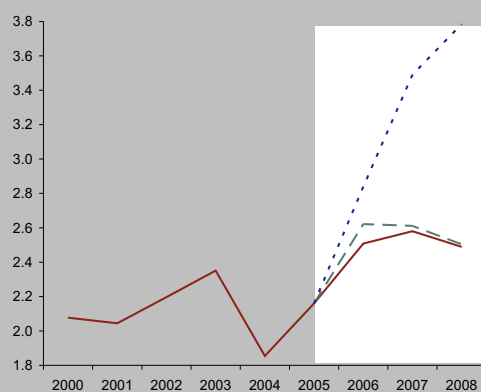
ANNUAL NET IMPAIRMENT CHARGE-OFF/
PROVISIONING

As a percentage of total loans
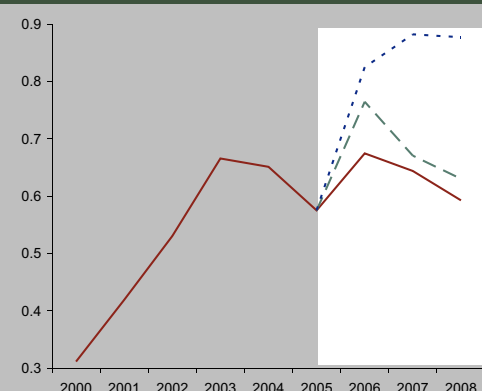
SPECIFIC PROVISIONS FOR CREDIT

As a percentage of overdue loans

Old accounting system
Baseline scenario
Disruptive adjustment scenario
Cyclical asynchrony scenario

Notes: Annual growth rates. There is a break in the statistical series in 2004, due to the adoption in 2005 of the International Accounting Standards.

Table 3

CUMULATIVE IMPACT ON THE CAPITAL ADEQUACY RATIO
In percentage points of the ratio in December 2005

Macroeconomic scenarios	TOTAL	of which:					
		Expected loss	Credit growth	Stock prices	Interest rates	Exchange rate	Pension funds
Baseline scenario	-0.05	0.04	-0.05	0.00	-0.02	0.02	-0.04
Disruptive adjustment scenario	-1.30	-0.25	-0.05	-0.22	0.03	-0.04	-0.77
Cyclical asynchrony scenario	-0.58	-0.43	0.00	0.00	-0.10	0.02	-0.06

Note: Average value of the impact on the ratio of each institution weighted by own funds requirements.

Results of the bottom-up approach

The results of the bottom-up exercise suggest that Portuguese banks are able to absorb several severe macroeconomic and financial shocks, which albeit plausible are unlikely to occur. The estimated impact of shocks was measured against the level of the overall capital adequacy ratio as of December 2005. Table 3 shows the cumulative impact of the shocks underlying each scenario, as well as their breakdown into the several risk factors. The disruptive adjustment scenario has a significant impact on the capital adequacy ratio, due to the sharp decline in stock prices. The strong fall in equity prices affects developments in the capital ratio in two different ways: in the valuation of the portfolio of financial investments of banks and, chiefly in the valuation of the portfolio of bank employees' pension funds (the impact through the own portfolio corresponds to one third of the impact through pension funds). In fact, as the portfolios of pension funds are particularly exposed to this risk factor, a sharp drop in stock prices gives rise to significant contributions by banks to cover the pension funds of their employees. In turn, credit risk is the most relevant factor in the cyclical asynchrony scenario, due to the unfavourable macroeconomic environment and chiefly to the rise in interest rates and the subsequent increase in the default probabilities of the credit portfolio.

Taking the consolidated accounts of the banking groups, a projection was made of the capital adequacy ratio for the period from 2006 to 2008 in each macroeconomic scenario (Chart 2). Conversely to the above analysis, these estimates incorporate the retained earnings of the business activity of banks. On average, the capital adequacy ratio increases in the cyclical asynchrony scenario. This is due to the effect of interest rate increases on the net interest income, which is higher than the rise in default probabilities. By contrast, the capital adequacy ratio decreases in the disruptive adjustment scenario, due to the impact of the significant drop in stock prices in the portfolio of banks and pension funds. However, and despite some dispersion, the capital adequacy ratio of all banking groups is higher than 9 per cent in all scenarios and over the simulation horizon.

In addition, the bottom-up exercise includes a sensitivity analysis, which consists in assessing the impact that shocks on each risk factor would have on the financial situation of banks and on the degree of coverage of the liabilities of bank employees' pension funds, holding all other factors constant. This analysis has only considered shocks coming from financial markets. The magnitude of the shocks was calibrated on the basis of historical data on the relevant variables (interest rates, stock indices, exchange rates and respective historical volatilities), corresponding to the larger changes observed in the sample period. Thus, despite being plausible, they are associated with extreme but unlikely events (Table 4).

The sensitivity analysis was made separately for banks and pension funds, and the impact of shocks was measured through different indicators. Thus, it was not possible to consolidate the impact of shocks through pension funds on the banking groups accounts. However, it is possible to infer that the results of the sensitivity analysis confirm the conclusion drawn from the above analysis, i.e. the stronger impact on the situation of banks and pension funds results from changes in stock prices (Table 5). It should also be noted that pension funds are also affected by parallel shifts in the yield curve, mirrored in the actuarial discount rate of future liabilities.

Chart 2

PROJECTED DEVELOPMENTS IN THE CAPITAL ADEQUACY RATIO
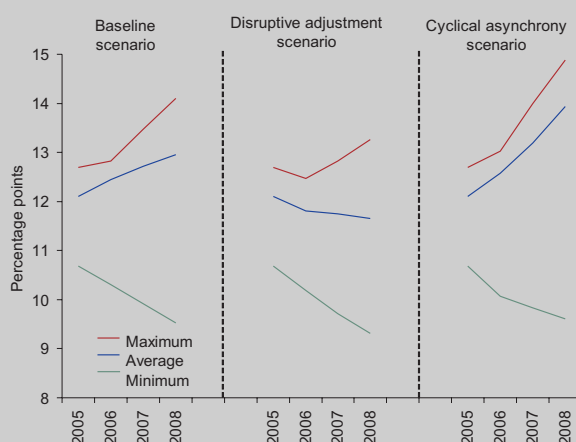
Note: The average value is calculated by weighting the ratio of each institution by the respective own funds requirements. The maximum (minimum) value is calculated per year and does not reflect the evolution of only one institution over time.

The stress test has also included a qualitative assessment of liquidity risk. All institutions taking part in the exercise reported that they have in place the required means to deal with potential financial market liquidity constraints. Such means include keeping interbank credit lines and highly liquid assets (including securities). All institutions recognised that a downgrade of the Portuguese Republic rating would impact on their financing costs. However, this does not seem to be the main problem. Most banks highlighted a potential change in market sentiment that might bring about a reduction in market liquidity as the most stressful situation.

In sum, the results of the stress tests conducted by Banco de Portugal enabled the IMF to conclude that the Portuguese banking system has a high level of resilience, meaning that the level of own funds is adequate to absorb extreme, but plausible, shocks. The factors that have been identified as having higher potential impact were the risk associated with the stock market, through the portfolios of bank employees' pension funds and, to a lesser extent, credit risk.

Table 4

MAGNITUDE OF SHOCKS IMPLIED IN THE SENSITIVITY ANALYSIS

Risk factor	Nature of the shock	Magnitude of the shock
Interest rate risk	Combined movement of short and long-term interest rates[a]	+100 pb; + 50 bp -100 pb; - 50 bp +200 pb; + 100 bp -200 pb; - 100 bp
	Change in the slope of the yield curve	+50 pb -50 pb
Exchange rate risk	Change in the euro exchange rate against other currencies	15% -15%
Capital market risk	Change in the valuation of stock prices	30% -30%
Volatility risk	Change in implied volatility	30% -30%

Note: (a) For pension funds, this risk factor also takes into account changes in the actuarial discount of +25 b.p.; -25b.p.; +50 b.p. and -50b.p. respectively.

Table 5

RESULTS OF THE SENSITIVITY ANALYSIS			
		Banks measured in percentage points of the capital adequacy ratio in December 2005	**Pension funds** measured by the difference between the funds' assets and liabilities, as a percentage of total liabilities
Combined (short and long-term) interest rate movement and actuarial discount rate	+100 bp; + 50 bp; +25 bp	-0.04	3.16
	-100 bp; - 50 bp; -25bp	0.03	-3.41
	+200 bp; + 100 bp; +50bp	-0.08	6.33
	-200 bp; - 100 bp; -50 bp	0.06	-6.94
Slope of the yield curve	+50 bp	-0.01	-0.45
	-50 bp	0.02	0.40
Exchange rate risk	15%	0.02	0.55
	-15%	-0.03	-0.55
Capital market risk	30%	0.24	9.34
	-30%	-0.25	-9.34
Volatility risk	30%	0.00	-0.08
	-30%	0.00	0.09

Box 4.2. The adoption of Basel II rules in Portugal

In June 2004 the Basel Committee on Banking Supervision (BCBS) issued a document amending the 1988 Capital Accord.[1] On the same date, a long process dating back to 1996 came to an end, following the public discussion of three preliminary versions. In parallel, a consultative process was undertaken at the European Union (EU) level, before the approval of Directives 2006/48/EC and 2006/49/EC.[2]

In the process that led to the New Accord, also known as Basel II, the BCBS established at a very initial stage, a philosophy based on three mutually strengthening pillars. Under Basel II, the minimum capital requirements are defined in such a way as to better correspond to the economic risk of exposures and a specific requirement was introduced to cushion operational risk – the First Pillar –, to increase the role of supervisors in the review process of the integrity, global consistency and robustness of internal risk assessment systems – the Second Pillar – and to introduce minimum requirements for the public disclosure of information on the financial standing and details on risk measures used, their methodology and control systems – the Third Pillar, also known as "market discipline".

At more advanced stages, the calculation formulas of minimum capital requirements were designed and subsequently enhanced, differentiated and recalibrated by type of portfolio, enabling lower minimum own funds levels for those portfolios with higher granularity (i.e. with a larger number of exposures and therefore more diversified). Finally, the concepts of capital adequacy and provisions were more closely aligned and it was also established that capital requirements must cover unexpected losses in a credit portfolio, assuming that expected losses are matched by provisions. Potential divergences between the concept of expected loss in the credit portfolio and the level of provisioning lead to an adjustment, that can be made either through the own funds requirements, or directly in own funds. This aspect was particularly important in the completion of the New Accord, considering that the diversity of approaches at international level as to the implementation of the concept 'provisions for credit losses' could lead to a very different treatment of capital adequacy of institutions subject to different provisioning regimes.

The three public consultations carried out by the BCBS which, in particular, enabled a deeper and more detailed approach to the first pillar for different portfolios, were followed by Quantitative Impact Studies (QIS) resulting from the introduction of the new rules. The results of the last round of studies, the so-called QIS5, were compiled in two documents of the BCBS and of the Committee of European Banking Supervisors (CEBS) respectively. The latter promoted the studies and compiled the results for the countries of the European Economic Area.[3] This box gives a detailed explanation of the specific requirements of the New Accord regarding the credit and operational risk requirements and the quantitative implications of the transition to the new regulatory framework.

Minimum capital requirements of the First Pillar – Credit risk

The minimum capital requirements of banks for credit risk are set out in the first pillar in accordance with two approaches: the standardised approach and the internal ratings-based (IRB) approach. In both approaches, the portfolio of banks was disaggregated into homogenous classes, to which correspond a risk weight that enables the calculation of the own funds requirement. Compared with Basel I, the major innovation of the standardised approach is associated with the correspondence of the capital requirements of loans to enterprises to the external rating given to the counterparties, classified in broad classes of risk rating. Thus, it enhances the currently prevailing regime for exposures to companies, as it allows for a differentiation of capital requirements among companies with a clearly different credit risk. Besides, the standardised approach assigns risk weights to retail exposures (and to small and medium enterprises (SME)) and residential mortgage exposures that are lower than those of Basel I. In turn, under the IRB approach, banks must use the statistical distribution of losses in the credit portfolio to calibrate the formulas for capital requirements that are set out in the New Accord. This approach has two alternatives: basic IRB and advanced IRB.

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(1) *Subsequently, the Committee published additional guidance on specific issues applicable to the trading book regime (July 2005) and introduced a multiplier scaling factor, materialised in a 6 per cent increase in requirements, across all segments, to be uniformly applied to all institutions that adopt, for regulatory purposes, Internal Ratings-Based Approaches for credit risk. The document comprising all changes to the original Accord was published in June 2006 and is available at http://www.bis.org/publ/bcbs128.htm.*

(2) *It should be noted that while the Capital Accord within the framework of Basel is explicitly designed for internationally active banks, in the EU the new regulations shall be universally applicable to all credit institutions and investment firms.*

(3) *Committee of European Banking Supervisors, "Quantitative Impact Study 5 – Overview on the Results of the EU countries" and BCBS, "Results of the fifth quantitative impact study (QIS5)", both published in June 2006.*

In the most advanced version of the IRB approach, banks shall assign to each exposure the amount at risk in a one-year horizon (exposure at default – EAD), the probability of default in that same horizon (probability of default – PD), the fraction of credit that cannot be recovered in the event of default (loss-given-default – LGD) and the effective maturity; while in the basic IRB approach only the parameter PD is estimated by institutions (the others are fixed by the supervisory authorities, with the exception of LGD of the companies portfolio that is set at 0.45 in the New Accord). Therefore, the capital requirement of a loan to an enterprise is given by a function K = f (EAD, PD, LGD, M), where M is the effective maturity of such loan. After a standardisation of function f (.) for a unit exposure and for the capital requirement under Basel I, it is possible to represent this function in space {PD, K}, where LGD and M are parameters of the function. Chart 1 illustrates the curve of regulatory capital for credit to companies corresponding to the basic IRB approach, which has implicit a LGD of 0.45. The effective maturity parameter was set at two years and a half. As illustrated in Chart 1, capital requirements associated with companies under the basic IRB approach (LGD=0.45) should be relatively neutral as compared with Basel I for PD values of approximately 1 per cent. Overall and on average, in the portfolio of banks that participated in QIS5, the PD in the corporate portfolio is around that value, with some dispersion among banks and large heterogeneity in the portfolio of each of them.

After having recognised that in the credit portfolio of companies whose exposure is higher than EUR 1 million co-exist very large and clearly smaller-sized companies the BCBS introduced an additional adjustment to the calculation formula, in order to reduce the capital requirement associated with the exposures to companies in economic groups, whose consolidated turnover is lower than EUR 50 million. The impact of this adjustment is shown in Chart 2. It should be noted that the neutrality threshold, in terms of PD, of capital requirements and compared with Basel I for companies whose turnover is lower than EUR 50 million may increase substantially, reaching 2.6 per cent for companies whose turnover is lower than EUR 5 million. Moreover, small enterprises may have an even more favourable prudential treatment, provided that they are incorporated in the retail portfolio. For this purpose, a number of requirements must be fulfilled regarding the sufficiency of diversification, atomisation. Further, these loans shall be included into homogeneous pools of exposures for the purposes of aggregated credit risk management, which shall be consistent over time and adopt similar procedures as the management of other retail portfolios.

The New Accord also sets out that collateral and guarantees, assessed in accordance with prudent criteria, or other risk mitigation instruments may be taken into account in the estimation of LGD, which in turn should be assessed in a conservative manner, taking into account the degree of subordination of the exposure.

Chart 1

CAPITAL REQUIREMENTS FOR LOANS TO ENTERPRISES
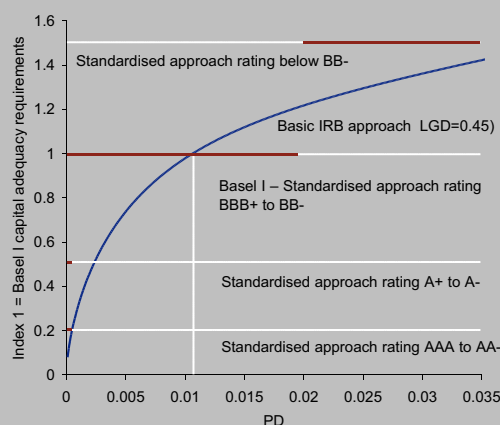
Sources: BCBS and Moody's.
Note: The upper and lower limits of red lines correspond to the average default rate in the period 1983-2006 of Moody's lowest-rated corporate bond issuers in the respective class for a one-year time horizon, in "Corporate defaults and recovery rates: 1920-2006", Moody's Investors Service, February 2007.

Chart 2

CAPITAL REQUIREMENTS FOR LOANS TO ENTERPRISES
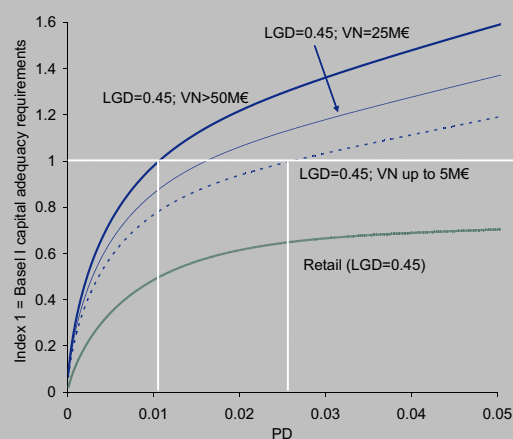
Source: BCBS.
Note: VN - turnover.

Minimum capital requirements of the First Pillar – Operational risk

Operational risk is defined in the New Accord as the risk of loss resulting from inadequate or failed internal processes or from external events. Strategic and reputational risks are explicitly excluded. The purpose of the approach to operational risk, similarly to what is prescribed in terms of credit risk, consists in establishing a relationship between capital requirements and the best estimate of potential losses associated with extreme events. The measurement of the estimation of potential losses associated with these risk factors is difficult, either because institutions still do not make a systematic registration of losses associated with failed management and internal control processes, or because the events that trigger high losses are quite rare. Thus, the BCBS has established three methods for calculating capital requirements. The most advanced methods (Advanced Measurement Approaches) enable banks to use the statistical properties in the distribution of losses inherent in this risk factor and the remaining two methods, which are less complex, associate the capital requirement to the level of turnover, defined as a specific aggregate of income, in fixed proportions, either for the activity as a whole (Basic Indicator Approach) or disaggregated by business line (Standardised Approach).

Impact on capital requirements – results of QIS5

As referred to above, the BCBS has conducted impact studies on the minimum capital requirements resulting from the introduction of the New Accord calculation rules. The most recent of these studies (QIS5) was carried out in the first half of 2006, in coordination with the Committee of European Banking Supervisors (CEBS). The results presented below for QIS5 relate to 33 countries, including the 13 members of the BCBS (identified on the whole as G10),[4] 18 countries of the European Union (EU) or in the process of accession to the EU (for simplicity, hereinafter all of them called EU),[5] and a group of other countries that do not belong to G10 nor to the EU.[6] It should be noted that in the group of countries that are members of the BCBS there are several EU countries. Therefore, the aggregates referring to G10 and the EU are not mutually exclusive as regards the countries comprising them. Table 1 shows the portfolio structure of G10 and EU banks that participated in the survey, divided in two groups: internationally active large banks (Group 1) and the remaining (Group 2). One of the most salient features is the fact that

Table 1

EXPOSURES TO THE NON-BANK PRIVATE SECTOR OF QIS5 RESPONDENT BANKS Structure of the portfolio as a percentage				
	G10		**EU**	
	Group 1	**Group 2**	**Group 1**	**Group 2**
Enterprises	63.6	52.3	62.3	48.2
Large enterprises	43.0	21.1	37.3	16.5
SME corporate portfolio	10.7	18.9	11.5	16.5
SME retail portfolio	4.5	9.0	6.6	11.5
Other	5.4	3.3	6.9	3.6
Retail portfolio (except enterprises)	27.2	42.1	32.4	47.9
Housing loans	18.3	27.0	22.1	30.5
Other	9.0	15.1	10.3	17.4
Equity exposures	4.8	3.5	2.1	2.2
Securitisation	4.3	2.1	3.2	1.7

Source: BCBS.

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[4] *The BCBS has the following members: Belgium, Canada, France, Germany, Italy, Japan, Luxembourg, the Netherlands, Spain, Sweden, Switzerland, the United Kingdom, and the United States.*

[5] *In addition to the EU countries that are members of BCBS, the Committee also has the following participants: Cyprus, Czech Republic, Finland, Greece, Hungary, Ireland, Malta, Poland, and Portugal. Bulgaria participated as a candidate to the European Union. Norway was also included in this sample of countries as it belongs to the European Economic Area and therefore the Capital Adequacy Directive is also applicable to it.*

[6] *The countries participating in QIS and which are not members of G10 or of the EU are: Australia, Bahrain, Brazil, Chile, India, Indonesia, Peru, and Singapore.*

the weight of large enterprises in Group 1 in both samples is higher than that of those in Group 2, typically more fo-cused on retail business. Large enterprises have on the one hand a lower probability of default than the smaller ones, but on the other hand the unpredictability or loss variance around the distribution average is higher. The capital requirement is concomitantly higher than that of the remaining enterprises for the same PD.

Chart 3 illustrates the values of dispersion that capital requirements for loans to enterprises can assume in this context. The area within the blue lines represents, in general terms, the range where should stand the most banks' exposures that have adopted the advanced approach both in G10 countries and in EU countries. This area is lim-ited above by the curve relating to capital requirements for large enterprises with 0.6 LGD, calibrated so that below that value it corresponds approximately to 90 per cent of the probability mass, weighted by the portfolio size of QIS5 respondent banks; the area is limited below by the curve corresponding to a 0.1 LGD, also calibrated so that above that value it corresponds to approximately 90 per cent of the probability mass of the same sample of banks. Besides, the green curve represents capital requirements for the most frequent LGD value (average value of the range of the modal class in the distribution). Chart 3 also shows that in the corporate portfolio the own funds re-quirements of QIS5 respondent banks on average are anticipated to be lower than those under the regime in force, standing at around 20 per cent for the group of internationally active large banks (identified as G10-1 and EU-1) and with higher dispersion for the remaining banks (identified as G10-2 and EU-2).

Chart 4 presents a similar exercise for the capital requirements of SME, aggregating the results of SME classified in corporate portfolios (and eligible for adjustment for turnover) and SME classified in the retail portfolio. As it can be seen, reductions in own funds requirements in these portfolios as a whole are significant, standing on average between 25 and 30 per cent in the four reference country groupings.

The capital requirements curve relating to residential mortgages (underlying housing loans, assuming a 0.2 LGD) is shown in Chart 5, where it can be seen that for the range of the most likely PD values the own funds requirements is signifi-cantly lower than those imposed under Basel I. In fact, the neutrality threshold compared with Basel I, assessed in terms of PD, is around 11 per cent.[7] Chart 6, following the procedure adopted for loans to enterprises in Chart 3, shows the own funds requirements for housing loans for the reference aggregates (G10 and EU, broken down into the two subgroups) of QIS5 respondent banks. Capital requirements curves relating to the most likely cases (LGD=0.2), upper limit defining 90 per cent of the probability mass of reporting to QIS5 (LGD=0.5) and lower limit defined in the New Accord (LGD=0.1) are also illustrated in Chart 6. As it can be seen, capital requirements for the average of the EU and G10 countries are signifi-

Chart 3

Chart 4

CAPITAL REQUIREMENTS FOR EXPOSURES TO LARGE ENTERPRISES

Turnover above EUR 50 million

CAPITAL REQUIREMENTS FOR EXPOSURES TO SME
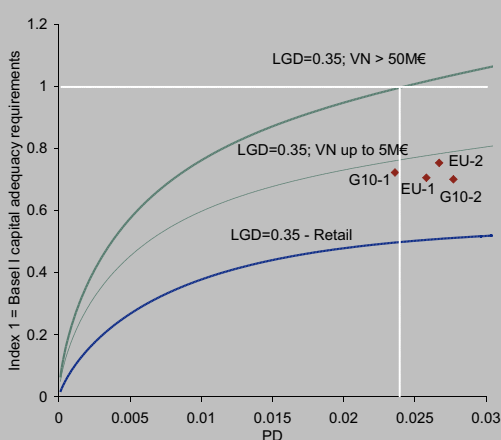
Source: BCBS.

Source: BCBS.

(7) *The choice of a 0.2 LGD corresponds to the modal value of the group of G10 and EU QIS5 respondent banks.*

Chart 5

CAPITAL REQUIREMENTS FOR LOANS FOR
HOUSE PURCHASE

Loans for house purchase(LGD=0.2)
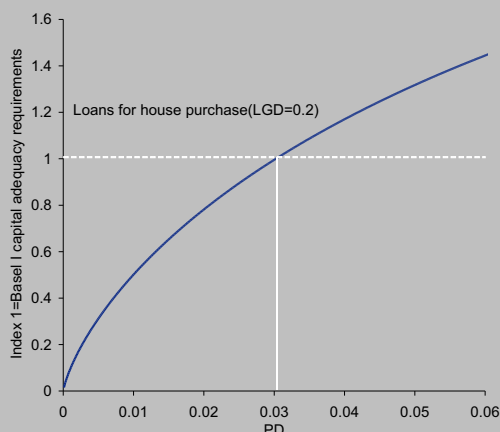
Source: BCBS.

Chart 6

CAPITAL REQUIREMENTS FOR LOANS FOR
HOUSE PURCHASE
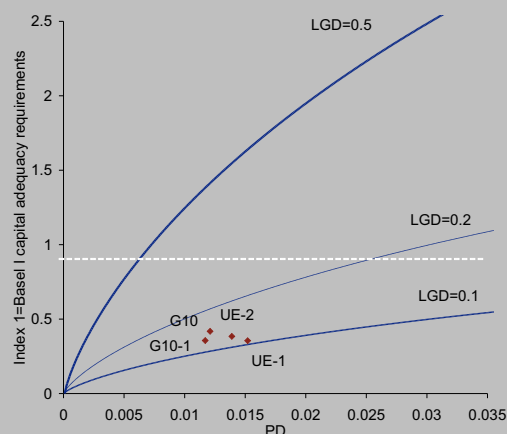
Source: BCBS.

Chart 7

CAPITAL REQUIREMENTS FOR RETAIL
PORTFOLIOS (EXCLUDING ENTERPRISES AND
LOANS FOR HOUSE PURCHASE)
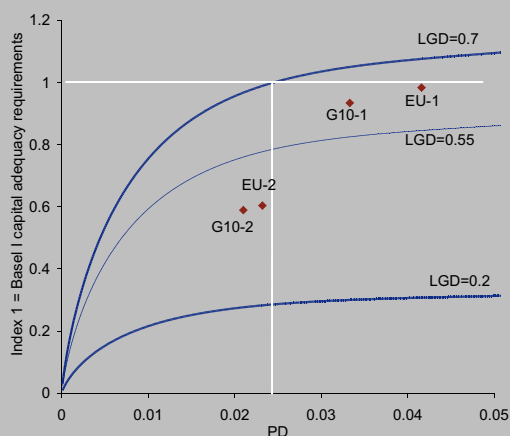
Source: BCBS.

cantly lower than those implicit in Basel I by approximately 50 to 60 per cent, reflecting the fact that the average PD in this group of banks (between 1 and 1.5 per cent) stands at a far lower level than the neutrality threshold referred to above.

With regard to the remaining retail portfolios – as for instance, factoring, credit extended through credit cards or general consumer credit – the dispersion of results is far higher among banks, when assessed in terms of both the PD, and the foreseeable impact on own funds requirements. It should be noted however that the group of internationally active banks recorded much more moderate reductions in requirements.

In sum, in the main credit portfolios of banks, the introduction of the New Accord may result in a very significant reduction in own funds requirements, mainly for retail portfolios and, in particular, for housing credit. It should be noted however that on top of these requirements there are also the requirements relating to other portfolios (such as equity portfolios), those associated with other specific risks (such as securitisation or exposures to entities having a close link), potential deviations

between provisions for credit risk and expected loss – where positive – and, mainly, operational risk requirements; the latter has an estimated contribution between 6 to 7.5 per cent to the rise in own funds requirements. Besides, during the transition period until the end of 2008, banks adopting the IRB approach for credit risk or the advanced approaches for operational risk shall at the same time continue to calculate the minimum requirements that would result from the application of the Basel I rules. A comparison of the figures of the two approaches shows that, where the total aggregate value implicit in Basel I is higher, own funds requirements shall not be lower than 90 per cent and 80 per cent of this value, in December 2007 and December 2008 respectively.

Transition process in Portugal

The adoption of Basel II rules in Portugal results from the transposition of the two Directives referred to above and takes effect already in 2007. In January 2007, the Banco de Portugal consulted the institutions covered in order to find out their intentions regarding the adoption of the new rules, in particular the methods for calculating the own funds requirements to cover credit and operational risk, as well as the transitional provisions envisaged in Directive 2006/48/EC for 2007.[8] Table 2 presents a summary of replies, as well as the latest information made available until March 2007. It can be seen that 32 institutions, accounting for around 60 per cent of the total assets of the banking system, would like to continue calculating own funds requirements according to the previous regime. From the remainder, only four (accounting for 15 per cent of the assets) expressed intentions to adopt the basic IRB approach and seven the standardised approach for operational risk. With regard to 2008, 18 institutions, accounting for more than 70 per cent of the system's assets and including some of the main banking groups, have expressed that they intend to adopt the advanced IRB approach, while for operational risk, the standardised approach was the one preferred by most institutions.

Table 2

SCHEDULE FOR THE ADOPTION OF BASEL II RULES IN PORTUGAL															
	Current prudential regime (Basel I)		**Credit risk**							**Operational risk**					
			Standardised approach		**Internal ratings-based approach**										
					Foundation		**Advanced measurement approach**		**Basic indicator approach**		**Standardised approach**		**Advanced measurement approach**		
Approach to be adopted by institutions:	**n.º**	**Total assets (%)**	**n.º**	**Total assets (%)**	**n.º**	**Total assets (%)**	**n.º**	**Total assets (%)**	**n.º**	**Total assets (%)**	**n.º**	**Total assets (%)**	**n.º**	**Total assets (%)**
in 2007	32	59.2	12	25.6	4	15.2			9	15.5	7	25.3		
in 2008			21	17.8	9	10.0	18	72.2	21	18.8	24	79.3	3	1.9

Note: Updated in March 2007.

(8) *Directive 2006/48/EC envisages the following possibilities (2007):*

For the calculation of the own funds requirements for the coverage of credit risk:

a) Subject to the prudential regulations in force on 31 December 2006, in accordance with the rules laid down in Article 152 (8) to (14) of Directive 2006/48/EC and in Article 50 of Directive 2006/49/EC;

b) Adoption of the standardised approach;

c) Adoption, subject to the prior authorisation of Banco de Portugal, of the standardised IRB approach and the IRB approach applicable to the retail portfolio. In these cases, the institution/group shall decide which of the above-mentioned options it will use until Banco de Portugal issues its opinion on the authorisation request.

For the calculation of the own funds requirements for the coverage of operational risk, where the option to be subject to the prudential regulations in force on 31 December 2006 is not used for all risk positions:

d) Adoption of the basic indicator approach;

e) Adoption, subject to the prior authorisation of Banco de Portugal, of the standardised approach (in this case, the institution/group must adopt the method identified in d) above until Banco de Portugal issues its opinion on the authorisation request).

Modelling of an Indicator for Credit Scoring of Non-Financial Corporations
– a Preliminary Research Based on Discriminant Analysis

   Maria Clara Soares

Credit Risk Drivers: Evaluating the Contribution of Firm Level Information
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MODELLING OF AN INDICATOR FOR CREDIT SCORING OF NON-FINANCIAL CORPORATIONS – A PRELIMINARY RESEARCH BASED ON DISCRIMINANT ANALYSIS*

*Maria Clara Soares***

1. INTRODUCTION

A significant share of credit risk in the Portuguese banking system is associated with its exposure to the non-financial corporations. This exposure assumes the form of either credit directly granted (loans and credit lines) or debt securities and equity issued by those corporations and included in the banks' portfolios. At the end of 2006, claims on non financial corporations corresponded to approximately 42 per cent of domestic assets held by resident monetary institutions and 30 per cent of the total assets in the monetary institutions' balance sheets.[1] Detecting the financial fragilities of non-financial corporations, liable to give rise to default in credit payments or even to insolvency, is therefore of the highest relevance in the analysis of the financial stability of the banking system.

In general, the analysis of financial ratios covering different aspects of the position of companies is a key instrument in detecting financial and operational difficulties of non-financial corporations. The use of ratio analysis in the development of techniques for the classification of corporations according to their creditworthiness and to predict business failure and bankruptcy has been increased and is evinced in a number of research since Beaver (1966) and Altman (1968), in the late 1960s, provided the first stimuli to the development of this type of models. Since then, a number of articles have been published with research in this field,[2] which has also been object of special attention by financial institutions and banking supervisors in the framework of the preparation of the new Basel Capital Accord (Basel II), which lays down the implementation of internal risk evaluation models.

Credit risk assessment of an institution requires that the quality of its credit portfolio is known, which will naturally reflect the creditworthiness of the debtors integrating it. This, in turn, depends on the capacity of debtors, at present and within a short- to medium-term horizon, to honour payments on account of interest and principal in due course. The evaluation of this capacity implies the analysis of several aspects of the current position of the company, but it is not easy to reflect them in a synthetic quantitative measure. The scoring models provide these synthetic measures, reflecting several aspects of the position of the company with relevance to gauging its capacity in terms of compliance with credit payments. These models, associated with measures of default probability, make it possible to estimate expected losses within a given time horizon, and are therefore essential instruments in the analysis and management of risk by financial institutions. From the perspective of some central banks, it is also important to mention the additional interest of these models when they form the basis of internal assessment systems of the credits to companies provided as collateral in monetary policy operations.

In addition, the scoring systems of companies based on the respective creditworthiness are a tool for analysis adding to the financial stability aggregate indicators of this sector (usually based on National Financial Accounts statistics). Those models provide a more accurate appreciation of either the trend of risks incurred by the financial system at a given moment in time or their distribution and intensity.

The purpose of the work presented in this article is to estimate synthetic indicators, based on the financial ratios of a set of non-financial corporations, able to signal potential situations of failure in credit payments in some of these companies. In sum, the aim is to obtain indicators which, with acceptable precision, will permit corporations to be classified in one of two groups: failed corporations and non-failed corporations.

The scoring models developed in different countries have an underlying definition of "failure" which is not unique. The "failure" event may correspond to the actual bankruptcy of the company but may also have another nature, such as the non-payment of the debt, whether under the form of debenture or bank loans. Although default in credit payments of a company does not necessarily lead to its bankruptcy, bankruptcy situations of non-financial corporations are, in general, preceded by episodes of default in credit payments which, when persisting and becoming more severe, eventually lead to the extinction of the corporation.[3]

The following section characterises the information used in the development of this article. In particular, it presents some statistics on the data from the Central Balance-Sheet Database of Banco de Portugal and on some financial ratios considered in the estimation process of the score formula. *Section 3* describes the methodology followed, while *Section 4* presents the results, comparing them with those from the estimation of an equivalent logistic regression model. *Chapter 5* presents the conclusions and final comments.

2. DATA

2.1. Characterisation of data used

The dataset used in this study was chiefly from the Central Balance-Sheet Database held by Banco de Portugal and comprises financial statements for a sample of non financial corporations covering the years from 1995 to 2004[4]. It should be noted that this information relates to a sample of companies with some specific characteristics, wherefore some caution is advisable in its analysis and, consequently, in the interpretation of results arising from its utilisation. First, the coverage of all economic activities of non-financial corporations was incomplete until 2000. Only from that date, the sample of the Central Balance Sheet Database has corresponded to a group of companies selected according to statistical representativity criteria. Nonetheless, the sample is clearly biased towards a broader coverage of larger companies, which are exhaustively surveyed, and of some activity sectors (such as manufacturing, "electricity, gas and water" and "transports and communications") to the detriment of other sectors (chiefly "trade and repairs"). In addition to the companies included in the statistical sample, any other non-financial corporation may participate, on its own initiative, in the Central Balance Sheet Database of Banco de Portugal.[5] This possibility permits to widen the coverage of small and medium-sized cor-

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(3) See *Antunes (2005)* on the move from default to recovery and to extinction.

(4) The year 2004 is partly covered.

(5) See *Banco de Portugal Booklet No 7* on the Central Balance Sheet Database.

porations (given that these are not the object of exhaustive surveys) and, in view of its strictly voluntary nature, it will tend to cover companies with relatively sound financial positions[6].

Firstly, this article has considered all companies that, at the Central Balance Sheet Database, present validated data, without reporting failures or anomalous values. As regards the companies covered, data on their past credit history was considered, based on principal and interest not paid in due course, as reported to the Central Credit Register (CCR).

Most companies in the initial group (more than 90 per cent) had reported credit liabilities to the CCR at some point during the period under review, of which approximately 15 per cent had a situation of default in credit payments in that period. For the purposes of the present study, the "failure" event in the year (reference period of the financial statements) was defined as the occurrence, during 3 months in a row, of failures in credit payments exceeding 500 euros, on average (reported to the CCR as type 7, 8 or 10 debt)[7].

In order to estimate the model, only data on companies established as regular legal persons was used. Of them, there were excluded those in financial sector (CEA 65, 66 and 67), public administrations (CEA 75), education, health and social work establishments (CEA 80 and 85) and other establishments whose main purpose is in some way similar to the provision of public or collective services (CEA 90, 91 and 92). Additional conditions were required for companies to be included in the samples to be analysed, as described below:

- Average number of employees > 1

- Total net assets > 0

- Debt, excluding intra-group lending and loans granted by other shareholders > 0

- Total equity, including intra-group lending and loans granted by other shareholders > 0

- Sales and provision of goods and services > 0

The sample also excluded companies for which the sum of debts with credit institutions, bonds, equity loans and other loans was nil, but with non-nil registers of credit and interest not paid in due course reported to the CCR in the corresponding year.[8]

Summing up, as a starting point, 133827 observations were analysed relating to 37114 companies. Of these, almost 3000 corresponded to observations with default in credit payments reported in the year, according to the above mentioned definition of the event "failure". From total companies, 35083 had no report on default episodes in the period considered, corresponding to 125380 observations.

Table 1 presents a summary characterisation of the data initially analysed.

Prior to the estimation of the model, some statistics from a set of financial ratios were analysed, with a view to identifying those that may reveal, à priori, more discriminating power between failed and non-failed firms. Considering the forward-looking objective of the model, on one hand, and the lag in the availability of the financial information (approximately three quarters after the end of the fiscal year), the financial ratios were considered 1-year lagged from the year when the event characterising the groups occurred.

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(6) In turn, companies with significant financial fragilities will tend not to report, especially when their vulnerability becomes more visible. This results in a marked bias of the whole information towards companies with positive creditworthiness, particularly in the case of small- and medium-sized corporations.

(7) It corresponds to credits with late repayment, credits involving litigation and restructured loans. On this subject, see *Banco de Portugal Booklet No 5*.

(8) A possible cause for this discrepancy may be due to the fact that the balance sheet of companies relates to their position as at the last day of the year, wherefore default situations occurring in any month in the course of the year may have been fully settled at the end of the fiscal year. Other causes may be reporting errors or misclassification in some of the databases used, wherefore observations with this discrepancy were excluded.

Table 1

	Total number of observations	Percentage of observations with default in credit payments during the year	Percentage of observations of firms with no failure in the whole period	Total number of employees [1]	
BRIEF CHARACTERISATION OF ORIGINAL DATA					
				Total	*Memo*: Failed firms
1995	12 846	4.3	91.8	39	86
1996	18 162	3.0	93.3	31	64
1997	20 738	2.8	93.9	26	51
1998	21 002	2.2	94.2	27	74
1999	17 760	1.2	94.4	29	64
2000	12 067	1.0	93.5	42	103
2001	11 343	1.4	93.7	42	111
2002	7 170	1.8	94.0	40	107
2003	7 741	2.0	94.1	45	85
2004	4 998	1.9	94.1	48	59

Note: (1) Yearly averages.

2.2. Distribution of main financial ratios

A relatively wide set of financial ratios was considered in the process of selection of indicators with more power to discriminate among credit default situations. In order to avoid an excessive loss of observations, indicators referring to growth rates were not taken into account (which, given the time lag considered, required reporting by the same company for at least three consecutive years). Extreme observations of the ratios on an annual basis were excluded; such outliers were defined by the difference of ± three standard deviations from the average ratio in each year. Nonetheless, a number of indicators maintained quite significant dispersions.

Table 2 presents some distributional measures of the financial ratios initially considered in the modelling process, such as the mean, the median and the standard deviation in the total sample considered. The analysis of the table makes it possible to evince some characteristics of the data included in the initial sample, which shall be the object of some comments.[9]

First, as regards leverage and risk ratios, the indebtedness ratios corresponding to the observations of failed corporations are, on average, higher than in the case of observations without default in credit payments[10]. This was expected, since high financial leverage levels are generally associated with higher default risk.

In addition, the weight of financial debt, on average, is lower in non-failed corporations than in failed corporations. This finding is mostly the result of a significant number of non-failed companies reporting financial debt as nil (almost 40 per cent of the total non-failed); i.e., a significant share of the sample observations relates to companies whose debt to third parties entered in the respective balance-sheets corresponds chiefly to trade credits and intra-group lending and loans granted by associate corporations and shareholders.

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(9) Given that, for the purpose of this study, each observation was assimilated to a company (even though relating to the same company, but in different years), observations and corporations shall be mentioned in this section indiscriminately.

(10) In the case of debt ratios as a percentage of total assets – either or not including intra-group lending and loans granted by associate corporations and partners in the debt aggregate –, the dispersion is more marked in the group of observations without default in credit payments. However, the application of the test t to both groups made it possible to confirm the sign of the difference between the groups' average as indicated in Table 2.

Table 2

MAIN FINANCIAL RATIOS						
	Without default in credit payments			With default in credit payments		
	Mean	Median	Standard deviation	Mean	Median	Standard deviation
Risk and Leverage ratios						
Debt to third parties, excl. intra - group lending and loans granted by partners / Total net assets	49.0%	50.8%	24.5	66.4%	68.4%	18.2
Debt to third parties, total / Total net assets	61.2%	65.3%	23.8	72.6%	74.6%	16.8
Debt to credit institutions, bonds and equity loans / Total net assets	11.6%	5.1%	14.6	23.4%	21.5%	15.2
Idem, excluding observations with no financial debt	19.0%	16.0%	14.4			
Share of financial debt in total debt to third parties [1]	19.3%	9.0%	23.7	35.7%	32.8%	23.2
Idem, excluding observations with no financial debt	31.4%	26.7%	23.2			
Share of financial debt, including other loans, in total debt to third parties [1]	19.6%	9.4%	24.0	36.4%	34.1%	23.3
Idem, excluding observations with no financial debt	31.9%	27.4%	23.3			
Trade credits [2] / Total net assets	36.3%	33.9%	22.3	40.3%	38.8%	21
Idem, excluding observations with no financial debt	36.1%	34.5%	20.5			
Share of trade credits [2] on total debt to third parties [1]	62.7%	65.2%	29.8	55.2%	56.6%	24.6
Idem, excluding observations with no financial debt	54.9%	56.6%	25.6			
Share of short-term financial debt [3] on total financial debt	27.0%	15.2%	30.4	28.3%	20.3%	28.0
Share of short-term debt to third parties [3] on total debt to third parties [1]	60.1%	64.0%	26.8	57.9%	59.8%	24.8
Equity / Total net assets	33.6%	29.1%	23.1	23.0%	20.7%	16.3
Idem, excluding observations with negative or nil equity	34.1%	29.5%	22.8	23.5%	21.0%	16.0
Equity plus intra - group lending and loans granted by partners / Total net assets	45.7%	43.0%	24.3	29.3%	27.0%	17.8
Idem, excluding observations with negative or nil equity	45.8%	43.1%	24.2	29.4%	27.0%	17.8
Structure ratios						
Debt of third parties, net of provisions / Total net assets	34.5%	32.9%	23.5	34.9%	32.6%	22.4
Debt of third parties, net of provisions / Total debt to third parties	85.7%	58.6%	278	54.7%	49.2%	43.7
Excluding observations in percentile 99	72.0%	58.0%	71.6	54.3%	49.2%	39.7
Debt to third parties, net of provisions / Total net assets less net fixed assets and financial participations	49.4%	52.0%	28.1	56.2%	58.8%	26.5
Equity plus provisions (except for pensions) less total net fixed assets and financial participations / Total net assets	4.5%	4.3%	31.4	-13.3%	-10.8%	27.1
Equity plus intra - group lending and loans granted by other partners less total net fixed assets and financial participations / Total net assets	16.6%	14.7%	31.8	-6.80%	-5.40%	27.6
Liquidity ratios						
Current assets / Total net assets	48.9%	48.5%	26.6	42.4%	39.8%	25.5
Cash, bank deposits and marketable securities / Total net assets	10.3%	5.3%	12.5	4.6%	1.4%	8.4
Profitability ratios						
Net profit / Total net assets	2.7%	1.7%	8.5	-0.9%	0.2%	7.2
EBIT / Total net assets	7.0%	5.7%	10.1	4.9%	5.0%	8.5

Notes: **(1)** Debt to third parties includes intra-group lending and loans granted by partners (including shareholders). **(2)** Trade debt corresponds to the sum of debts to suppliers, advances from customers and sales account, debt to the State and other public entities and debts to other creditors. **(3)** It only covers observations for which the breakdown of debt into short-term and medium- and long-term is reported.

Considering only the observations with positive financial debt, its weight on total debt (and on total net assets), on average, continues to be higher for failed corporations than for non-failed corporations, although the difference is significantly smaller. In turn, the weight of trade debt on total debt is virtually identical in both groups, when considering only observations with financial debt[11].

As regards the relationship between financial debt and trade credits and the respective impact on the credit quality of companies, economic literature does not provide clear indications on what to expect as regards the difference between the weights of these two liability components in the two groups under analysis. The few research in this field (carried out chiefly in the USA) refers mainly to the significant importance of trade debt as a source of financing of companies, especially small-sized corporations[12].

The two main reasons usually indicated as determining demand for trade credit by companies are the following:

   i) The transaction motive: if the timing of delivery of the orders is uncertain and converting liquid assets into cash is costly, companies must hold a high amount of cash balances, permitting immediate and full payment of the orders upon delivery. The utilisation of trade credit permits buyers to save in terms of the transaction costs associated with the maintenance and management of cash balances. For this motive (for which financial credit is no alternative), the share of this type of credit in total liabilities does not provide information on the creditworthiness of companies since its utilisation is a current practice in business. Factors associated namely with the size of the corporation, the turnover and frequency or type of the orders shall determine the intensity of this type of liability in different companies[13].

   ii) The financing motive: it refers to the non-utilisation of discounts resulting from the payment in shorter-than-established time-limits, and even the utilisation of trade credit for longer-than-regular time-limits (albeit agreed with suppliers), as an alternative to credit granted by financial institutions. The economic theory associates the use of trade credit for financial reasons (whose implied interest rate is generally higher than in financial debt) to imperfections in the credit market, resulting in credit rationing by financial institutions. Small-sized corporations, on which financial institutions usually have less information than that available to suppliers, are probably more affected by financial credit rationing. For this motive, high balances of trade credit may be associated either with creditworthy companies but with small size – not perfectly evaluated by financial institutions due to lack of information – or with poor credit quality companies. In addition, companies revealing to be "prompt payers" may benefit from especially favourable conditions from their suppliers, for which other factors besides the return on financing may be relevant for the decision to grant credit.[14]

An additional reason for the higher weight of trade debt relative to financial debt in the case of small-sized corporations (which is not directly related to the creditworthiness of the companies) is related to the fact that the amounts of credit needed often are small. Even if funds are available, arrang-

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(11) When considering all observations, the weight of trade credits on total debt is naturally higher in the non-failed group than in the failed group, as a result of the high percentage of observations without financial debt in the non-failed group. It should be noted, however, that the weight of intra-group lending and loans granted by other shareholders on debt to third parties is also significantly more relevant when companies do not have financial debt than when they have. In terms of total assets, the trade credits ratio is higher in failed corporations than in non-failed corporations (also, the weight of total debt on assets is higher in the former case). In the case of non-failed corporatios the trade credits ratio on assets is virtually identical in firms either with or without financial debt.

(12) Trade credit is generally granted according to terms that differ among sectors of activity but that typically involve deferred payment up to one month. It involves a discount when payment occurs within a shorter-than-established time-limit; when the normal time-limit is exceeded an additional cost is imposed or restrictions are introduced in the payment of future orders.

(13) Considering that the absence of any time-limit for payment to suppliers, even if small, may reflect a penalty (advance payment or mandatory payment upon delivery) resulting from previous defaults in this type of credit, low levels of utilisation of trade credit might indicate (when compared to similar companies) lack of credit quality of a company.

(14) Lewellen, McConnell and Scott (1980) and Emery (1984) argue that suppliers may charge lower prices than financial institutions for credit granted to risky debtors, because they incur lower risk-evaluation costs due to their access to information, by maintaining regular and close contact with their customers.

ing financial lending involves other costs in addition to the interest rate (such as commissions and other administrative costs related to the opening of files, etc.), which may make closed-end credit from financial institutions significantly more expensive than trade credit, especially if the amount involved is not high enough to offset these costs[15].

Chart 1 presents the average weights of both financial debt and trade credit on total net assets, by corporation size (evaluated according to the average number of employees in the reference year), for both groups of observations.

In effect, trade credits has higher weight in total assets in the case of small-sized corporations (considering corporations with more than 20 employees, as a whole).[16] Also, most small-sized corporations do not have financial debt (although the importance of trade credit in total assets is not significantly different, whether or not companies have financial debt). In the case of the sample considered, the absence of financial debt seems to be offset by equity or by intra-group lending and loans granted by partners, the latter with higher relative importance also in the case of small-sized corporations (Chart 2). Failed corporations have on average higher ratios of both financial debt and trade debt than non-failed corporations with both types of debt, so that the ratio of trade credits to financial debt is not particularly different between observations of failed and non-failed firms.

In the sample under analysis, (contrary to economic intuition) the weight of short-term debt (i.e. up to one year) is, on average, higher for the observations without default in credit payments than for the observations with default. This characteristic is maintained even when the failed group includes only observations with positive financial debt, and reflects the quality bias of the companies in the sample.

As regards trade credit granted, the weight in terms of total assets, on average, is not significantly different between both groups of observations. However, the ratio of trade credits granted to those received is higher in the group of observations without default in credit payments than in that of observations with default, indicating that corporations of the first group have more net lending capacity,

Chart 1
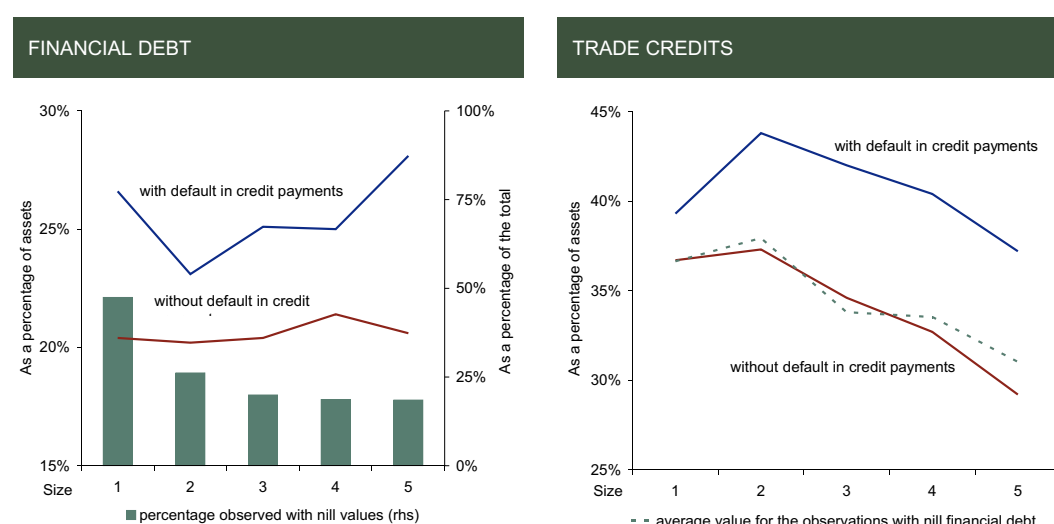
Note: The calculation of the average values of the ratios considered only observations with non-nil ratios.
Size = 1, if <=20 employees; = 2, if >20 and <=50 employees; = 3, if >50 and <=100 employees; =4, if >100 and <=200 employees; =5, if >200 employees.

(15) Credit lines permit this restriction to be eased, since they allow for the partial and fractioned utilisation of lending.

(16) In corporations with less than 20 employees, the weight of the trade debt is relatively smaller, reflecting the higher importance of own funds (including intra-group lending and loans granted by shareholders) in total financial assets.

Chart 2

FINANCING STRUCTURE

Legend:
- Own capital
- Financial debt
- Other loans
- Other, sundry
- Intra-group and partners loans
- Trade credits
- Provisions
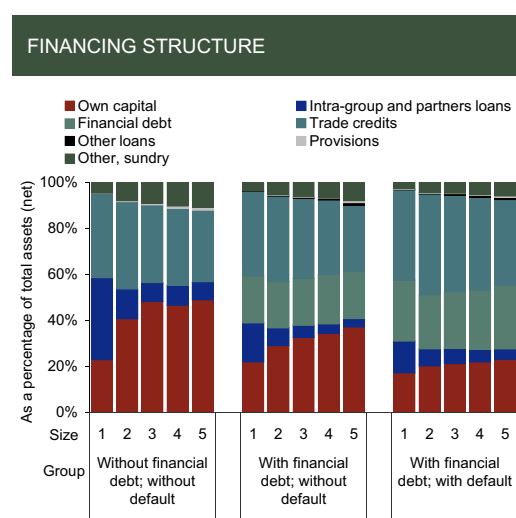
Note: Average values of the ratios, for each group (in the group without default in credit payments, observations with and without financial debt were considered separately).
Size = 1, if <=20 employees; = 2, if >20 and <=50 employees; = 3, if >50 and <=100 employees; =4, if >100 and <=200 employees; =5, if >200 employees.

consistent with a sounder financial situation. In terms of current assets, the weight of third-party debt is lower in the non-failed group, reflecting the higher importance of the more liquid assets (such as deposits and securities) in firms in this group. Moreover, own funds (including intra-group lending and loans granted by partners), on average, exceed the value of fixed assets in the case of observations without default in credit payments, contrary to failed corporations, reflecting the poorer financial equilibrium of the latter.

As regards liquidity and profitability ratios, the differences between both groups show the expected sign: failed corporations tend to have less liquidity and lower profitability, in terms of total assets, than non-failed corporations.

3. METHODOLOGY USED

In order to estimate the scoring model from financial ratios, the discriminant function analysis was used. This method consists in estimating a function (the discriminant function) as a liner combination of independent variables (the discriminant variables) able to differentiate an event or individual and classify it in one of two (or more) groups or categories. The groups in question in this study were defined as the one of corporations that failed debt payments and the other of non-failed corporations.[17]

The function to be estimated is of type $L \quad b_1 x_1 \quad b_2 x_2 \quad \ldots\ldots \quad b_n x_n \quad c$, where L is a dichotomic variable taking the values 0 and 1 corresponding to the two groups under analysis, b_i are the discriminant coefficients, x_i the discriminant variables and c is a constant. The b_i coefficients are estimated so as to maximise the distance between the group means of the function.

In this study,

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(17) This article assumes that each observation corresponds to one company. Although this assumption reduces independence among observations (more markedly after 2000, due to the greater consistency of the sample), it was intended to allow for a higher percentage of observations with default. In addition, observations without default were limited to those with positive financial debt in year t. Moreover. in estimating the discriminant function, less unbalanced samples were used, in terms of the percentage of observations with and without default.

$$L \quad \begin{cases} 1, \text{ if the firm fails debt payments in the year} \\ 0, \text{ on the contrary} \end{cases}.$$

Two models were estimated: in a first model, the criterion of distinction between the groups was the occurrence of failure in debt payments in the year, characterised as defaulting debt payments for three consecutive months in a year by an amount greater than 500 euros on average; the second model was intended to analyse the entry into failure in debt payments, defining the group where L 1 as the group in which corporations failed in the year, but not in the previous year.[18] In this case, L was stated as 0 when the firm had not failed in any year over the estimation period. [19]

Both models were estimated twice: with all observations, on one hand, and using only data of the manufacturing branches (CEA 15 to 37), on the other (CEA 15 a 37).

In addition to financial ratios, the estimated models took into account some factors broadly based across observations, such as those associated with the business cycle and with the corporations' sector of activity. For this purpose, the output gap and the short-term interest rate were included as independent variables.[20] Also sectoral dummies were tested in the models considering the observations for all activity sectors.

In addition, logit and probit models were estimated for the same variables, which corroborated the results obtained with the discriminant analysis.

The use of discriminant analysis on a number of ratios covering different features of the firms' financial position made it possible to identify a group of indicators with a significant contribution to the discriminant function.[21] In the final model, the selected ratios relate to indebtedness, asset financing structure, liquidity and profitability.

These ratios were defined as:

$$DIV \quad \frac{\text{Debt to third parties, excluding intra-group lending and loans granted by other partners and shareholders}}{\text{Total net assets}}$$

$$EFA \quad \frac{\text{Equity} \quad \text{intra-group lending and loans granted by other partners and shareholders} \quad \text{total net fixed assets}}{\text{Total net assets}}$$

$$LIQ \quad \frac{\text{Cash, bank deposits and marketable securities}}{\text{Total net assets}}$$

$$ROA \quad \frac{\text{Net profit}}{\text{Total net assets}}$$

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(18) The cases in which the company failed debt payments in the year but its situation in the previous year is not observed or also failed (i.e. when it is not possible to determine when the entry into failure in debt payments has occurred or whether it has occurred in the previous year) are excluded. If a company recovers from the default situation within at least one year, and later re-enters into failure in debt payments, this re-entry when immediately preceded by compliance is considered as being an entry of a new company.

(19) In this case, the groups are not mutually exclusive, since the companies that are not in default in the year but were before or will enter into default subsequently are not considered in the group where L = 0.

(20) These two variables are negatively correlated, with the former prevailing in the final model. The coefficients associated with the financial indicators estimated by the models without the business cycle variable are virtually identical to those estimated with that variable, the inclusion of which chiefly influences the value of the constant. The output gap values were calculated using the HP filter to data extracted from the "Quarterly series for the Portuguese economy" (2006) *Banco de Portugal Economic Bulletin Summer* . On this methodology, see *Almeida and Félix (2006)*.

(21) Also the weights of the short-term debt and of intra-group lending and loans granted by shareholders on total debt could satisfactorily differentiate between observations with and without default in credit payments, positively relating to the latter event. However, this discriminating power is clearly the result of the bias in the quality of firms in the sample, with no economic significance. It was therefore decided not to consider these indicators in the final models.

Moreover, the use of a dummy to differentiate corporations with and without financial debt made it possible to improve the discriminant power of the model (by increasing the number of correct failure predictions). This dummy was assigned to the year t-1 and was defined as follows:

$$dfin \quad \begin{cases} 1, \text{if finacial debt} > 0 \\ 0, \text{if finacial debt} = 0. \end{cases} [22]$$

The following charts illustrate the distributions of the mentioned indicators for the set of observations used in estimating the final models, in each of the groups defined by the occurrence of failure in debt payments in the year[23].

Chart 3.1

Distribution of observations of DIV

in groups without default (0) and with default (1) in credit payments

	Without default		With default	
	Mean	Median	Mean	Median
Total	55.3%	57.4%	66.2%	68.2%
Manufacturing	52.3%	53.6%	65.1%	66.0%

Chart 3.2

Distribution of observations of EFA

In groups without default (0) and with default (1) in credit payments

	Without default		With default	
	Mean	Median	Mean	Median
Total	8.7%	8.3%	-7.6%	-6.3%
Manufacturing	4.6%	4.0%	-13.2%	-12.9%

Chart 3.3

Distribution of observations of LIQ

in groups without default (0) and with default (1) in credit payments

	Without default		With default	
	Mean	Median	Mean	Median
Total	8.7%	4.3%	4.8%	1.6%
Manufacturing	7.9%	3.9%	4.0%	1.3%

Chart 3.4

Distribution of observations of ROA

in groups without default (0) and with default (1) in credit payments

	Without default		With default	
	Mean	Median	Mean	Median
Total	2.20%	1.34%	-0.67%	0.20%
Manufacturing	2.07%	1.26%	-1.37%	0.11%

(22) In this case, the estimated coefficient associated with the dummy is significant and indicates that the probability of a corporation failing credit payments in a given year is higher in the case of corporations carrying forward financial debt from the previous year. From a total of 11443 observations, 1177 corporations reported financial debt in t-1, but did not report it in t, 11 of which were in default in t.

(23) Charts and statistics presented herein refer to the indicators in t-1 relative to observations for which the financial debt is positive in t, for total observations (charts and statistics) and for observations relative to companies in manufacturing (statistics).

4. RESULTS

The estimated model was identical for both definitions of failure. In effect, the relevant financial ratios selected by the discriminant analysis were the same, whether the dependent variable would refer to the occurrence of failure in debt payments in the year or to the entry into failure in debt payments.

Therefore, the general model estimated is as follows:[24]

$$Z_{i,t} \quad _1 \; DIV_{i,t-1} \quad _2 \; EFA_{i,t-1} \quad _3 \; LIQ_{i,t-1} \quad _4 \; ROA_{i,t-1} \quad dfin_{i,t-1} \quad output \; gap_t$$

The higher the value of $Z_{i,t}$ (corresponding to the estimated score for corporation i in year t), the higher the probability of failure.

In the case where observations available for all sectors of activity were considered, the model was also estimated with sectoral dummies ($dsect_j$):

$$Z_{i,t} \quad _1 \; DIV_{i,t-1} \quad _2 \; EFA_{i,t-1} \quad _3 \; LIQ_{i,t-1} \quad _4 \; ROA_{i,t-1} \quad \sum_{j \, 1}^{9} {}_j \; dsect_j \quad dfin_{i,t-1} \quad output \; gap_t$$

The contribution of some dummies for the discriminant function was little significant, although permitting the percentage of correct in-sample classifications to improve marginally. Also, in the context of the logit model, the inclusion of sectoral dummies was rejected.

Table 3 presents the coefficients estimated for the discriminant function (unstandardised) and for the equivalent logistic regression (i.e. using the same observations), in the case where failure was defined as the occurrence of default in credit payments in the year.[25] The coefficients of the discriminant function reflect the contribution of each ratio for the discriminant score.

The classification power of the model, gauged by the percentage of correct in-sample classifications, stands at around 67 per cent, with a higher percentage (above 71 per cent) in the case of observations belonging to the group of failed.[26] Reflecting the significant disproportion between the sizes of the two groups, the model tends to classify a high percentage of observations without default in credit payments in the failed group.

The coefficients of the model are not significantly changed when the default situation is defined as "entry into failure in debt payments" (Table 4). However, the percentage of correct classifications in the total is, in this case, below 65 per cent (72 per cent in the failed group).[27]

It should be noted that the size of the corporation, which in some research of this nature emerges as a relevant variable to determine the probabilities of default in credit payments (with a negative coefficient), did not have a significant contribution to the discriminant function in this study. In turn, in the case of the logit and probit models, the coefficients of the variable size (measured by the logarithm of

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Table 3

RESULTS: DISCRIMINANT FUNCTION AND EQUIVALENT LINEAR LOGIT MODEL Occurrence of failure in debt payments in the year			
	Total		**Manufacturing**	
	Discriminant function	**Logit model** [1]	**Discriminant function**	**Logit model** [1]
	-1.158	-5.132	-1.18	-5.784
		(0.32)		(0.48)
1	1.671	2.063	2.167	2.675
		(0.17)		(0.27)
	-1.294	-1.137	-1.434	-1.369
		(0.12)		(0.18)
3	-1.379	-3.078	-1.474	-4.218
		(0.41)		(0.70)
4	-4.923	-5.379	-5.169	-4.653
		(0.49)		(0.60)
	0.720	2.425	0.393	2.199
		(0.31)		(0.45)
(2)	0.307	0.276	0.238	0.228
		(0.02)		(0.02)

Notes: **(1)** Numbers in brackets refer to standard deviations. **(2)** Output gap as a percentage.

the average number of employees) revealed to be significant, although close to zero and with a positive sign, contrarily to that expected (i.e. larger firms have a higher probability to fail in credit payments). This result reflects the characteristics of the sample of the Central Balance Sheet Database, in which, the companies with failure have, on average, more employees than the total, while the smaller companies are typically creditworthy.

Therefore, it is possible to determine a score (which is a synthetic measure of creditworthiness) for each firm, using the formula of the discriminant function to the respective financial ratios. This permit to classify firms into creditworthiness levels, stated as a range of score values with homogeneous probabilities of default in credit payments. The score distribution for each group is illustrated in Charts 4.1 and 4.2.

Table 4

RESULTS: DISCRIMINANT FUNCTION AND EQUIVALENT LINEAR LOGIT MODEL Entry into failure in debt payments in the year			
	Total		**Manufacturing**	
	Discriminant function	**Logit model** [1]	**Discriminant function**	**Logit model** [1]
	-1.395	-5.354	-1.475	-5.796
		(0.34)		(0.51)
1	2.267	2.379	2.775	2.634
		(0.25)		(0.40)
3	-1.150	-0.956	-1.043	-0.864
		(0.17)		(0.28)
3	-1.102	-2.197	-1.569	-3.263
		(0.53)		(0.96)
4	-4.420	-4.240	-5.815	-3.746
		(0.64)		(0.78)
	0.641	1.631	0.431	1.406
		(0.31)		(0.46)
(2)	0.270	0.217	0.147	0.118
		(0.02)		(0.03)

Notes: **(1)** Numbers in brackets refer to standard deviations. **(2)** Output gap as a percentage.

Chart 4.1

Distribution of score values – Total
in groups without default (0) and with default (1)

Distribution of score values – Manufacturing
in groups without default (0) and with default (1)

Occurrence of failure in debt payments

Occurrence of failure in debt payments
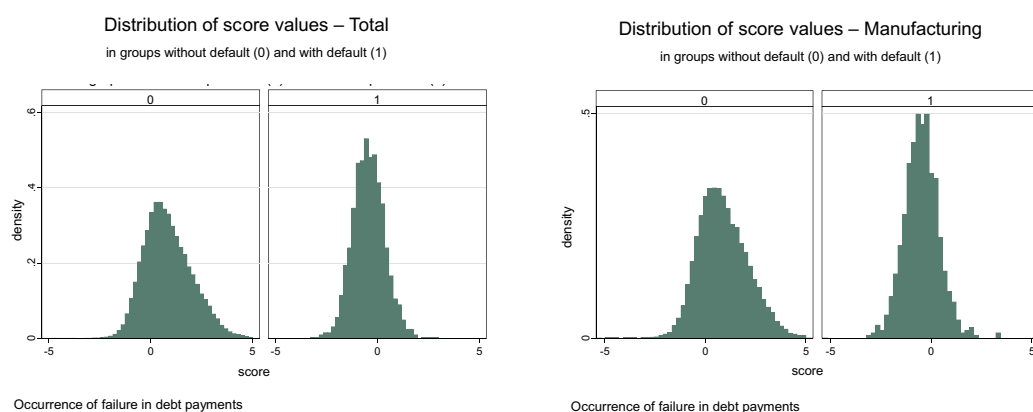
Note: The calculation of scores is based on standardised coefficients.

Chart 4.2

Distribution of score values – Total
in groups without default (0) and with default (1)

Distribution of score values – Manufacturing
in groups without default (0) and with default (1)

Entry into failure in debt payments

Entry into failure in debt payments
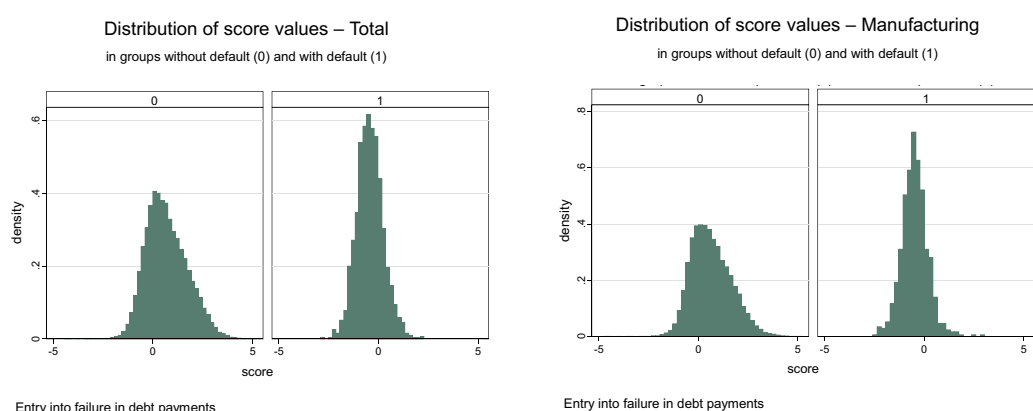
Note: The calculation of scores is based on standardised coefficients.

In the case of the logistic regression, the estimated model permits observations to be classified according to the value estimated for the probability of occurrence of failure in debt payments. The level of estimated probabilities, in turn, is influenced by the actual proportion of observations with default in credit payments in total observations considered in the model. In order to render comparable the probabilities estimated by the logit models and the percentage of default of the original sample, the estimation of the logistic regression models took into account all observations available in the original sample.

Table 5 presents the percentage of observations with default in credit payments included in each percentile of score values estimated by the discriminant function. It includes also the probabilities of default in credit payments estimated by the logistic regression model for the observations belonging to the percentile.

In the case of the logit model, the inclusion in each of the groups is determined by comparing the estimated probability with the value of the probability selected as cut-off between the two groups. The per-

Table 5

	DISTRIBUTION OF OBSERVATIONS WITH DEFAULT IN CREDIT PAYMENTS BY SCORE CLASS							
Percentil	**Model 1 – total**		**Model 1 Manufacturing**		**Model 2 – total**		**Model 2 Manufacturing**	
	Perc.	**Logit**	**Perc.**	**Logit**	**Perc.**	**Logit**	**Perc.**	**Logit**
[0;10[	10.57	9.88	11.83	10.91	3.94	3.91	3.83	3.57
[10;20[	5.55	5.64	5.88	5.83	2.38	2.28	2.22	2.20
[20;30[	3.87	3.96	4.01	4.05	1.65	1.68	1.85	1.67
[30;40[	3.14	2.96	2.65	2.98	1.56	1.32	1.40	1.33
[40;50[	2.24	2.28	2.56	2.30	1.03	1.04	0.90	1.06
[50;60[	1.63	1.73	1.42	1.69	0.54	0.80	0.74	0.82
[60;70[	1.04	1.23	0.95	1.12	0.49	0.57	0.42	0.61
[70;80[	0.70	0.79	0.60	0.71	0.31	0.37	0.17	0.38
[80;90[	0.36	0.38	0.23	0.34	0.19	0.19	0.15	0.20
[90;100]	0.07	0.07	0.10	0.06	0.03	0.04	0.07	0.04

Note: This table presents the percentage of observations with default in credit payments for each class to which the percentile is the upper limit (model 1: occurrence of failure in debt payments in the year; model 2: entry into failure in debt payments) in total observations in which the estimated score belongs to that class. On the right-hand side, it includes the average value of default probabilities estimated by the logistic regression model for observations included in each percentile class (as a percentage). The score is calculated for all available observations.

formance of the logit models estimated for the occurrence of failure in debt payments in the year is represented in Chart 5 by the respective ROC curves.[28]

Chart 6 compares the average probability predicted by the logit model for the "occurrence of failure in debt payments in the year" with the percentage of failed companies in the sample in each of the years considered. During the second half of the 1990s, the probability of occurrence of failure in debt payments by non-financial corporations declined systematically, which was supported by the path followed by the interest rate and by the economic juncture. This trend was reversed in 2000, showing a decoupling between the two lines, in particular after 2002. The difference in the profile of the two measures over the last two years of the period under review may reflect somewhat easier conditions provided by financial institutions to companies with fragile financial positions to negotiate the respective loans. This

Chart 5

ROC CURVES
Model relative to the occurrence of failure in debt payments

Total — Area under ROC curve = 0.8396

Manufacturing — Area under ROC curve = 0.8502
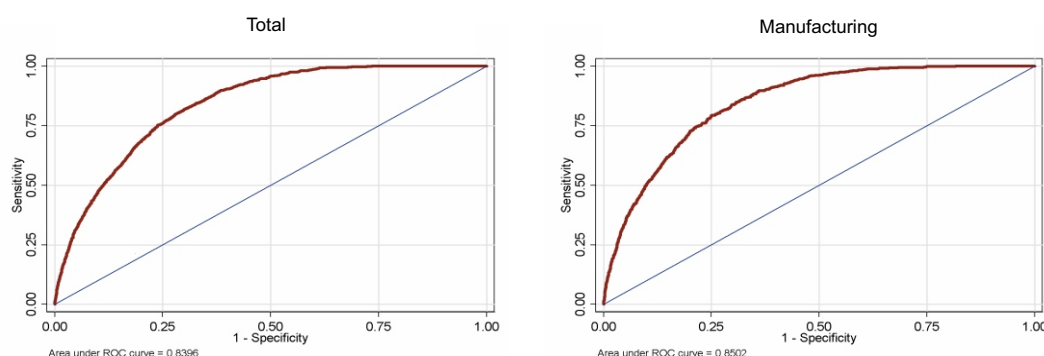
(28) ROC means Receiver Operating Characteristic. For an intuitive introduction to this topic, see *http://www*.anaesthetist.com/mnm/stats/roc/.

Chart 6

AVERAGE DEFAULT PROBABILITIES ESTIMATED BY THE LOGIT MODEL

Default in credit payments in the year
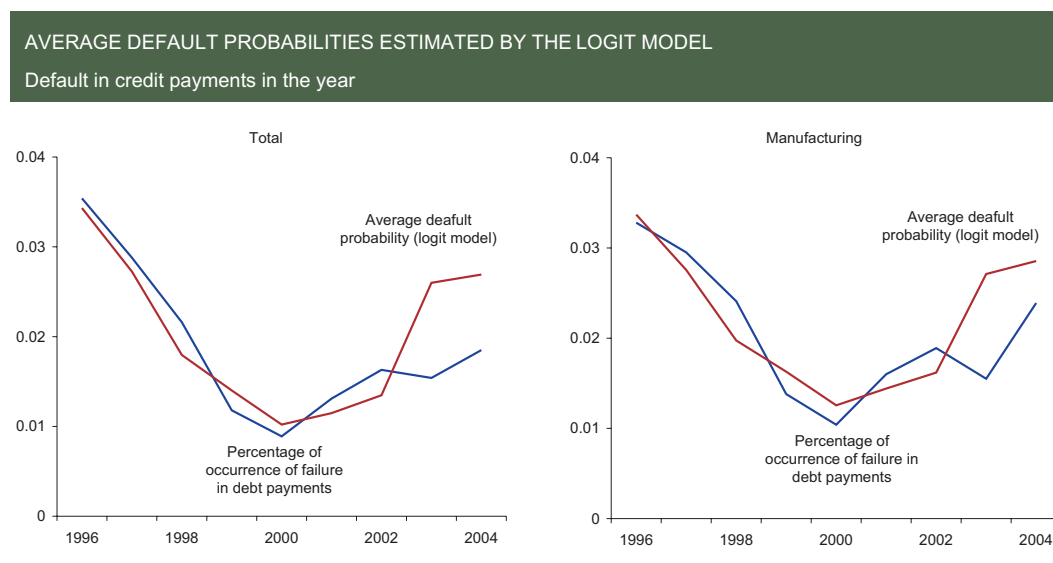
development took place against a background of increased competition among banks and of interest rates standing at historically low levels.

5. CONCLUSIONS

The objective of this study was to develop a model aimed at obtaining synthetic indicators on credit risk of the non-financial corporations, by resorting to individual financial information annually disclosed by companies. With this view, a number of financial ratios were analysed in order to gauge their capacity to discriminate companies with higher probability of occurrence of failure in debt payments. A discriminant function was used for this analysis, as well as linear logit/probit models. As expected, more indebted companies will tend to fail debt payments more easily. In turn, companies with higher liquidity and yield ratios will be less liable to enter into failure in debt payments.

This article is a further step into the systematic utilisation of microdata of companies for the purposes of financial stability analysis as well as supervision. However, it has some limitations chiefly resulting from the bias of the sample of firms in the Central Balance-Sheet Database. In particular, data available on financial statements do not cover a significant number of companies with lower credit quality, thus limiting the discriminating power of the model. The results of this fact are, on the one hand, less conventional signs of the coefficients associated to some indicators (as the case of the weight of short-term debt in the total and the corporation size) and, on the other hand, the little diversified range of indicators kept in the final model (due to the absence of discriminating power in other indicators covering the more operational aspects of the companies in the sample).

In spite of the limitations due to the characteristics of the information used, the methodology followed permits to define a simple system for the classification of companies based on a score to which a probability of default in credit payments may be associated. The possibility of classifying companies in classes with homogeneous default probabilities has obvious advantages for the supervision of institutions, either because it permits minimum capital requirements to be calculated according to Basle II assumptions, or because it allows for credit provisioning regimes to be defined on the basis of expected losses. Based on the average probability of default in credit payments associated with each score class, the value of debt at risk may be determined at the level of individual companies as the product of that probability by the amount of the financial debt of each company, making it possible to monitor com-

panies of upper risk for the system. The availability of relatively simple financial information on a significant share of indebted companies with specific banking groups will also permit to gauge the amount of debt at risk for these groups and, in aggregate terms, for the system as a whole, thus monitoring it .

The results of this study may be enhanced depending on the additional information made available in the future. Besides incorporating more representative financial information in terms of credit risk (i.e. covering more corporations with default in debt payments), also the inclusion in models of other type of variables, such as the existence of collateral, or of information on other characteristics of the corporation (age, inclusion in a economic group, etc.) will contribute to improve the reliability of results. Monitoring the performance of the estimated models through the inclusion of information relating to subsequent years as it becomes available and applying the methodology to some specific branches of activity will be natural developments of the work presented in this article.

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CREDIT RISK DRIVERS: EVALUATING THE CONTRIBUTION OF FIRM LEVEL INFORMATION AND OF MACROECONOMIC DYNAMICS*

*Diana Bonfim***

1. INTRODUCTION

Banks and other financial intermediaries try to maximise their profits, which requires an accurate pricing of the risks contained in their assets portfolios. Thereby, given the weight loans to firms have on banks' assets, understanding why do some firms default, while others do not, may be a very important question to address. Moreover, from a financial stability viewpoint, it is interesting to understand if credit default risk is mostly driven by idiosyncratic factors (which may allow for the identification of a set of characteristics common to riskier firms) or by systematic factors, which simultaneously affect all firms (thus having more widespread impacts on financial stability, given that several banks can suffer sizeable losses in their credit portfolios at the same time). On one hand, firm-specific characteristics should clearly be determinant on their decision to default on bank loans. On the other hand, it has become clearer that macroeconomic developments may also have an important role in the evolution of credit risk over time. The empirical results obtained in the literature suggest that there are some important links between credit risk and macroeconomic developments (see, for instance, Pederzoli and Torricelli (2005), Jiménez and Saurina (2006) or _Bonfim_ (2007)). In fact, periods of strong economic growth, which are sometimes accompanied by robust credit growth, are sometimes followed, with some lag, by an increase in default rates at the aggregate level, possibly as a consequence of imbalances generated in those periods.

Under this setup, the main purpose of this article is to empirically examine the determinants of corporate credit default in loans granted by the Portuguese banking system, taking simultaneously into account firm-specific data as well as macroeconomic information. Using micro information, which includes very detailed firm-level data, it becomes clear that the firms' financial situation will influence the probability of default on their loan commitments. Profitability, liquidity, solvency and recent investment and sales performance seem to offer a valuable contribution in explaining default probabilities. When time-effect controls or macroeconomic variables are taken into account together with the firm-specific information, the results of the models seem to improve considerably. Hence, the results obtained with this work suggest that even though the determinants of loan default at the micro level are ultimately driven by the firms' specific financial situation, there are important relationships between overall macroeconomic conditions and default probabilities over time.

The remainder of the paper proceeds as follows. _Section 2_ describes the main datasets used in this work, which include information for more than 30.000 Portuguese firms. In _Section 3_ we present some summary statistics which are relevant for the characterisation of the sample. Afterwards, in _Section 4_ we briefly present the modelling setup underlying the empirical work which will be developed in

Sections 5 and *6*, which present, respectively, the results obtained using discrete choice models and duration models. Finally, in *Section 7* we present some concluding remarks.

2. DATA

The microeconomic dataset used in this work comprises two distinct datasets held by Banco de Portugal, namely, the Central Credit Register and the Central Balance Sheet Database. The Central Credit Register provides information on all credit exposures above 50 euro in Portugal. The information contained in this database is reported by credit institutions (reporting is mandatory) and its main objective is sharing information between participant institutions, in order to improve their credit risk assessment and management. This database contains monthly information on loans granted to firms and households, including their current status (it is possible to know whether credit has become overdue, if it was renegotiated, or if it is an off-balance sheet risk, such as the unused parts of credit lines or bank guarantees).[1] Using end-of-year data for the period between 1996 and 2002, there are 203.655 observations regarding loans granted to non-financial corporations.[2] In turn, the Central Balance Sheet Database contains detailed accounting data on a large sample of Portuguese firms, being used mostly for statistical and economic analysis purposes.[3] Reporting by firms in this database is not compulsory. The sample of firms covers to an acceptable degree the Portuguese universe, although some bias may exist towards larger firms, which are almost totally covered.[4] In this dataset there are 153.581 annual observations for the period between 1996 and 2002. By merging the two datasets there are 113.119 observations, which regard 33.084 different firms.

We constructed several ratios and indicators to evaluate firms' financial situation, namely in what concerns their profitability, financial structure, leverage, productivity, liquidity and investment. In order to guarantee the quality of results, several filters were applied to the data. First, ratios for which the denominator equalled (or was close to) zero, as well as ratios for which a negative numerator was combined with a negative denominator (leading to ratios with a positive sign), were eliminated from the analysis, in order to avoid misleading results. Moreover, in order to prevent outliers from distorting the analysis, observations below the 1st percentile and above the 99th percentile were replaced with the value of the corresponding percentile.

3. CHARACTERISATION OF FIRMS IN DEFAULT

Only a small percentage of firms in the sample has credit overdue (around 3 per cent of firms). The higher default rates are recorded in fishing, mining, tourism and restaurants and manufacturing (Table 1). With regard to the size of firms, the highest default frequencies are recorded by medium-sized firms, closely followed by larger firms, contrary to what is usually seen in the literature. For instance, Bhattacharjee *et al*. (2002), Bunn and Redwood (2003), Eklund *et al* . (2001) and Jiménez and Saurina

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(1) The main purposes and features of the Central Credit Register of Banco de Portugal are described in
http://www.bportugal.pt/internet/prod/publish/cadernos/responsabilidades_credito_e.pdf.

(2) Reporting credit institutions aggregate information on loans with similar status for each firm (i.e. information is not reported on a loan-by-loan basis). In order to merge the two datasets used in this article, the CRC records were aggregated within firms. As a consequence, each observation is defined as a pair firm-year, summing up all credit liabilities for a given firm in each year.

(3) The main purposes and features of the Central Balance Sheet Database of Banco de Portugal are described in
http://www.bportugal.pt/internet/prod/publish/cadernos/central_balancos_e.pdf.

(4) In 2005 firms included in the Central Balance Sheet Database accounted for around 61 per cent of the gross value added of the Portuguese economy and for around 35 per cent of the total size of the workforce in Portugal. However, while for large enterprises coverage stood at around 82 per cent of the size of the workforce, for small and medium-sized enterprises this coverage stood at around 20 per cent. For more details on the coverage of this database, see *Table G.1.2* of the Statistical Bulletin of Banco de Portugal.

Table 1

DEFAULT FREQUENCIES BY FIRM SECTOR AND SIZE		

By sector of activity

	No of obs.	Default rate (%)
Fishing	277	11.19
Mining	1 084	5.17
Agriculture	3 487	2.81
Manufacturing	41 427	3.76
Utilities	355	1.97
Construction	14 020	3.25
Commerce	31 793	1.83
Tourism and restaurants	1 405	4.70
Transportation and communications	6 004	2.60
Real estate activities	2 319	2.29
Education	249	3.21
Healthcare	331	1.21

By size

	No of obs.	Default rate (%)
Micro	39 725	2.67
Small	42 608	2.72
Medium	16 548	4.21
Large	4 320	3.89

Note: The size of enterprises was defined according to Commission Recommendation of 6 May 2003 (2003/631/EC), taking into account the number of employees and sales and services turnover.

(2004) find that smaller firms are more likely to default.[5] In turn, Pain and Vesala (2004) and Bernhardsen (2001) conclude that any systemic effect of firm size on default is relatively small, particularly after controlling for firm's characteristics.[6] Such results imply that two firms with very similar financial indicators are not likely to present significantly different default probabilities, even if they have considerably different sizes. Finally, Benito *et al*. (2004), using a sample of Spanish firms, obtain a result similar to ours, observing a positive relationship between firm size and default rates. The authors argue that their database may be biased towards "good" companies, which may also be a problem in our database, given that reporting to the Central Balance Sheet Database is not mandatory (and therefore the response rate by firms under strong financial pressure is expected to be relatively lower).[7]

Taking into account that one of the main purposes of this article is to understand what drives credit risk at the firm-level, it may be relevant to compare some features of firms with and without default. Table 2 presents some of the main results obtained, showing that, in fact, there are several aspects that distinguish firms in default. For instance, average profitability levels in these firms are much lower, sales growth is far lower, and the dependence on external funding sources (solvency ratio, defined as the ratio between equity and total assets) seems to be significantly higher. Moreover, firms with problems in

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(5) Bhattacharjee *et al*. (2002) and Bunn and Redwood (2003) use samples of firms from the United Kingdom, Eklund *et al*. (2001) use a database of Norwegian firms and, finally, Jiménez and Saurina (2004) use Banco de España databases similar to those used in this article.

(6) The above-mentioned studies use a database comprising European firms and Norwegian firms respectively.

(7) Antunes *et al*. (2005) conclude that default rates tend to be lower for firms with more credit, on the basis of available information in Central Credit Register, which contributes to strengthen the hypothesis that small enterprises in financial distress should be sub-represented in the Central Balance Sheet Database.

Table 2

SUMMARY STATISTICS – COMPARISON OF FIRMS WITH AND WITHOUT DEFAULTS				
			Welch test - Ho: no difference	
	Mean values for non-defaulting firms in t	Mean values for defaulting firms in t	Ha: difference not zero Pr(|T| > |t|)	Significantly different mean (Y/N)
ROA	0.5	-4.9	0.00	Y
Sales growth	12.9	5.7	0.00	Y
Solvency ratio	23.2	1.1	0.00	Y
Total credit as a % of assets	12.5	16.9	0.00	Y
Leverage	76.8	98.9	0.00	Y
Investment rate	2.6	-2.5	0.00	Y
Liquidity ratio	119.0	86.5	0.00	Y
Number of observations	100 117	3 084		

Note: ROA (return on assets) defined as net income as a percentage of assets; Sales growth defined as the year-on-year rate of change in sales and services; solvency ratio assessed by the ratio of equity to assets; total credit refers to total debt recorded at Central Credit Register for each firm; leverage is defined as the ratio of the firm's liabilities to assets; the investment rate refers to the annual change in net fixed assets as a percentage of sales and services provided; finally, the liquidity ratio assesses the amount recorded under cash and deposits, third-party debt, inventories and marketable securities as a percentage of third-party debt.

paying their debt also have, on average, lower investment rates, as well as less favourable liquidity indicators. The Welch test makes it possible to determine whether mean values in these two groups of firms are significantly different. The results of this statistical test confirm that all mean values for firms in default are statistically different from mean values for the remaining firms.

The empirical distribution of the default ratio of firms included in the sample is clearly two-peaked: either firms record only small amounts of credit overdue, which should reflect transitory episodes of delinquency, or they default on nearly all their debt, which should be a situation closer to bankruptcy (Chart 1). It may be interesting to notice that the former is particularly frequent for larger firms, whereas the latter mostly respects to smaller firms. In this sense, although larger firms have relatively higher default frequencies, default episodes recorded by these firms usually have a very small magnitude.

By estimating conditional transition matrices, it is possible to assess default probabilities for different time horizons *(t+1, t+2,…)*. These matrices suggest that for firms with no previous default episodes, default probabilities increase steadily over time. In turn, for firms that have recorded some default episode, default probabilities are always far higher than those of firms that have never had problems in paying their debt commitments. This implies that firms with a past record of credit overdue are more likely to default again in the future than firms that never defaulted before.

Chart 1

EMPIRICAL DISTRIBUTION OF THE CREDIT OVERDUE RATIO

(Gaussian kernel density)
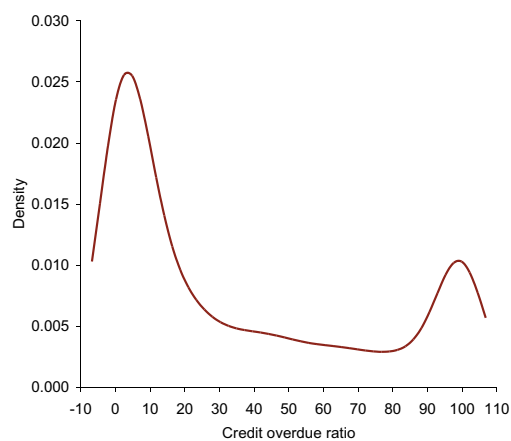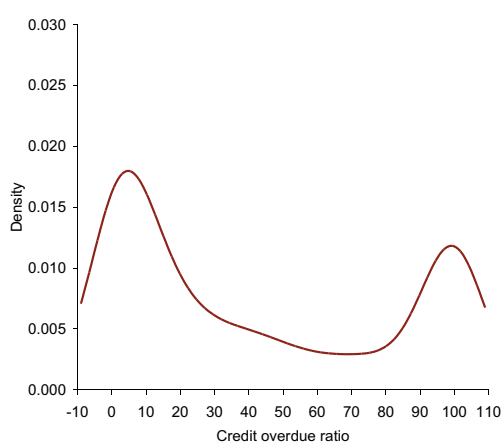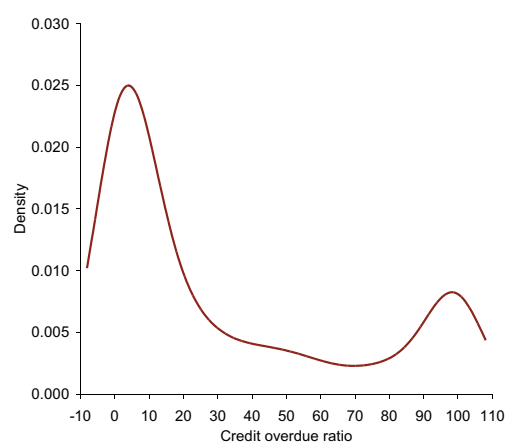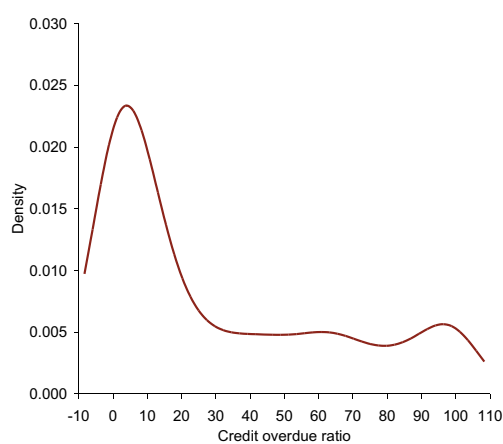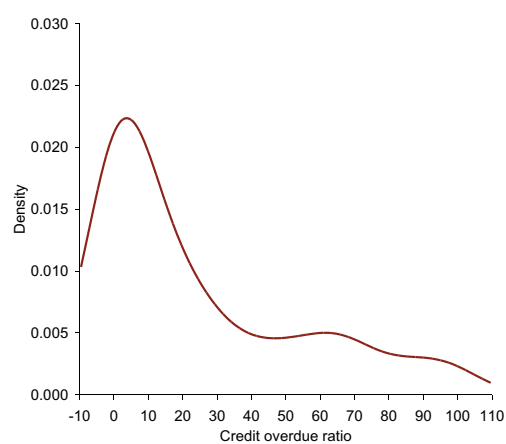
4. METHODOLOGY

A default episode of firm i in period t may be modelled as a random variable Y_{it}, such that:

$$Y_{it} \begin{cases} 1 \text{ of firm } i \text{ defaults in } t \\ 0 \text{ otherwise} \end{cases}$$

The default probability would thus be defined as:

$$\pi_{it} = \Pr(Y_{it} = 1) = \Pr(R_{it} < c_{it})$$

where R_{it} represents the return on a firm's assets. Thus, a firm is likely to default if its returns fall below a given threshold c_{it}.

In this article two types of explanatory variables are considered. The first one is a set of firm-specific variables, which shall account for idiosyncratic risk (Z_{it}). The second vector comprises a set of aggregate time-varying regressors, common to all firms, which intend to account for the systematic risk component (X_t). If we consider that the firm's returns may be defined through a linear combination of these vectors, the following applies:

$$\pi_{it} = \Pr(Y_{it} = 1) = \Pr(R_{it} < c_{it}) = \Pr(\alpha X_t + \beta Z_{it} + u_{it} < c_{it}) = F(\tilde{\alpha} \tilde{X}_t + \tilde{\beta} \tilde{Z}_{it})$$

where $F(.)$ denotes the cumulative distribution function of the residual. This model's parameters may be estimated using a discrete choice model, namely a probit or a logit. The use of this type of econometric model is relatively common in the literature on credit risk, and therefore this will the methodology initially used in this article for the econometric estimation of factors driving loan default.

However, it may be relevant to understand not only if a firm will default, but also when will that default eventually occur. The timing of loan default is important for perform a complete risk assessment, as well as for accurate loan pricing and provisioning. Duration models, which only recently started to be applied to credit risk models, directly model the survival time of a loan, taking as a dependent variable the time until default.[8]

Under the duration modelling framework, we define T as the time until a loan defaults[9]. The hazard function can be defined as the probability of a firm defaulting within the infinitely short interval *[t, t+dt)*, conditional on not having defaulted before:

$$h(t) = \lim_{dt \to 0} \frac{\Pr(t \leq T < t + dt | T \geq t)}{dt}$$

The duration distribution function can be defined as $F(t) = \Pr(T < t)$. The survival function is the probability of surviving up to t, and can be defined as:

$$S(t) = \Pr(T \geq t) = 1 - F(t) = \exp\left(-\int_0^t h(s) ds\right)$$

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(8) For examples of studies applying this econometric estimation technique to credit risk models, see Banasik *et al*. (1999), Carling *et al*. (2007), Couderc and Renault (2005) or Shumway (2001).

(9) Lancaster (1990) presents a detailed and rigorous description of several issues associated with duration models.

Whenever *T* has an exponential distribution, the hazard function *h(t)* is constant. When that is not observed, the underlying process is said to exhibit duration dependence. If $\frac{\partial h(t)}{\partial t}$ 0, there is positive duration dependence, which implies that, in our framework, the probability of default increases over the life of the firm. Otherwise, duration dependence should be negative, implying that the longer the firm has remained without defaulting, the lower should be its default probability.

5. MAIN ECONOMETRIC RESULTS OBTAINED USING DISCRETE CHOICE MODELS

Table 3 presents some of the main results obtained using discrete choice models, based on a random-effects probit model.[10] The choice of variables to be used was based on the estimation of correlation matrices between the set of available variables, as well as on the abovementioned mean comparison statistical tests. The first model includes a relatively diversified set of variables, which broadly characterises firms' financial situation. Sales growth displays a negative coefficient, suggesting that firms with stronger sales growth rates should have lower default probabilities. Profitability seems to offer an important contribution in explaining why do some firms default, given that higher profitability levels should reflect a solid financial situation of the firm and, as a consequence, imply lower default probabilities. The solvency ratio, which is defined as the ratio between equity and total assets, also suggests that firms with healthier financial conditions should have relatively low credit risk. Moreover, firms with high investment rates are also likely to have lower default probabilities. In fact, it seems reasonable to admit that firms under strong financial pressure are not expected to engage in investment projects. Finally, the liquidity indicator, defined as short-term assets as a percentage of the firm's total debt, also displays a negative coefficient, implying that firms facing stronger liquidity constraints may have higher difficulties in paying their debt commitments.

Even though the firm-specific variables taken into account seem to play an important role in predicting loan default for the firms included in this sample, they should be seen as contingent on the firm's size, as well as on the sector in which it operates, given that some variables may be more or less important for different types of firms. In order to control for specific effects associated with such firm characteristics, all the regressions presented in this article include economic sector and firm size dummies as control variables. Results suggest that there are indeed substantial differences in the determinants of default probabilities in various sectors (the estimation of separate regressions for each economic sector in the sample confirms this hypothesis). Estimated models confirm that fishing and mining firms will tend to have higher default probabilities, as shown in Table 1. With regard to the inclusion of control variables for firm size, the results are not so clear. Descriptive statistics for the entire sample suggested that smaller firms show slightly lower default rates than larger firms, which is not consistent with the results usually obtained in the literature on credit risk modelling.[11] Estimated regressions confirm this result, although differences between firms with different dimensions are not statistically significant. This result implies that, although larger firms display slightly higher default probabilities, after controlling for several firm characteristics, firm size does not have a statistically significant effect on default probabilities. As a consequence, two firms with similar financial characteristics should present identical default probabilities, even if they have very different sizes. Finally, given that macroeconomic variables will only be introduced further ahead, year dummies were also included as control variables, in order to control for any possible systematic effects. Most coefficients associated with these year

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(10) Results presented in this section are a brief summary of those presented in *Bonfim* (2007).

(11) This result may be conditioned by the sample bias towards firms with better credit quality, which should be over-represented, as discussed in *Section 3*.

Table 3

PROBIT REGRESSIONS (DEPENDENT VARIABLE: DUMMY CREDIT OVERDUE)						
	Model 1	**Model 2**	**Model 3**	**Model 4**	**Model 5**	**Model 6**
Sales growth	-0.001	-0.001	-0.001	-0.001	-0.001	0.000
	-2.19	*-2.20*	*-2.16*	*-2.52*	*-1.97*	*-0.47*
ROA	-0.004	-0.004	-0.004	-0.004	-0.004	-0.004
	-3.96	*-3.95*	*-3.92*	*-3.97*	*-3.66*	*-4.05*
Solvency ratio	-0.005	-0.005	-0.005	-0.006	-0.006	-0.007
	-7.56	*-7.35*	*-7.36*	*-11.24*	*-11.09*	*-11.87*
Investment rate	-0.005	-0.005	-0.005		-0.005	-0.005
	-5.01	*-4.99*	*-4.99*		*-4.52*	*-5.18*
Liquidity ratio	-0.001	-0.001	-0.001			
	-4.47	*-4.48*	*-4.51*			
Firm age			0.001			
			0.63			
Share of tangible fixed assets				-0.002		
				-1.49		
Available collateral (approx.)					0.001	
					1.51	
Turnover ratio						-0.003
						-12.01
Small			-0.044	-0.035	-0.035	-0.044	-0.034
			-0.52	*-0.41*	*-0.42*	*-0.53*	*-0.41*
Micro			-0.013	-0.001	-0.011	-0.025	-0.059
			-0.15	*-0.01*	*-0.13*	*-0.29*	*-0.69*
Medium-sized			-0.026	-0.022	-0.015	-0.023	-0.005
			-0.30	*-0.25*	*-0.17*	*-0.27*	*-0.06*
Fishing	0.358	0.363	0.360	0.431	0.369	0.234
	1.42	*1.45*	*1.43*	*1.74*	*1.46*	*0.93*
Mining	0.222	0.223	0.224	0.240	0.228	0.148
	1.57	*1.57*	*1.58*	*1.71*	*1.60*	*1.05*
Agriculture	-0.191	-0.195	-0.194	-0.182	-0.194	-0.306
	-1.95	*-1.98*	*-1.96*	*-1.85*	*-1.94*	*-3.07*
Utilities	-0.492	-0.500	-0.492	-0.446	-0.473	-0.622
	-1.34	*-1.36*	*-1.34*	*-1.26*	*-1.29*	*-1.70*
Construction	0.040	0.039	0.041	0.019	0.035	-0.027
	0.81	*0.78*	*0.82*	*0.37*	*0.67*	*-0.54*
Commerce	-0.329	-0.332	-0.332	-0.356	-0.337	-0.199
	-7.34	*-7.26*	*-7.25*	*-7.78*	*-7.09*	*-4.34*
Tourism and restaurants	-0.151	-0.152	-0.154	-0.107	-0.152	-0.177
	-1.03	*-1.04*	*-1.05*	*-0.75*	*-1.02*	*-1.21*
Transportation and communications	-0.019	-0.023	-0.023	-0.027	-0.030	0.052
	-0.26	*-0.32*	*-0.32*	*-0.38*	*-0.41*	*0.73*
Real estate activities	-0.496	-0.502	-0.499	-0.535	-0.505	-0.585
	-3.28	*-3.32*	*-3.29*	*-3.60*	*-3.36*	*-3.91*
Education	0.194	0.190	0.193	0.189	0.190	0.166
	0.65	*0.64*	*0.65*	*0.63*	*0.64*	*0.55*
Healthcare	-0.286	-0.287	-0.284	-0.266	-0.277	-0.253
	-0.91	*-0.92*	*-0.91*	*-0.86*	*-0.88*	*-0.81*
1997	-0.303	-0.303	-0.302	-0.312	-0.313	-0.284
	-5.61	*-5.59*	*-5.56*	*-5.76*	*-5.76*	*-5.25*
1998	-0.229	-0.230	-0.228	-0.236	-0.235	-0.206
	-4.55	*-4.55*	*-4.50*	*-4.68*	*-4.65*	*-4.09*
1999	-0.340	-0.341	-0.339	-0.343	-0.342	-0.329
	-6.38	*-6.37*	*-6.34*	*-6.44*	*-6.39*	*-6.15*
2000	-0.390	-0.390	-0.390	-0.391	-0.393	-0.391
	-6.51	*-6.51*	*-6.51*	*-6.56*	*-6.56*	*-6.50*
2002	0.006	0.006	0.005	0.011	0.002	-0.013
	0.12	*0.12*	*0.11*	*0.21*	*0.05*	*-0.26*
Constant	-2.184	-2.153	-2.175	-2.048	-2.304	-1.907
	-29.42	*-20.17*	*-19.27*	*-11.85*	*-21.12*	*-18.61*
Number of observations	71 058	71 058	71 058	71 078	71 078	71 406
Number of firms	24 668	24 668	24 668	24 589	24 589	24 731
Pseudo-R^2	0.046	0.046	0.046	0.042	0.051	0.062
Wald Chi^2	346.3	347.0	346.7	338.1	345.8	412.5
Prob > Chi^2	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*
rho	0.397	0.396	0.396	0.392	0.399	0.389
Prob >= chibar^2	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*

Note: z-scores in italics. All models estimated using a random-effects probit estimator, where the dependent variable is the dummy credit overdue. Coefficients refer to marginal effects. In what concerns size, sector and year dummies, the omitted variables were large enterprises, manufacturing firms and 2001 respectively. The pseudo-R^2 is a measure of the goodness of the fit. The Wald test evaluates the overall statistical significance of the estimated coefficients. Finally, rho assesses the proportion of the total variance resulting from the panel-level variance component.

dummies are significant, which gives support to the hypothesis that macroeconomic developments should also be important in explaining loan default.

In addition to the variables used in the first model (sales growth, return on assets, solvency ratio, investment rate and liquidity indicator), other possible specifications were considered, which are also shown in Table 3. Firm age is not a statistically significant variable for determining default probabilities. Another variable considered was the share of tangible assets on firms' total non-financial fixed assets. This variable displays a negative coefficient, implying that the higher the share of tangible assets, the lower is the default probability, after controlling for the firm's economic sector. Nevertheless, the estimated coefficient for this variable is hardly statistically significant. Given that the database does not provide information on the collateral used to guarantee loans, we tried to build an approximate measure of total available collateral (tangible assets as a percentage of total assets), but it did not prove to be significant in the estimated regression models. Turnover ratios, defined as sales over assets, also seem to have a relatively significant explanatory power and show a negative sign. This variable confirms the evidence presented by sales growth (which is not significant in this specification, given the strong correlations between the two variables), suggesting that the current buoyancy of firm activity is an important signal of its financial soundness.

The different model specifications outlined in Table 3 help to identify some of the firm-specific determinants of loan default in a given moment of time. However, it should also be of interest to evaluate how the firm's past performance affects its current default probability. Such information may help to improve the ability to forecast default probabilities, given that it helps to better understand to what extent the deterioration of some financial indicators may imply an increase in the firm's credit risk in the near future. Moreover, understanding such dynamic relationships is also important due to the time lag usually associated with the release of accounting data, particularly for non-quoted firms, which may hamper the monitoring of credit risk developments over time. In this sense, Table 4 shows the baseline model defined in Table 3 with explanatory variables lagged by one, two, three and four years, respectively. When all firm variables are lagged by one and two years, the results are mainly robust. Obtaining this result is very important, given that it implies that variables identified as particularly relevant for determining the current risk of the firm also make it possible to detect in advance possible financial difficulties in a horizon of up to two years. The most notable exception is the investment rate, which ceases to be significant when lagged. Moreover, the estimated coefficient for sales growth is not statistically significant when more than two lags are considered, suggesting that only the most recent sales performance truly conditions firms' default probabilities. There seems to be an increase in the marginal effect of profitability on credit risk, and, conversely, a decrease in the relative importance of the solvency ratio. Hence, sustained poor profitability ratios over time are a strong sign of firm distress, yielding possibly high future default probabilities. When variables are lagged by three or four years there is a clear decrease in the model's quality (most variables are no longer significant and the model's goodness of fit, assessed by the pseudo-R2, decreases considerably),[12] suggesting that the firm's recent performance is, as expected, much more relevant to explain loan default than its historical background over a longer horizon.

In addition, we also considered simultaneously several time lags, in order to capture in a more integrated manner the dynamic effect of the firm's financial situation on credit risk. Overall, the results are consistent with those previously described, as in both cases only one and two year lags turn out to be statistically significant. The results confirm that profitability seems to have the highest lagged explana-

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[12] The pseudo-R2 is a measure of the goodness of the fit, being computed as ―――⁰――――, where ₀ is the log-likelihood of the constant-only model Y_{it} ,
and is the log-likelihood of the estimated regression. This ratio is a measure of the percentage of the variance on the dependent variable that is captured by the model.

Table 4

PROBIT REGRESSIONS								
		Baseline specification	**All firm variables lagged by:**				**Models with several simultaneous lags**	
			1 year	**2 years**	**3 years**	**4 years**		
Sales growth	*t*	-0.001	-0.001	0.000	0.001	0.001	-0.003	
		-2.20	*-2.60*	*0.23*	*1.23*	*0.99*	*-5.54*	
	t-1						-0.001	-0.001
							-2.84	*-2.59*
ROA	*t*	-0.004	-0.005	-0.006	-0.006	-0.003		
		-3.95	*-3.59*	*-3.09*	*-2.22*	*-1.32*		
	t-1							-0.005
								-3.58
	t-2						-0.003	
							-2.01	
Solvency ratio	*t*	-0.005	-0.003	-0.003	-0.002	-0.002	-0.007	
		-7.35	*-3.60*	*-3.21*	*-1.83*	*-1.68*	*-7.39*	
	t-1							-0.003
								-3.61
	t-2						0.003	
							3.22	
Investment rate	*t*	-0.005	0.000	0.002	0.000	0.000	-0.005	
		-4.99	*0.17*	*1.40*	*0.22*	*-0.10*	*-3.62*	
Liquidity ratio	*t*	-0.001	-0.002	-0.001	-0.002	-0.001	-0.002	
		-4.48	*-4.68*	*-3.25*	*-3.23*	*-2.39*	*-3.99*	
	t-1							-0.002
								-4.81
Constant		-2.153	-2.085	-2.130	-1.951	-1.756	-2.092	-2.083
		-20.17	*-17.31*	*-14.28*	*-10.88*	*-14.92*	*-16.90*	*-17.32*
Number of observations		71 058	46 608	30 924	19 831	12 139	45 335	46 608
Number of firms		24 668	17 169	12 135	8 623	7 346	16 662	17 169
Pseudo-R^2		0.046	0.038	0.038	0.037	0.023	0.052	0.038
Wald Chi^2		347.0	196.4	119.0	65.4	55.7	250.2	196.2
Prob > Chi^2		*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*
rho		0.396	0.357	0.347	0.244	0.000	0.362	0.358
Prob >= chibar^2		*0.00*	*0.00*	*0.00*	*0.02*	*1.00*	*0.00*	*0.00*

Note: z-scores in italics. All regressions include the control dummies for size, sector and year presented in Table 3. All models estimated using a random-effects probit estimator, where the dependent variable is the dummy credit overdue. Coefficients refer to marginal effects. The pseudo-R2 is a measure of the goodness of the fit. The Wald test evaluates the overall statistical significance of the estimated coefficients. Finally, rho assesses the proportion of the total variance resulting from the panel-level variance component.

tory power, though the liquidity and solvency ratios also provide interesting information when lagged by one year. Again, the investment rate fails to be significant when lagged.

As mentioned in the beginning of this article, empirical evidence suggests that developments in default probabilities over time should be largely associated with cyclical fluctuations of the economic activity. In this sense, it may be interesting to assess the contribution of firms' specific characteristics and of macroeconomic and financial conditions, by introducing macroeconomic variables in panel data regressions, as an alternative to simple time effects controls. The most insightful results are presented in Table 5. From all the variables considered, the most important seem to be the GDP growth rate or the

Table 5

PROBIT REGRESSIONS WITH MACROECONOMIC VARIABLES									
	Baseline specification without time dummies	**Baseline specification with time dummies**	**Model1**	**Model 2**	**Model 3**	**Model 4**	**Model 5**	**Model 6**	**Model 7**
Sales growth	-0.001	-0.001	-0.001	-0.001	-0.001	-0.001	-0.001	-0.001	-0.001
	-2.67	*-2.20*	*-2.12*	*-2.14*	*-2.21*	*-2.33*	*-2.18*	*-2.21*	*-0.72*
ROA	-0.004	-0.004	-0.004	-0.004	-0.004	-0.004	-0.004	-0.004	-0.004
	-4.30	*-3.95*	*-3.93*	*-3.96*	*-3.90*	*-4.16*	*-3.94*	*-3.94*	*-1.63*
Solvency ratio	-0.004	-0.005	-0.005	-0.005	-0.005	-0.004	-0.005	-0.005	-0.004
	-7.06	*-7.35*	*-7.37*	*-7.35*	*-7.34*	*-7.23*	*-7.37*	*-7.32*	*-3.08*
Investment rate	-0.005	-0.005	-0.005	-0.005	-0.005	-0.005	-0.005	-0.005	-0.006
	-5.35	*-4.99*	*-4.99*	*-4.99*	*-4.91*	*-5.25*	*-4.97*	*-4.95*	*-2.45*
Liquidity ratio	-0.001	-0.001	-0.001	-0.001	-0.001	-0.001	-0.001	-0.001	-0.003
	-4.52	*-4.48*	*-4.46*	*-4.47*	*-4.50*	*-4.44*	*-4.49*	*-4.49*	*-4.28*
Interest rate on loans to firms								0.026	
								2.26	
Yield curve slope (10 y - 3 m)							-0.159		
							-3.43		
Loan growth					-0.023		-0.019		
					-8.34		*-6.02*		
PSI Geral variation						-0.002	-0.002		
						-4.86	*-3.48*		
GDP growth rate			-0.087						-0.141
			-7.54						*-6.47*
Coincident indicator of economic activity				-0.061			-0.075		
				-7.14			*-7.07*		
Sales growth * GDP growth rate									0.000
									-0.16
ROA* GDP growth rate									0.000
									-0.16
Solvency ratio* GDP growth rate									0.000
									-0.35
Investment rate * GDP growth rate									0.000
									0.26
Liquidity ratio* GDP growth rate									0.001
									2.81
1997		-0.303							
		-5.59							
1998		-0.230							
		-4.55							
1999		-0.341							
		-6.37							
2000		-0.390							
		-6.51							
2002		0.006							
		0.12							
Constant	-2.241	-2.153	-2.093	-2.192	-1.872	-2.274	-1.755	-2.321	-1.935
	-23.26	*-20.17*	*-20.38*	*-21.40*	*-17.64*	*-22.45*	*-14.57*	*-19.71*	*-16.78*
Number of observations	71 058	71 058	71 058	71 058	71 058	71 058	71 058	71 058	71 058
Number of firms	24 668	24 668	24 668	24 668	24 668	24 668	24 668	24 668	24 668
Pseudo-R^2	0.037	0.046	0.043	0.042	0.044	0.040	0.045	0.043	0.044
Wald Chi^2	333.8	347.0	330.3	327.3	345.7	323.3	344.3	338.3	336.2
Prob > Chi^2	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*
rho	0.336	0.396	0.393	0.392	0.384	0.371	0.395	0.383	0.395
Prob >= $chibar^2$	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*

Note: z-scores in italics. All regressions include the control dummies for size and sector presented in Table 3. All models estimated using a random-effects probit estimator, where the dependent variable is the dummy credit overdue. Coefficients refer to marginal effects. The pseudo-R2 is a measure of the goodness of the fit. The Wald test evaluates the overall statistical significance of the estimated coefficients. Finally, rho assesses the proportion of the total variance resulting from the panel-level variance component.

coincident economic activity indicator (with a negative contemporaneous impact on default probabilities, in agreement with what would be expected), loan growth (which also displays a negative coefficient), the interest rate on loans to firms (with a positive coefficient, as expected), and the change in stock market prices (implying that positive developments in stock market prices seem to be associated with lower default probabilities). Given that firms' financial ratios are also subject to sizeable fluctuations over the business cycle, we tried to explicitly model these co-movements by adding to the model interactions between firm-specific variables and the GDP growth rate. Results suggest that these interactions are not particularly significant in determining default probabilities (only the interaction between the liquidity indicator and the GDP growth rate is significant). In general, macroeconomic variables shown in Table 5 have a considerable explanatory power, with relatively strong marginal effects on default probabilities. Furthermore, the inclusion of control variables for time effects or macroeconomic variables significantly improves the model's goodness of fit.

6. MAIN ECONOMETRIC RESULTS OBTAINED USING DURATION MODELS

The application of duration models to our research helps to understand not only why do firms default, but also when is default more likely to occur. In order to estimate that, we take into account information on the firm's survival since its creation date. However, the database used in this research only includes data from 1996 onwards, originating significant left-censoring problems. This problem can be partly accounted for by declaring that firms are considered to be at risk since their creation date, though that failure risk can be observable only after the firm enters the sample (which may eventually be after 1996). This information is taken into account in the estimation of the regressions. Alternatively, in order to fully eliminate left-censoring, some estimations only considered firms created after 1996. However, in this case we are analysing a very specific group of newly created firms, which may show credit risk determinants very different from those of the remaining firms. In general, these firms have, on average, higher investment rates and indebtedness levels, which is consistent with their life phase. Chart 2

Chart 2

HAZARD FUNCTION FOR FIRMS ESTABLISHED SINCE 1996
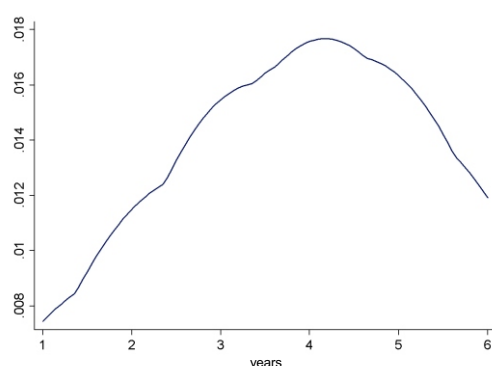
Table 6

COX REGRESSIONS (HAZARD RATIOS)

	Full sample			New firms								
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8	Model 9	Model 10	Model 11	Model 12
Sales growth	0.998			1.003								
	-1.72			*1.54*								
ROA	0.995	0.994	0.994	0.992	0.992	0.992	0.993	0.993	0.992	0.992	0.993	0.992
	-4.33	*-4.83*	*-4.84*	*-2.44*	*-2.31*	*-2.31*	*-2.02*	*-1.79*	*-2.36*	*-2.37*	*-2.17*	*-2.49*
Solvency ratio	0.995	0.995	0.995	1.003	1.003		1.003	1.000	1.005	1.003	1.002	1.003
	-4.59	*-4.56*	*-4.53*	*0.74*	*0.78*		*0.74*	*-0.06*	*1.29*	*0.70*	*0.59*	*0.77*
Investment rate	0.990	0.989	0.989	0.993	0.994	0.994	0.994	0.993	0.994	0.994	0.994	0.994
	-3.94	*-4.10*	*-4.12*	*-1.23*	*-1.02*	*-1.02*	*-1.00*	*-1.47*	*-1.04*	*-1.04*	*-1.08*	*-1.02*
Liquidity ratio	0.995	0.995	0.995	0.990	0.990	0.990	0.990	0.993	0.986	0.990	0.990	0.990
	-4.53	*-4.51*	*-4.54*	*-3.94*	*-4.04*	*-4.04*	*-3.89*	*-2.97*	*-5.01*	*-3.99*	*-3.97*	*-3.98*
Leverage						0.997						
						-0.78						
Share of tangible fixed assets							0.994					
							-0.77					
Turnover ratio								0.996				
								-2.26				
Available collateral (approx.)									0.994			
									-1.32			
Firm established since 1996 (Y/N)			0.962									
			-0.23									
GDP growth rate										1.030		
										0.24		
Loan growth											0.991	
											-0.39	
PSI Geral variation												1.005
												0.98
Constant	-	-	-	-	-	-	-	-	-	-	-	-
Number of observations	76 292	76 292	76 292	3 847	3 847	3 847	3 802	3 847	3 802	3 847	3 847	3 847
Number of firms	25 690	25 690	25 690	2 324	2 324	2 324	2 297	2 324	2 297	2 324	2 324	2 324
Number of failures	1 000	1 000	1 000	68	68	68	67	68	67	68	68	68
Time at risk	76 292	76 292	76 292	3 847	3 847	3 847	3 802	3 847	3 802	3 847	3 847	3 847
Wald chi^2	583.9	581.4	577.9	35.7	34.2	34.2	35.2	39.9	44.8	31.5	31.0	31.3
Prob > chi^2	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*

Note: z-scores in italics. New firms include all firms established since 1996. Regressions for the full sample include the control dummies for size, sector and year presented in Table 3. All models estimated using a Cox regression which evaluates the time until default, using robust variance estimates. A coefficient lower than 1 should be interpreted as contributing to an increase in time until default eventually occurs. The Wald test evaluates the overall statistical significance of the estimated coefficients.

presents hazard functions for this group of firms, showing that their default probabilities increase up to the 4th year of the firm, gradually declining thereafter.[13]

Within the framework of duration modelling, we estimated several regression models, in a spirit similar to that of discrete choice models. The results obtained are broadly consistent with those obtained with probit models: firms with higher profitability, higher solvency, higher investment rates, and better liquidity ratios should take a longer time to eventually default on their loan commitments (Table 6). However, sales growth turns out to be clearly non-significant in these models. Hence, though sales growth may contribute to explain why some firms default, it does not seem to determine the time until default. Given the strong left-censoring in the database, we also tested whether firms created from 1996 onwards were substantially different from others. In order to achieve that, we estimated a model including a dummy variable for such firms (model 3 in Table 6). This dummy variable is far from being significant, suggesting that these firms do not substantially differ from the remaining firms in the sample, after controlling for a set of firm's financial characteristics.

However, the only way to totally eliminate left-censoring in the sample is to exclude all firms that have not been observed since their creation date, estimating regressions only for the sub-group of firms created after 1996. The results of these estimations are also shown in Table 6. In general, the solvency ratio and the investment rate are no longer statistically significant, suggesting that default probabilities for start-up firms may have slightly different determinants than those of more mature firms. Several alternative specifications were considered, including the introduction of macroeconomic variables. Most of the variables tested do not seem to be statistically significant in the determination of the time until default of these start-up firms. The only relevant exception seems to be the turnover ratio. According to the results obtained with these regressions, firms with lower turnover ratios should default sooner than other firms. None of the macroeconomic variables tested is significant.

7. CONCLUDING REMARKS

The results obtained in the literature suggest that in periods of strong economic growth, which are sometimes accompanied by strong credit growth, there may be some tendency towards excessive risk-taking, amid some market optimism. Cumulative imbalances created in such periods will tend to become apparent only when economic activity slows down markedly. Against this background, this article examines the determinants of credit risk, taking into account firm-specific idiosyncratic factors, as well as systematic factors, which simultaneously affect all economic agents.

For that purpose, an extensive database including financial information for more than 30.000 Portuguese firms was thoroughly analysed. The results obtained suggest that default probabilities are affected by several firm-specific characteristics, such as their financial structure, profitability and liquidity, as well as by their recent sales performance or their investment policy. After controlling for the most relevant firm characteristics, firm's size does not seem to significantly affect default probabilities. However, there are considerable differences across economic sectors. Lagged information on the firm's financial situation over a short period also seems to be important in explaining why do some firms default on their loan commitments.

When time-effect controls or macroeconomic variables are taken into account together with the firm-specific information, the results of the models seem to improve considerably. Hence, even though the determinants of loan default at the micro level are ultimately driven by the firms' specific financial

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(13) For a discussion on the determinants of survival probabilities for young firms, see *Farinha* (2005). The results shown in Chart 2 are very similar to those obtained in that study.

situation, there are important relationships between overall macroeconomic conditions and default rates, which should be assessed from a financial stability perspective.

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THE DISTRIBUTION OF LOSSES IN CREDIT TO NON-FINANCIAL FIRMS*

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1. INTRODUCTION

The aim of this article is to characterise the distribution of losses in loans to Portuguese non-financial firms under different macroeconomic scenarios. The topic is relevant for several reasons. First, periodic assessments by international agencies aimed at evaluating the soundness of a country's financial system require the setup of credit default models for loans in several market segments, along with other sophisticated tools for economic analysis. For instance, in 2006 the IMF conducted a Financial Sector Assessment Programme (FSAP) in Portugal. In this context, a credit default model incorporating macroeconomic factors was developed at Banco de Portugal. The model was used to estimate both the expected loss and the distribution of losses in loans to non-financial firms, which are obvious measures of interest for the assessment.[1] Second, from a banking supervision perspective, it is useful to gauge the impact of adverse macroeconomic shocks on the banking system in terms of the Capital Adequacy Ratio (CAR). For instance, one might be interested in assessing how much capital a particular set of banks (or a single bank) would need to cover low-probability unexpected losses, under a given adverse macroeconomic scenario. As credit losses are obvious and important drivers of banks' profitability, regulators dedicate a significant share of their efforts in ensuring that both expected and unexpected credit losses in a given horizon under stressful scenarios are adequately covered by either provisions or own funds, or a combination of both. Third, periodic assessments of credit risk might use the distribution of losses to identify significant vulnerabilities of the loan portfolio to non-financial firms. For instance, suppose an analyst considers two different macroeconomic scenarios: one with particularly high interest rates, the other with a particularly large upsurge of unemployment. If the analyst concludes that under the first scenario the distribution of losses is somewhat more adverse than under the second scenario, this might lead her to recommend a careful focus of the assessment on interest rate-related issues.

Based on credit register and other data on Portuguese firms, we use a binary response model to estimate the probability of default on a loan by a firm. We perform Monte Carlo simulations to estimate the distribution of losses in loans to Portuguese non-financial firms under a "baseline" macroeconomic scenario and two "stress" scenarios, labelled "disruptive adjustment" and "cyclical asynchrony".[2] The macroeconomic scenarios span the period 2005-2008 and consist of complete and consistent projections for the Portuguese economy using a full-fledged macroeconomic model.[3] All scenarios were constructed using information available by December 2005. Thus, the macroeconomic scenarios presented here are not forecasts of current macroeconomic conditions, nor do they reflect Banco de Portugal's assessment of

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

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(1) Banco de Portugal (2007) *Occasional Paper no 1*, presents the design and results of the stress tests carried out in the context of the 2006 IMF FSAP; parts of that paper overlap this article.

(2) Details about the statistical model and other aspects of the default probability estimation are provided in *Antunes, Ribeiro and Antão (2005)*.

(3) Details about the macroeconomic model used in the projections can be found in Castro (2005).

what a stressful macroeconomic scenario would be under the current conditions. Rather, these results aim merely at giving a broad perspective about what an assessment of aggregate credit risk might look like at a particular point in time.

The "baseline" scenario is an extension to 2008 of the macroeconomic projections conducted in the context of the Eurosystem December 2005 Broad Macroeconomic Projection Exercise.[4] It comprises a moderate recovery of overall macroeconomic conditions during the 2006-2008 period.

The "disruptive adjustment" scenario assumes an abrupt adjustment of the global imbalances in 2006. US economic activity sharply decelerates, and worldwide economic activity ensues. There is a real appreciation of the euro with respect to the dollar and a sharp decline in global stock prices. The ECB is assumed to adjust its monetary policy by cutting intervention rates.

The "cyclical asynchrony" scenario considers the impact of an unexpected increase in productivity in the euro area, causing higher domestic demand and imports. This, however, does not spill over to Portuguese exports. Oil prices increase throughout the simulation horizon. The ECB adjusts short-term interest rates upwards. Cyclical asynchrony between Portugal and the euro area economy reflects falling economic activity in Portugal while the rest of the euro area grows briskly.

The macroeconomic scenarios are fed into the credit default model. Under simplifying assumptions and using Monte Carlo simulations, we are able to study the distribution of losses in loans to non-financial firms, as well as changes on the Capital Adequacy Ratio (CAR) of the Portuguese banking sector associated with each scenario.

We conclude that the distribution of losses is right-skewed, with percentile 95 of the loss in 2008 equal to 184 per cent of the mean in the baseline scenario and 146 per cent in the disruptive adjustment scenario; the figure for the cyclical asynchrony scenario is 144 per cent. These results imply that, as expected losses increase, losses tend to lie nearer to the mean in relative terms. In other words, under "baseline" conditions, expected losses in 2008 are low and there is a 5 per cent chance that losses are more than 84 per cent higher than the average; under "stress" conditions, expected losses are high, but with the same probability of 5 per cent, losses will be just 44 or 46 per cent higher than the average. There seems thus to exist a mechanism that narrows the distribution of losses as expected losses increase.

In terms of the overall CAR, we conclude that the Portuguese banking sector was, as of end-2005, perfectly capable of absorbing the large macroeconomic shocks posited in the stress scenarios, with the CAR ratio well-above the minimum requirement of 8 per cent in the entire simulation period. Given actual data for 2005, our estimates imply that yearly losses on the corporate portfolio are comfortably below the regulatory capital buffer with probability of 99.5 per cent.

This article is organised as follows. The *next section* briefly describes the macroeconomic scenarios, the data, the model for defaulted loans, and the procedure adopted in the estimation of losses. *Section 3* then presents the main features of the loss distribution. *Section 4* assesses the impact of macroeconomic conditions on the CAR of the entire Portuguese banking system, holding all other risk factors constant. *Section 5* concludes.

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(4) These projections were superseded by Banco de Portugal's forecasts published in summer 2006 and winter 2006 issues of *Economic Bulletin*.

2. MODELLING LOSSES UNDER MACROECONOMIC SCENARIOS

This Section describes the macroeconomic scenarios, the data and the model for defaulted loans, the procedure adopted in the estimation of losses, and is mostly a summary of material available in Antunes, Ribeiro and Antão (2005).

2.1. The macroeconomic scenarios

We use a "baseline" and two "stress" macroeconomic scenarios. They consist of complete and integrated projections of macroeconomic conditions for the Portuguese economy using a full-fledged macroeconomic annual model.[5]

The baseline scenario is an extension to 2008 (with small changes) of the macroeconomic projections conducted in the context of the Eurosystem December 2005 Broad Macroeconomic Projection Exercise. It comprises a moderate recovery of macroeconomic conditions during the 2006-2008 period *vis-à-vis* 2005.

The disruptive adjustment scenario posits an abrupt adjustment of the global imbalances in early 2006. There is a sharp deceleration of the US economic activity, which translates into a slowdown in worldwide economic activity. Investors' portfolios shy away from the US dollar, leading to a real appreciation of the euro *vis-à-vis* the dollar. There is also a sharp decline in global stock prices. Finally, the ECB is assumed to adjust its monetary policy and cut its intervention rates, reflecting the downward adjustment in inflation stemming from the appreciation of the euro, and the slowdown in economic activity.

As in the disruptive adjustment scenario, the cyclical asynchrony scenario considers the impact of an unexpected increase in productivity in the euro area. The cyclical asynchrony scenario includes negative output growth over the simulation horizon. However, the recession observed in this scenario is milder than that of the disruptive adjustment scenario. Gross fixed capital formation and private consumption are most affected by interest rates' surge. The increased external demand does not cause a rise of Portuguese exports; instead, a 3 per cent market share loss in each year is assumed *vis-à-vis* the baseline. This scenario thus involves negative GDP growth and high interest rates and inflation.

Table 1 provides details about the scenarios in terms of the short-term interest rate and the GDP growth rate.

2.2. The data and the statistical model

The data come from two sources: the credit data from the *Central de Responsabilidades de Crédito* (*CRC*), which is the Portuguese credit register; and the *Estatísticas Gerais* (*EG*) database for firm-specific information. We used a sample of firms classified in terms of total exposure (in a total of 4 classes, with larger firms in terms of credit exposure having higher representativeness in the sample), which was stratified by activity sector (in a total of 15 different activity sectors). We defined the "loan" as the statistical unit of observation, since this is the relevant concept of interest when looking at default events in particular loans. A "loan" is understood to be the bilateral credit relationship between a firm in the sample and a single financial intermediary. The *CRC* monthly data were transformed into quarterly data. The sample includes almost 2 million observations and ranges from 1995q1 to 2004q4.

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(5) As mentioned above, the macroeconomic scenarios should be interpreted as merely illustrative. See footnote 4.

Table 1

MACROECONOMIC SCENARIOS				
Values in percentage				
	2005	**2006**	**2007**	**2008**
Baseline				
Short-run interest rate	2.2	2.2	2.3	2.4
GDP growth rate	0.3	0.8	1.0	1.3
Disruptive adjustment				
Short-run interest rate	2.2	1.0	0.8	0.9
GDP growth rate	0.3	-1.0	-0.7	-0.1
Cyclical asynchrony				
Short-run interest rate	2.2	3.6	4.2	4.9
GDP growth rate	0.3	-0.2	-0.6	-0.2

We use a *probit* model with the "default event" defined as follows. For any given loan, we first compute its total amount and the past due amount (which is equal to or less than the previous quantity). The "default" occurs when positive past due amounts are registered in three consecutive months and the amount past due three months ago was zero.

The model includes regressors at the loan, firm and aggregate levels. Examples include, at the loan level, an indicator of the event that, not including the loan under observation, the loan's obligor has on average defaulted on more than half of its loans during the current quarter. At the firm level, we use, for instance, categorical variables for the activity sector and the firm's total debt. At the macroeconomic level, we use, for example, short-term nominal interest rates and deviations of GDP from trend.

We determine the distribution of losses through Monte Carlo simulations. In each simulation, we use the model to randomly classify each loan as having defaulted or not. Summing all "defaulted" loans, we have an aggregate measure of loan defaults for that particular experiment. Repeating this procedure many times allows us to obtain a Monte Carlo estimate of the loan loss distribution.

In order to perform the simulations under the three macroeconomic scenarios, we assume that the characteristics of the credit portfolio do not change in response to macroeconomic conditions. Therefore, all the variation in the loss distribution is caused by changes in the macroeconomic variables, either directly or through their interactions with firm-level variables. This hypothesis may be subject to criticism, since it ignores the endogenous portfolio change that would occur as the macroeconomic conditions evolved, firms defaulted and eventually exited activity, and new firms and loans arrived. We chose to keep the portfolio unchanged, implicitly assuming that the firms and loans leaving the portfolio do not differ significantly from entrant firms and loans.

A number of criticisms may be cast over this exercise. The credit default model just described omits important dimensions that might help explain default. This was a consequence of the lack of comprehensive data on the firms' balance sheets. The use of more comprehensive information would allow for a better characterisation of each firm. Some econometric issues might also be raised (such as non-observed heterogeneity); other working hypotheses, in particular those assuming a fixed portfolio structure, may also be insufficient or inadequate. In view of these criticisms, the results should be interpreted cautiously.

Due to computational constraints, we used a sample covering the entire portfolio of credit to Portuguese non-financial firms as of end-2004. We performed 10,000 experiments for each year and scenario in the simulation horizon.

3. THE DISTRIBUTION OF LOSSES

Before we turn to the distribution of losses, let us first take a look at their expected values. Table 2 presents expected losses in yearly terms for the scenarios as a percentage of total exposure to non-financial firms, where it was assumed that on average 50 per cent of a defaulted loan is effectively lost.

As expected, the stress scenarios have in 2008 more than twice the expected loss of the baseline scenario. This is mostly due to the economic recession embedded in both the disruptive adjustment and the cyclical asynchrony scenarios. The cyclical asynchrony scenario induces the highest loss as of 2008 due to the high interest rates. As for the disruptive adjustment scenario, lower interest rates (relative to the baseline) are not enough to compensate for the strong and negative economic growth effect. In both cases, GDP grows considerably below its long-run trend.

Charts 1 and 2 present the distribution of losses as a fraction of the mean loss in the baseline and each stress scenario.[6] Table 3 presents percentiles of the loss measured as a percentage of mean loss, for the three scenarios.

Consistent with the fact that, in the baseline scenario, macroeconomic variation is such that the expected loss decreases very slowly in the simulation horizon, the distribution of losses shows little variation. In general terms, total losses are skewed to the right, with the median at around 90 per cent of the average in the whole simulation horizon. The distribution is also bimodal, a characteristic common to the stress scenarios up to 2006. For instance, in 2005 there is a local maximum of the probability density just above 160 per cent of the mean for the baseline case. This probably has to do with the concentration of large loans in the credit portfolio. For relatively benign outcomes, only some large loans default and we have losses around the median. However, if a sufficient number of large loans defaults, the cumulative effect is going to be that at some large value the density of probability becomes considerable. This might happen 10 per cent of the time, which is approximately the probability mass above 1.5 in Chart 1 for 2005.

As documented in Table 3, the characteristics of the relative loss distribution under the disruptive adjustment scenario do not differ much from the baseline. At a first glance, the most striking difference between both is the fact that the secondary hump is closer to the mean by the end of the projection horizon. There is some preliminary evidence that this hump is partly associated to portfolio concentration in large firms, which suggests that adverse shocks feed through the credit loss distribution mostly by increasing the expected value of default probabilities in the portfolio of smaller firms, while the unexpected part arises essentially from larger firms. This is in line with the rationale for calibrating the Basel II risk weighted assets

Table 2

ESTIMATED YEARLY LOSSES IN EACH SCENARIO FOR CREDIT PORTFOLIO TO NON FINANCIAL FIRMS				
All values in percentage				
	2005	**2006**	**2007**	**2008**
Baseline	1.1	1.1	1.0	1.0
Disruptive adjustment	1.1	1.5	1.7	2.1
Cyclical asynchrony	1.1	1.4	1.8	2.3

(6) All histograms in this article are kernel density estimates using the artificially generated data.

Chart 1

DISTRIBUTION OF YEARLY LOSS AS A FRACTION OF THE MEAN

Baseline and disruptive adjustment scenarios

Baseline   Disruptive adjustment
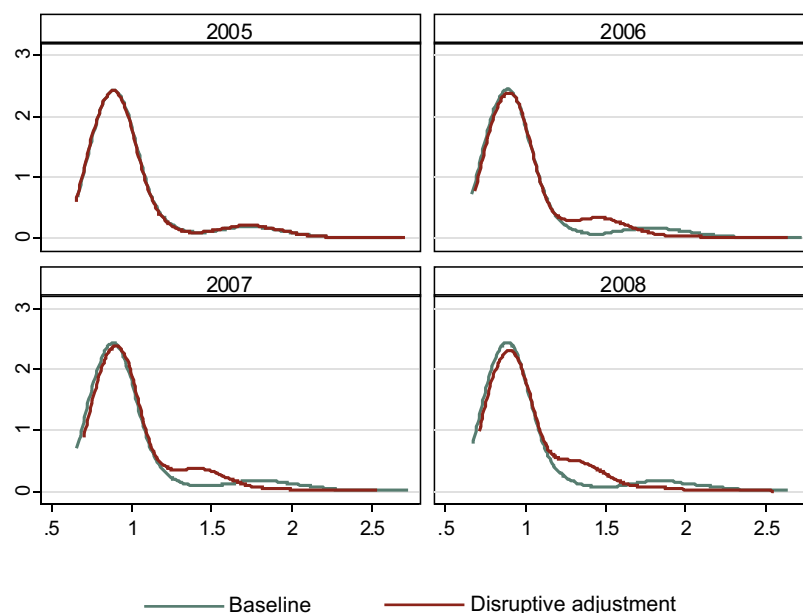
Chart 2

DISTRIBUTION OF YEARLY LOSS AS A FRACTION OF THE MEAN

Baseline and cyclical asynchrony scenarios

Baseline   Cyclical asynchrony
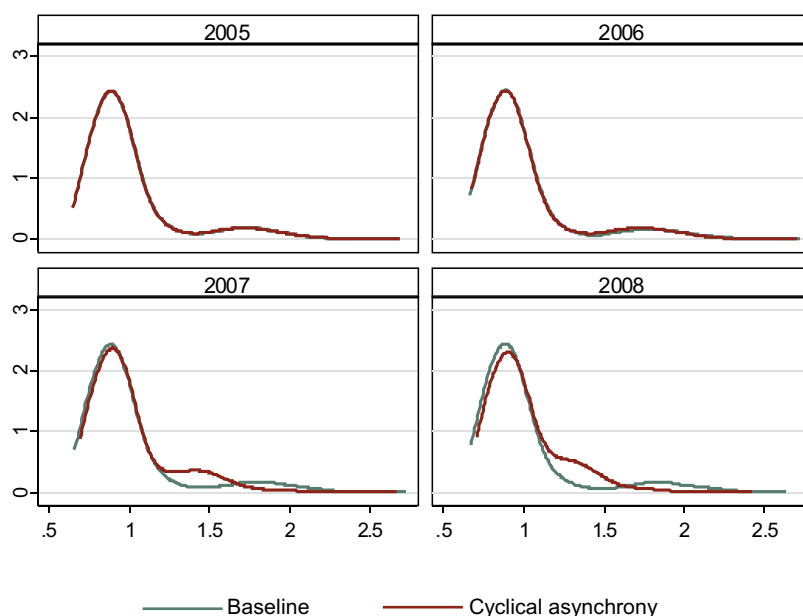
Table 3

PERCENTILES OF THE YEARLY LOSS AS A PERCENTAGE OF THE MEAN					
		2005	**2006**	**2007**	**2008**
Baseline	p1	73	73	72	73
	p5	77	77	76	76
	p50	90	90	89	90
	p95	177	181	183	184
	p99	208	217	218	221
Disruptive adjustment	p1	73	75	75	76
	p5	77	78	79	79
	p50	90	91	92	91
	p95	177	156	152	146
	p99	208	188	185	183
Cyclical asynchrony	p1	73	73	75	76
	p5	77	77	78	79
	p50	90	90	91	92
	p95	177	178	153	144
	p99	208	209	193	177

formulae, whose parameters are, *ceteris paribus*, more favourable to corporate and retail SMEs, than large corporations.

Under the disruptive adjustment scenario, the coefficient of variation (defined as the ratio of the standard deviation to the mean) of the loss distribution decreases by 32 per cent during the simulation horizon. This decrease in the relative dispersion of losses is consistent with the framework put forward in Basel Committee on Banking Supervision (1999). There it is shown that the coefficient of variation of a particular facility is roughly proportional to $\sqrt{1/p}$ for small p, where p is the probability of default.[7] Since under the disruptive adjustment scenario p deteriorates uniformly across facilities, the coefficient of variation of the total credit loss distribution should also decrease.

The above comments also apply to the cyclical asynchrony scenario. There is essentially one difference between the two stress scenarios. By the end of the simulation horizon, expected losses are higher for the cyclical asynchrony case, which is a consequence of the higher interest rates.

The amount of losses relative to total exposure that is lost cannot be conveyed by Charts 1 and 2. In terms of the relevant exposure, we see from Table 2 that, in yearly terms, about 1 per cent of total exposure is lost in the baseline case. Charts 3 and 4 and Table 4 characterise the yearly total loss as a percentage of the total exposure amount. This is a relative Value-at-Risk (VaR) measure. For instance, the 99 per cent VaR is the threshold above which losses lie 1 per cent of the years.[8]

Let us now turn to the relative VaR results. The most prominent difference between the baseline and the stress scenarios is that the distribution in the stress scenarios shifts to the right during the simulation period (Charts 3 and 4), while that of the baseline scenario remains roughly static. This reflects the adverse macroeconomic environment embedded in the stress scenarios.

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(7) This is true whether Loss-Given-Default is stochastic or not.

(8) This study considers only the VaR of loans to non financial firms. It should be noted that the VaR of loans to non financial firms does not add up with the VaR of loans, for instance, to households.

Chart 3

DISTRIBUTION OF YEARLY LOSS AS A PERCENTAGE OF TOTAL EXPOSURE

Baseline and disruptive adjustment scenarios

——— Baseline   ——— Disruptive adjustment

Chart 4

DISTRIBUTION OF YEARLY LOSS AS A PERCENTAGE OF TOTAL EXPOSURE

Baseline and cyclical asynchrony scenarios

——— Baseline   ——— Cyclical asynchrony
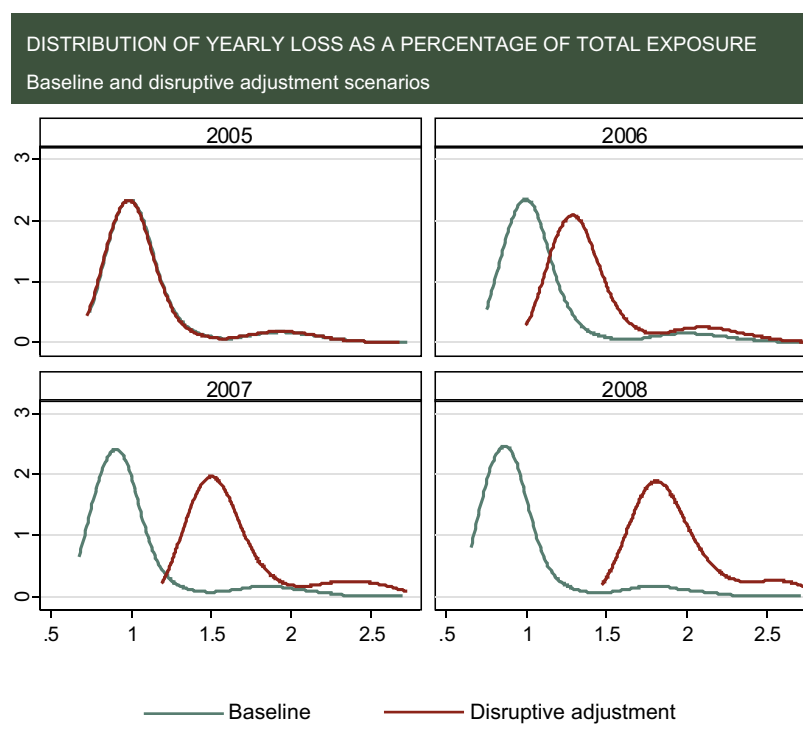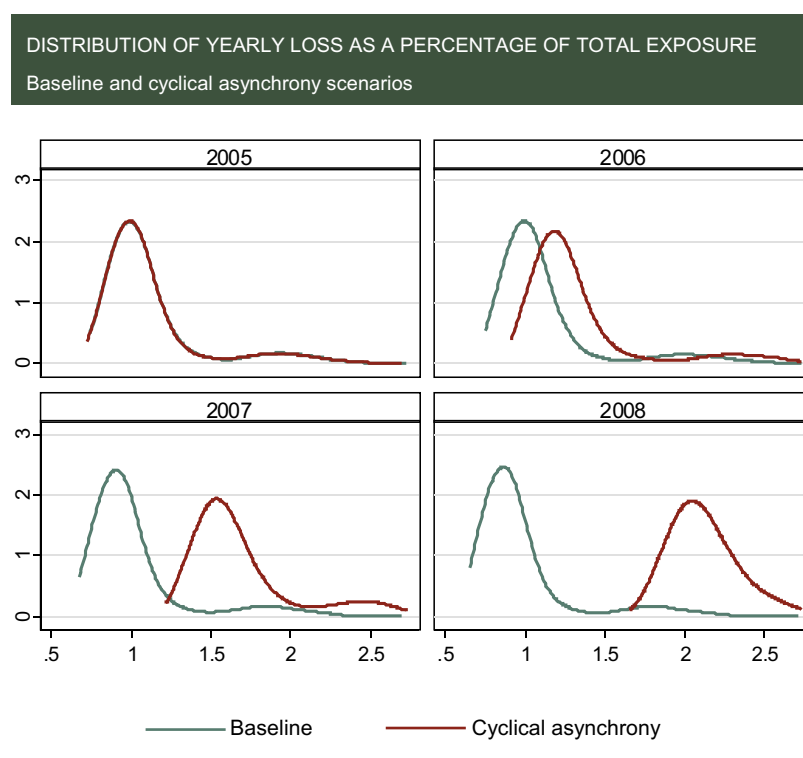
Table 4

PERCENTILES OF THE YEARLY LOSS AS A PERCENTAGE OF TOTAL EXPOSURE					
		2005	**2006**	**2007**	**2008**
Baseline	p1	0.8	0.8	0.7	0.7
	p5	0.9	0.9	0.8	0.7
	p95	2.0	2.0	1.9	1.8
	p99	2.3	2.4	2.2	2.2
Disruptive adjustment	p1	0.8	1.1	1.3	1.6
	p5	0.9	1.1	1.3	1.6
	p95	2.0	2.3	2.6	3.0
	p99	2.3	2.7	3.1	3.8
Cyclical asynchrony	p1	0.8	1.0	1.3	1.8
	p5	0.9	1.0	1.4	1.9
	p95	2.0	2.4	2.7	3.4
	p99	2.3	2.8	3.4	4.1

We see in Table 4 that the baseline scenario total loss in 2005 is estimated to be less than 2 per cent of the aggregate exposure with a 95 per cent probability. If we want to be more conservative, these results suggest that at most 2.3 percent of the exposure is lost in 2005 with a 99 percent confidence level.[9] We see that the decrease of losses in the simulation horizon is accompanied by a decrease in the 95 and 99 percent levels. For the disruptive adjustment scenario, the corresponding values increase by 1 and 1.5 percentage points. These figures are, respectively, 1.4 and 1.8 for the cyclical asynchrony case. This implies that, in terms of credit to non-financial firms, the cyclical asynchrony scenario is more stringent than the disruptive adjustment scenario, both on average and on the right tail of the loss distribution.

To convey a quantitative notion of how much outcomes differ under the baseline and the stress scenarios, let us give an example. For the disruptive adjustment scenario, the median loss in 2008 is 1.9 per cent of total exposure. In contrast, such loss corresponds to the percentile 96 in the baseline case. Therefore, if the disruptive adjustment scenario materialised, an outcome with loss above 1.9 per cent of exposure would be likely (50 per cent probability), while under the baseline scenario, such an adverse outcome would still be possible, but much less likely (4 per cent probability).

4. IMPACT ON THE CAPITAL ADEQUACY RATIO (CAR)

This section deals with the way losses affect the Capital Adequacy Ratio (CAR) under the three macro-economic scenarios.[10] To this aim, we make simplifying assumptions about the behaviour of banks throughout the simulation horizon. We assume that losses follow the distribution documented in section 3. We use own funds, risk-weighted exposure and total exposure as of end-2005, and proceed to the estimation of the changes in own funds due to loss variability. We then use these estimates in order to obtain the impact of losses in credit to non-financial firms on the CAR, abstracting from any other impact. We thus make the simplifying assumption that variability of losses in credit to non-financial firms is the sole source of variability during simulations.

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(9) In a somewhat different context (using a macroeconomic reduced-form credit risk model) and for the Finnish 2003q2 credit portfolio to non financial firms, Virolainen (2004) reports a comparable figure of 1.81 per cent.

(10) The Capital Adequacy Ratio (CAR) is the quotient between consolidated own funds and risk-weighted exposure.

The starting point for the CAR was calibrated with actual data, i.e. the average aggregate figure for the whole banking system at end-2005 (11.3 per cent). This level implied a capital buffer of around 3.3 points, which results from the comparison with the 8 per cent minimum regulatory level. It should be pointed out that this minimum level of capitalisation could be understood under a Basel II framework as the one which is sufficient to cover extreme unexpected losses in a one year horizon, after taking into account the provisioning adequacy covering expected losses, and assuming that sound risk management system controls are in place. In other words, 8 per cent of the risk weighted exposure would be the Value-at-Risk at some conservatively high confidence level, for instance 99.5 per cent. Accordingly, the probability of losses in excess of own funds requirements over a one-year horizon would be lower than 0.5 per cent.

The exercise that we are going to perform is the following: what is the distribution of the capital buffer (the excess capital over the minimum) given that (i) the overall characteristics of the credit portfolio to non-financial firms remain unchanged; (ii) expected own funds, risk-weighted exposure and total exposure remain at their 2005 levels; (iii) all other sources of risk are either ignored or assumed to be covered by provisions or the expected flow of income; and (iv) the macroeconomic environment is changing according to a given scenario?

Since losses impact own capital directly and we assume that supervisory capital and risk-weighted exposure are kept at their 2005 levels, the capital buffer distribution in percentage points of the CAR is similar to those of Charts 1 and 2, appropriately inverted and rescaled. This is of course a simplifying assumption. When faced with macro-economic surprises impacting on credit losses, banks adjust their portfolio (towards or away from, and within, credit to non-financial firms). As defaults occur and new firms start activity, the characteristics of the pool of risks also changes. We thus assume that banks change their portfolio and allocate supervisory capital so as to keep expected risk-weighted exposure and own funds requirements at their 2005 levels.

Table 5 presents the results. The probability that, in 2008, the capital buffer would be lower than 2.8 percentage points is 0.5 per cent in the baseline. In the disruptive adjustment scenario, the corresponding figure at the end of the simulation horizon is 2.1 percentage points. For the cyclical asynchrony case, the value is 1.9 percentage points. This means that the portfolio of credit to non-fi-

Table 5

PERCENTILES AND AVERAGE OF THE CAPITAL BUFFER RESULTING FROM LOSSES IN CREDIT TO NON-FINANCIAL FIRMS All values in percentage points		2006	2007	2008
Baseline	p0.5	2.6	2.7	2.8
	p1	2.8	2.8	2.9
	average	3.3	3.4	3.4
	p50	3.4	3.4	3.4
Disruptive adjustment	p0.5	2.5	2.3	2.1
	p1	2.6	2.5	2.2
	average	3.2	3.1	2.9
	p50	3.2	3.1	3.0
Cyclical asynchrony	p0.5	2.5	2.2	1.9
	p1	2.6	2.4	2.0
	average	3.2	3.1	2.8
	p50	3.3	3.1	2.9

nancial corporations would be responsible for, at most, the erosion of roughly one third of excess capital in a three-year horizon with 99.5 per cent probability and conditional on the materialisation of particularly stressful macroeconomic scenarios.

The main conclusion from this exercise is that the impact of purely macroeconomic factors on the CAR via non-financial firms, though significant, appears manageable, even under very extreme and conservative assumptions.

5. FINAL REMARKS

This article describes and presents results concerning the distribution of losses in the credit portfolio to Portuguese non-financial firms under three different macroeconomic scenarios (the baseline, the disruptive adjustment and the cyclical asynchrony scenarios), for Portuguese banks as a whole. The main conclusions are: (i) macroeconomic factors affect the distribution of losses both in terms of location (mean, median) and shape (skewness, dispersion and relative placement of modes); (ii) the stress scenarios induce a behaviour of losses that is much more adverse than under the baseline scenario; (iii) the cyclical asynchrony scenario is more stressful than the disruptive adjustment scenario due essentially to higher interest rates; (iv) even though other risk sources were ignored in the analysis and should be taken into account to deliver a more complete picture, the capital buffer of the banking system as a whole looks adequate to absorb swiftly very unlikely credit events in the corporate portfolio, leaving the capital adequacy ratio comfortably above the minimum regulatory level.

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PART III – ANNEX

Table A.1

MAIN INDICATORS (to be continued) Per cent; end-of-period figures												
	1995	**1996**	**1997**	**1998**	**1999**	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**
Macroeconomic and financial indicators												
Real GDP (rate of change)												
US	2.5	3.7	4.5	4.2	4.4	3.7	0.8	1.6	2.5	3.9	3.2	3.3
Euro area	2.6	1.5	2.6	2.8	3.0	3.9	1.9	0.9	0.8	2.0	1.4	2.6
Portugal	2.3	3.6	4.2	4.7	3.9	3.9	2.0	0.8	-0.8	1.3	0.5	1.3
Fiscal balance (as a percentage of GDP)												
US	-3.1	-2.2	-0.8	0.4	0.9	1.6	-0.4	-3.8	-4.8	-4.6	-3.7	-2.6
Euro area	-5.1	-4.3	-2.6	-2.3	-1.4	-1.0	-1.9	-2.6	-3.1	-2.8	-2.4	-1.6
Portugal	-4.2	-3.8	-2.8	-2.4	-2.7	-2.9	-4.3	-2.9	-2.9	-3.3	-6.1	-3.9
Current account balance (as a percentage of GDP)												
US	-1.5	-1.6	-1.7	-2.4	-3.2	-4.2	-3.8	-4.5	-4.8	-5.7	-6.4	-6.5
Euro area	n.a.	n.a.	1.4	0.7	0.3	-0.7	0.0	0.6	0.4	1.0	0.1	-0.3
Portugal	-2.8	-4.2	-5.9	-7.0	-8.5	-10.2	-9.9	-8.1	-6.1	-7.7	-9.7	-9.5
Oil price (USD brent; y-o-y rate of change)	11.7	28.9	-29.4	-37.2	142.7	-6.7	-13.6	46.6	-1.2	34.0	44.4	5.5
Key interest rates - Monetary policy												
US	5.50	5.25	5.50	4.75	5.50	6.50	1.75	1.25	1.00	2.25	4.25	5.25
Euro area	n.a.	n.a.	n.a.	n.a.	4.00	5.75	4.25	3.75	3.00	3.00	3.25	4.50
3-month Euribor	n.a.	n.a.	n.a.	n.a.	3.34	4.86	3.29	2.87	2.12	2.16	2.49	3.73
Yields on (10-year) Government bonds												
US	5.57	6.42	5.74	4.65	6.44	5.11	5.05	3.82	4.25	4.22	4.39	4.70
Euro area	7.67	6.30	5.42	3.93	5.49	5.02	5.13	4.26	4.33	3.72	3.36	4.06
Stock markets (annual rate of change)												
S&P 500	34.1	20.3	31.0	26.7	19.5	-10.1	-13.0	-23.4	26.4	9.0	3.0	13.6
Dow Jones Euro Stoxx	8.7	21.2	37.0	29.8	39.5	-5.9	-19.7	-34.5	18.1	10.0	23.0	20.3
PSI Geral	-4.6	32.6	65.2	26.2	12.6	-8.2	-19.0	-20.7	17.4	18.0	17.2	33.3
PSI Financial Services	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	-14.6	-24.8	4.0	12.0	24.4	34.8

Notes: y-o-y year-on-year. n.a. not available.

Table A.1

MAIN INDICATORS (continued)												
Per cent; end-of-period figures												

	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
Financial situation of the non-financial private sector												
Households												
Indebtedness												
As a percentage of GDP	27	32	37	45	54	60	64	68	73	78	83	88
As a percentage of disposable income	37	43	53	63	77	86	91	97	103	110	117	124
Total loans												
Annual rate of change	n.a.	25.3	25.4	29.4	27.0	19.4	12.6	11.2	10.6	9.8	10.3	9.8
Loans granted by resident financial institutions[a]												
Annual rate of change	n.a.	25.4	25.6	30.9	29.6	19.9	12.7	11.3	11.0	9.8	10.1	9.8
of which:												
Housing purposes	n.a.	25.9	27.3	34.6	30.0	20.2	14.9	16.0	11.8	10.5	11.1	9.9
Consumption and other purposes	n.a.	24.2	22.3	23.2	28.8	19.1	7.5	-0.1	8.7	7.4	6.8	9.7
Net lending (+) / borrowing (-)[b]												
As a percentage of GDP	5.0	2.8	1.1	0.7	-0.4(0.8)	1.1	2.6	2.9	3.4	2.9	3.4	1.8
As a percentage of disposable income	6.9	4.0	1.6	1.1	-0.6(1.1)	1.6	3.7	4.2	4.8	4.1	4.7	2.5
Current savings[b]												
As a percentage of GDP	10.0	8.4	7.2	6.9	5.9 (6.9)	7.2	7.7	7.4	7.8	7.3	6.7	5.9
As a percentage of disposable income	13.8	11.9	10.4	10.0	8.6 (9.9)	10.2	10.9	10.5	10.9	10.3	9.5	8.3
Investment in real assets[b]												
As a percentage of GDP	6.7	6.4	6.7	7.0	7.2 (6.9)	6.6	6.4	6.0	5.1	5.1	4.9	4.7
Change in financial assets												
As a percentage of GDP	11.5	10.4	10.6	18.4	15.6	13.4	14.1	8.1	11.7	8.0	9.6	7.9
Idem, excluding extraordinary contributions to pension funds	n.a.	10.3	10.5	18.2	15.3	13.3	13.1	6.9	11.3	7.7	8.3	7.7
Change in financial liabilities												
As a percentage of GDP	6.4	7.1	8.0	17.7	14.8	12.3	11.4	5.1	8.4	5.1	6.2	6.2

Notes: **(a)** Loans granted by monetary financial institutions and other financial intermediaries adjusted for securitisations conducted through non-resident special purpose vehicles. **(b)** Net lending / borrowing, savings and investment ratios to GDP use National Accounts base 1995 until 1999. Afterwards (in parentheses for 1999) those ratios correspond to Banco de Portugal estimates. Investment comprises gross fixed capital formation and the net acquisition of land and intangibles.

Table A.1

MAIN INDICATORS (continued)
Per cent; end-of-period figures

	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
Non-financial corporations												
Total debt [c]												
As a percentage of GDP	60	61	64	74	81	90	96	96	99	98	103	105
Annual rate of change	n.a.	8.4	16.1	17.6	18.1	19.2	12.7	6.1	5.6	5.1	7.6	5.3
Financial debt [d]												
As a percentage of GDP	52	53	56	66	72	80	90	91	94	91	95	98
Loans granted by resident financial institutions[a]												
Annual rate of change	n.a.	8.5	20.8	22.3	25.6	26.4	15.5	7.3	5.4	3.2	4.1	5.5
Net lending (+) / borrowing (-)[b]												
As a percentage of GDP	0.1	0.6	-1.1	-2.9	-3.4(-5.4)	-8.2	-7.0	-6.1	-4.7	-4.3	-5.0	-6.4
Current savings[b]												
As a percentage of GDP	11.6	11.5	10.7	10.5	10.6(8.8)	7.2	7.8	7.9	8.1	8.6	7.2	5.5
Investment in real assets												
As a percentage of GDP	12.7	12.4	14.1	15.7	16.0(16.2)	16.6	15.9	14.7	13.8	13.6	13.3	12.5
Change in financial assets												
As a percentage of GDP	6.7	9.2	10.9	9.8	11.2	15.8	9.1	6.2	8.7	4.1	1.4	1.2
Change in financial liabilities												
As a percentage of GDP	6.9	9.2	13.7	13.4	16.5	24.0	16.2	12.2	13.8	8.4	6.4	7.6

Notes: (c) It includes loans granted by resident and non-resident credit institutions, loans/additional capital by non-resident intra-group corporations (excluding those granted to non-financial corporations having their head-office in Madeira's off-shore), commercial paper and bonds issued by non-financial corporations held by other sectors and trade credits received from other sectors. **(d)** Total debt excluding trade credits and including loans granted to non-financial corporations having their head-office in Madeira's off-shore. It corresponds to the financial accounts instruments "Securities other than shares" and "Loans".

Table A.1

MAIN INDICATORS (continued) Per cent; end-of-period figures													
	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2004*	2005*	2006*
Profitability [(e)]													
ROE - Return on equity [(f)]	13.2	13.5	20.1	19.3	18.0	18.3	17.8	14.1	16.2	14.5	13.1	19.4	20.7
ROA - Return on assets [(f)]	0.82	0.81	1.18	1.16	1.12	1.11	1.01	0.78	0.91	0.87	0.65	1.03	1.30
Financial margin (as a percentage of average assets)	2.76	2.45	2.72	2.69	2.45	2.21	2.24	2.12	2.00	1.94	1.91	1.86	1.89
Income from services and commissions (net, as a percentage of average assets)	0.44	0.43	0.59	0.79	0.76	0.70	0.63	0.63	0.69	0.76	0.72	0.77	0.78
Ratio of operational costs to gross income	64.5	66.1	60.9	54.1	63.1	58.2	57.6	59.1	57.4	57.2	71.7	58.3	53.3
Capital adequacy [(e)]													
Overall capital adequacy ratio	11.8	11.3	11.7	11.1	10.8	9.2	9.5	9.8	10.0	10.4	10.2	11.3	10.9
Market risk													
Net open position in equities to regulatory capital	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	1.8	1.3	2.7
Coverage ratio of the pension funds of bank employees (as a percentage of regulatory capital)	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	-1.8	-0.8	0.1	-0.4	-0.4	1.2	5.3
Liquidity Risk [(e)]													
Credit-to-deposit ratio	62.5	65.4	72.5	90.9	104.7	116.0	122.7	129.5	129.1	128.3	130.9	137.5	145.6
Coverage ratio of interbank liabilities by highly liquid assets	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	85.6	80.0	100.7	99.5	110.0	98.5	99.3
Liquidity gap [(g)]													
Up to 3 months	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	-2.2	-2.4	1.6	2.4	1.4	-0.9	-1.4
Up to 1 year	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	-6.4	-7.2	-6.3	-3.6	-5.4	-8.2	-8.9
For domestic banks													
Credit-to-deposit ratio	n.a.	n.a.	n.a.	87.2	99.9	114.6	121.1	125.6	124.8	127.2	129.2	134.2	140.7
Coverage ratio of interbank liabilities by highly liquid assets	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	88.1	91.6	120.1	120.8	127.3	126.5	115.8
Liquidity gap [(g)]													
Up to 3 months	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	-3.5	-3.4	0.5	0.7	0.6	-0.7	-0.9
Up to 1 year	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	-7.8	-7.6	-6.5	-4.8	-5.4	-7.4	-8.8

Notes: * The break in the series in 2004 resulted from the adoption of different accounting standards, which also implied a redefinition of the group of banking institutions under analysis. This break did not apply to the indicators based on Monetary and Financial Statistics, which consider resident monetary institutions. **(e)** Indicators for the period comprised between 1995 and 1997 are estimates of Banco de Portugal for a smaller set of institutions than that considered between 1998 and 2004. **(f)** ROE and ROA indicators are based on Income before taxes and minority interests, considering average values for the period for the stocks variables. **(g)** Only 2005 and 2006 figures were reported according to the valuation criteria used in IAS.

Table A.1

<table>
<tr><td colspan="14">MAIN INDICATORS (continued)
Per cent; end-of-period figures</td></tr>
<tr><th></th><th>1995</th><th>1996</th><th>1997</th><th>1998</th><th>1999</th><th>2000</th><th>2001</th><th>2002</th><th>2003</th><th>2004</th><th>2004*</th><th>2005*</th><th>2006*</th></tr>
<tr><td>Credit risk</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>Loans granted by resident financial institutions to the non-financial private sector [a]</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>Annual rate of change</td><td>n.a.</td><td>16.0</td><td>23.1</td><td>26.6</td><td>27.7</td><td>23.0</td><td>14.1</td><td>9.3</td><td>8.3</td><td>6.6</td><td>6.6</td><td>7.4</td><td>7.9</td></tr>
<tr><td>Credit and interest overdue (on a consolidated basis)</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>As a percentage of credit to customers</td><td>n.a.</td><td>n.a.</td><td>n.a.</td><td>n.a.</td><td>n.a.</td><td>2.2</td><td>2.2</td><td>2.3</td><td>2.4</td><td>2.0</td><td>1.8</td><td>1.7</td><td>1.5</td></tr>
<tr><td>As a percentage of assets</td><td>n.a.</td><td>n.a.</td><td>n.a.</td><td>n.a.</td><td>n.a.</td><td>1.4</td><td>1.4</td><td>1.6</td><td>1.6</td><td>1.3</td><td>1.3</td><td>1.1</td><td>1.0</td></tr>
<tr><td>Non-performing loans of households</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>As a percentage of loans to households</td><td>n.a.</td><td>n.a.</td><td>3.2</td><td>2.5</td><td>2.1</td><td>1.8</td><td>2.0</td><td>2.1</td><td>2.4</td><td>2.2</td><td>2.2</td><td>2.0</td><td>1.7</td></tr>
<tr><td>Non-performing loans of non-financial corporations</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>As a percentage of loans to non-financial corporations</td><td>n.a.</td><td>n.a.</td><td>6.4</td><td>4.7</td><td>3.2</td><td>2.5</td><td>2.4</td><td>2.4</td><td>2.2</td><td>1.7</td><td>1.7</td><td>1.7</td><td>1.5</td></tr>
<tr><td>Annual flow of new credit overdue and other credit considered to be doubtful</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>As a percentage of bank loans adjusted for securitisation transactions</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>Households</td><td>n.a.</td><td>n.a.</td><td>n.a.</td><td>n.a.</td><td>0.22</td><td>0.27</td><td>0.43</td><td>0.39</td><td>0.61</td><td>0.32</td><td>0.32</td><td>0.29</td><td>0.53</td></tr>
<tr><td>Non-financial corporations</td><td>n.a.</td><td>n.a.</td><td>n.a.</td><td>n.a.</td><td>-0.01</td><td>0.34</td><td>0.74</td><td>0.76</td><td>0.57</td><td>0.52</td><td>0.52</td><td>0.60</td><td>0.42</td></tr>
<tr><td>International exposure (for domestic banks):</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>Share of external assets in total assets [h]</td><td>n.a.</td><td>n.a.</td><td>n.a.</td><td>n.a.</td><td>23.1</td><td>21.7</td><td>19.8</td><td>18.1</td><td>21.6</td><td>20.5</td><td>30.3</td><td>27.6</td><td>29.0</td></tr>
<tr><td><i>of which:</i></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>Local assets denominated in local currency</td><td>n.a.</td><td>n.a.</td><td>n.a.</td><td>n.a.</td><td>1.8</td><td>2.8</td><td>1.8</td><td>1.2</td><td>1.7</td><td>1.6</td><td>7.1</td><td>6.4</td><td>6.4</td></tr>
<tr><td>International assets by counterparty sector:</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>Banking sector</td><td>n.a.</td><td>n.a.</td><td>n.a.</td><td>n.a.</td><td>14.1</td><td>12.3</td><td>10.6</td><td>8.3</td><td>14.1</td><td>14.8</td><td>13.6</td><td>12.7</td><td>13.6</td></tr>
<tr><td>Non-banking sector</td><td>n.a.</td><td>n.a.</td><td>n.a.</td><td>n.a.</td><td>7.1</td><td>6.6</td><td>7.4</td><td>8.5</td><td>5.8</td><td>4.0</td><td>9.6</td><td>8.5</td><td>9.0</td></tr>
</table>

Sources: Bloomberg, IMF, *INE* and Banco de Portugal.
Notes: * The break in the series in 2004 resulted from the adoption of different accounting standards, which also implied a redefinition of the group of banking institutions under analysis. This break did not apply to the indicators based on Monetary and Financial Statistics, which consider resident monetary institutions. **(h)** The comparable figures for 2004, 2005 and 2006 are based on a new information report. Total assets for the whole set of domestic banks is an estimate.

Table A.2

DEVELOPMENTS IN THE PORTUGUESE GENERAL INDEX AND IN SECTORAL INDICES						
Annual rate of change, per cent						
	2001	**2002**	**2003**	**2004**	**2005**	**2006**
PSI Geral	-19.0	-20.7	17.4	18.0	17.2	33.3
PSI 20	-24.7	-25.6	15.8	12.6	13.4	29.9
PSI Basic Materials	-9.7	-14.2	15.1	15.6	16.7	36.5
PSI Industrials	-29.1	13.4	26.4	31.1	68.3	40.9
PSI Consumer Goods	-10.8	-13.1	-0.5	-6.7	21.2	31.6
PSI Consumer Services	-27.8	17.0	23.7	29.3	11.6	18.0
PSI Telecommunications	-17.7	-24.6	27.1	20.6	12.0	22.3
PSI Utilities	-27.2	-31.4	38.0	15.5	21.7	52.4
PSI Financials	-14.6	-24.8	4.0	12.0	24.4	34.8
PSI Technology	-58.9	-37.9	4.5	24.0	-9.5	-15.1

Sources: Bloomberg and Euronext.

Table A.3

| BALANCE SHEET OF THE BANKING SYSTEM |
| On a consolidated basis |
| EUR millions |

	1998	1999	2000	2001	2002	2003	2004
Cash and claims on central banks	8 867	10 829	9 642	10 063	8 762	15 430	8 637
of which: cash and claims on Banco de Portugal	8 608	10 026	8 592	8 987	7 857	14 327	7 657
Investment in other credit institutions	30 984	27 254	28 596	33 887	30 293	32 837	36 119
In the country	n.a.	n.a.	10 952	12 768	9 570	7 968	9 232
Abroad	n.a.	n.a.	17 644	21 119	20 723	24 868	26 887
Claims on customers (net of provisions)	103 523	131 213	160 235	181 468	194 219	199 477	206 631
Credit overdue	n.a.	n.a.	3 553	3 903	4 462	4 881	4 164
Provisions	2 577	2 377	2 406	2 609	2 802	3 561	3 471
Provisions and financial fixed assets (net of provisions)	33 594	31 843	36 984	35 951	32 149	37 485	44 349
of which: securities of public issuers (gross)	n.a.	n.a.	10 793	10 742	9 697	9 853	10 636
Non-financial fixed assets	4 468	4 631	4 600	4 735	4 578	4 551	4 315
Other assets	9 092	13 249	10 661	12 361	12 995	14 288	15 499
Total assets	190 527	219 019	250 719	278 464	282 996	304 067	315 550
Central bank resources	1 690	3 158	3 462	2 766	1 284	3 147	3 899
of which: Banco de Portugal	1 383	2 658	3 300	2 258	1 031	2 766	3 195
Other credit institutions resources	41 748	44 920	51 834	57 017	54 503	54 546	49 184
In the country	n.a.	n.a.	10 024	11 099	7 767	5 569	7 129
Abroad	n.a.	n.a.	41 810	45 918	46 736	48 977	42 055
Customer resources	116 729	127 606	140 205	150 033	152 136	157 236	163 761
By residence of customer:							
Deposits of resident customers	n.a.	n.a.	109 976	113 870	116 485	117 673	122 667
Deposits of non-resident customers	n.a.	n.a.	30 181	36 101	35 538	39 440	41 006
By type of deposit:							
Demand deposits	37 659	44 363	47 188	53 033	54 649	55 709	57 350
Time and savings deposits	78 975	83 195	92 969	96 938	97 374	101 404	106 323
Liabilities represented by securities	6 606	13 225	23 106	32 973	38 686	49 814	56 206
of which: bonds	5 239	10 072	18 214	27 309	30 921	37 444	42 307
Subordinated liabilities	3 892	4 521	5 392	8 076	8 721	8 883	9 207
Provisions	1 847	2 263	3 119	3 354	3 510	3 365	3 484
Other liabilities	6 217	9 487	9 015	8 810	8 326	9 490	10 409
Equity capital	11 798	13 840	14 587	15 436	15 830	17 586	19 398
Net profit/loss for the year	1 241	1 431	1 672	1 829	1 488	1 914	1 910
Total liabilities and own funds	190 527	219 019	250 719	278 464	282 996	304 067	315 550

Source: Banco de Portugal.
Notes: n.a. - not available. Prepared in accordance with the accounting standards in force until December 2004.

Table A.4

PROFIT AND LOSS ACCOUNT OF THE BANKING SYSTEM On a consolidated basis EUR millions							
	1998	**1999**	**2000**	**2001**	**2002**	**2003**	**2004**
1. Interest income	12 974	12 629	14 633	17 181	15 026	14 508	14 477
2. Interest expenses	8 164	7 622	9 401	11 246	9 077	8 606	8538
3. Financial margin (1-2)	4 809	5 007	5 231	5 935	5 949	5 902	5 939
4. Income from securities	140	113	166	213	191	160	176
5. Net commissions	1 414	1 548	1 662	1 670	1 758	2 037	2 320
6. Income from financial operations	610	549	625	417	437	529	481
7. Income from affiliated companies and branches excluded from consolidation (net)[a]	102	62	228	147	112	370	361
8. Other operating profits (net)	425	442	408	641	707	842	945
9. Other current income (4+5+6+7+8)	2 691	2 714	3 090	3 089	3 206	3 937	4 283
10. Gross income (3+9)	7 500	7 721	8 321	9 024	9 154	9 839	10 222
11. Staff costs	2 525	2 608	2 626	2 722	2 812	2 949	3 025
12. Other administrative costs	1 531	1 626	1 625	1 849	1 929	2 021	2 135
13. Administrative costs (11+12)	4 056	4 234	4 251	4 571	4 740	4 970	5 160
14. Overall gross income (10-13)	3 444	3 487	4 070	4 453	4 414	4 869	5 062
15. Extraordinary gains	327	813	643	30	163	184	-20
16. Depreciation for the year	613	640	590	625	667	677	685
17. Net provisions	1 081	1 356	1 501	1 191	1 713	1 683	1 699
18. Income before taxes and minority interests (14+15-16-17)	2 078	2 303	2 623	2 666	2 197	2 693	2 657
19. Taxes on profit for the year	473	418	457	427	369	389	321
20. Income before minority interest[b] (18-19)	1 605	1 885	2 166	2 240	1 828	2 304	2 336
21. Minority interests (net)	364	454	494	410	340	390	426
22. Profit/loss for the year (20-21)	1 241	1 431	1 672	1 829	1 488	1 914	1 910
Memo:							
Average assets	190 527	204 773	237 223	264 753	280 795	294 640	306 275

Source: Banco de Portugal.
Notes: Prepared in accordance with the accounting standards in force until December 2004. **(a)** The item "Income from affiliated companies and subsidiaries excluded from consolidation" registers income generated by affiliated companies excluded from the consolidation of the banking groups considered, which is attributable to the group according to the percentage of shares held in these companies. Affiliated companies are companies whose management is under a significant influence, assuming that this situation occurs when the shares held correspond to at least 20 per cent of the voting rights. In turn, subsidiaries excluded from the consolidation are those whose management is under a relevant influence, carries on activities which are incompatible with the objective of consolidated accounts, namely commercial, industrial, agricultural and insurance corporations. **(b)** Income before minority interests enables a more accurate measure of income generated by all consolidated assets and, therefore, it should be used in order to compare income with profitability on an individual basis.

Table A.5

BALANCE SHEET OF THE DOMESTIC INSTITUTIONS On a consolidated basis EUR millions							
	1998	**1999**	**2000**	**2001**	**2002**	**2003**	**2004**
Cash and claims on central banks	8 090	10 127	7 996	8 911	7 795	14 651	7 803
of which: cash and claims on Banco de Portugal	7 903	9 378	7 270	7 899	6 957	13 613	6 853
Investment in other credit institutions	24 436	21 464	20 470	21 495	22 020	23 029	25 401
In the country	n.a.	n.a.	8 539	10 013	7 583	6 246	7 528
Abroad	n.a.	n.a.	11 931	11 482	14 437	16 783	17 873
Claims on customers (net of provisions)	95 878	120 529	134 819	150 840	160 391	164 170	172 314
Credit overdue	n.a.	n.a.	2 933	3 268	3 835	4 247	3 564
Provisions	2 451	2 241	2 038	2 252	2 451	2 994	2 815
Provisions and financial fixed assets (net of provisions)	31 320	29 870	33 778	32 895	28 573	29 992	32 408
of which: securities of public issuers (gross)	n.a.	n.a.	9 185	9 471	8 393	8 340	9 124
Non-financial fixed assets	4 252	4 401	3 976	4 105	3 961	3 839	3 571
Other assets	8 403	9 317	9 475	10 772	11 140	12 417	12 763
Total assets	172 379	195 708	210 514	229 019	233 880	248 099	254 258
Central bank resources	1 596	2 979	3 133	2 611	1 272	2 923	1 326
of which: Banco de Portugal	1 383	2 658	3 300	2 258	1 031	2 766	3 195
Other credit institutions resources	32 756	35 502	40 223	40 107	37 360	34 233	29 725
In the country	n.a.	n.a.	7 812	9 857	6 564	4 660	6 248
Abroad	n.a.	n.a.	32 411	30 250	30 796	29 574	23 477
Customer resources	110 268	120 976	119 381	126 449	129 669	133 938	137 732
By residence of customer:							
Deposits of resident customers	n.a.	n.a.	95 144	98 779	101 630	102 175	106 339
Deposits of non-resident customers	n.a.	n.a.	24 237	27 670	28 038	31 762	31 392
By type of deposit:							
Demand deposits	35 655	42 062	41 040	44 603	47 708	47 931	49 753
Time and savings deposits	74 561	78 911	78 341	81 845	81 960	86 006	87 978
Liabilities represented by securities	5 970	11 589	20 632	29 635	34 608	43 629	49 764
of which: bonds	4 808	9 370	16 746	25 611	28 952	35 676	40 198
Subordinated liabilities	3 625	4 233	4 808	7 126	7 835	8 042	8 422
Provisions	1 740	2 153	2 412	2 601	2 751	2 685	2 940
Other liabilities	5 429	5 302	7 417	7 048	6 730	7 731	7 942
Equity capital	10 996	12 975	12 508	13 442	13 654	14 917	16 409
Net profit/loss for the year	1 241	1 431	1 672	1 829	1 488	1 914	1 910
Total liabilities and own funds	172 379	195 708	210 514	229 019	233 880	248 099	254 258

Source: Banco de Portugal.
Notes: n.a. - not available. Prepared in accordance with the accounting standards in force until December 2004.

Table A.6

PROFIT AND LOSS ACCOUNT OF THE DOMESTIC INSTITUTIONS On a consolidated basis EUR millions							
	1998	**1999**	**2000**	**2001**	**2002**	**2003**	**2004**
1. Interest income	11 761	11 414	12 336	14 101	12 275	11 322	11 225
2. Interest expenses	7 196	6 691	7 815	9 035	7 172	6 383	6 283
3. Financial margin (1-2)	4 565	4 722	4 521	5 066	5 103	4 939	4 942
4. Income from securities	132	98	161	180	159	127	141
5. Net commissions	1 312	1 443	1 479	1 427	1 494	1 691	1 918
6. Income from financial operations	595	534	573	338	363	488	434
7. Income from affiliated companies and branches excluded from consolidation (net)[a]	88	48	205	123	97	336	318
8. Other operating profits (net)	408	422	359	558	618	742	847
9. Other current income (4+5+6+7+8)	2 536	2 545	2 777	2 626	2 731	3 384	3 657
10. Gross income (3+9)	7 101	7 268	7 298	7 692	7 834	8 323	8 600
11. Staff costs	2 385	2 456	2 264	2 292	2 430	2 527	2 596
12. Other administrative costs	1 419	1 501	1 392	1 584	1 659	1 717	1 812
13. Administrative costs (11+12)	3 804	3 957	3 656	3 877	4 089	4 244	4 408
14. Overall gross income (10-13)	3 297	3 311	3 642	3 816	3 745	4 079	4 192
15. Extraordinary gains	335	744	384	65	188	202	17
16. Depreciation for the year	582	611	518	538	584	589	592
17. Net provisions	1 059	1 318	1 094	1 030	1 521	1 457	1 513
18. Income before taxes and minority interests (14+15-16-17)	1 990	2 125	2 414	2 312	1 827	2 234	2 104
19. Taxes on profit for the year	454	397	421	372	311	311	227
20. Income before minority interest[b] (18-19)	1 537	1 728	1 993	1 940	1 516	1 923	1 877
21. Minority interests (net)	364	454	452	365	302	352	384
22. Profit/loss for the year (20-21)	1 173	1 275	1 541	1 575	1 215	1 571	1 493
Memo:							
Average assets	172 379	184 044	200 744	218 879	230 577	242 094	246 779

Source: Banco de Portugal.
Notes: Prepared in accordance with the accounting standards in force until December 2004. **(a)** The item "Income from affiliated companies and subsidiaries excluded from consolidation" registers income generated by affiliated companies excluded from the consolidation of the banking groups considered, which is attributable to the group according to the percentage of shares held in these companies. Affiliated companies are companies whose management is under a significant influence, assuming that this situation occurs when the shares held correspond to at least 20 per cent of the voting rights. In turn, subsidiaries excluded from the consolidation are those whose management is under a relevant influence, carries on activities which are incompatible with the objective of consolidated accounts, namely commercial, industrial, agricultural and insurance corporations. **(b)** Income before minority interests enables a more accurate measure of income generated by all consolidated assets and, therefore, it should be used in order to compare income with profitability on an individual basis.

Table A.7

BALANCE SHEET OF THE BANKING SYSTEM (INTERNATIONAL ACCOUNTING STANDARDS) On a consolidated basis EUR millions			
	2004	**2005**	**2006**
Cash and claims on central banks	7 555	6 205	6 906
Claims and investment in other credit institutions	25 041	30 876	31 490
In the country	n.a.	5 748	5 773
Abroad	n.a.	25 127	25 718
Financial assets at fair value through profit or loss	12 900	18 150	20 266
Equity	n.a.	853	1 305
Debt instruments	n.a.	12 221	12 712
Other	n.a.	5 076	6 248
Available-for-sale financial assets	14 806	14 037	17 876
Equity	n.a.	4 169	6 021
Debt instruments	n.a.	8 909	11 485
Other	n.a.	959	371
Net credit to customers	182 717	199 873	222 942
Investment held to maturity	520	718	663
Hedging derivatives	692	816	953
Securitised non-derecognised assets	12 157	14 186	15 450
of which: credit to customers	12157	14 186	15 372
Investment in subsidiaries	2 613	3 475	4 080
Tangible and intangible assets	3 611	3 886	4 301
Other assets	9 799	13 768	12 544
Total assets	272 411	305 989	337 473
Resources from central banks	3 542	6 215	1 739
Resources from other credit institutions	33 315	38 840	42 941
In the country	n.a.	5 384	4 078
Abroad	n.a.	33 457	38 863
Resources from customers and other loans	142 784	149 139	156 606
Liabilities represented by securities	55 694	62 807	81 184
Subordinated liabilities	9 887	9 973	9 893
Financial liabilities held for trading	2 589	4 306	5 776
Hedging derivatives	562	956	1 471
Liabilities for non-derecognised assets in securitisation operations	0	2 363	4 130
Other liabilities	10 013	13 608	11 998
Total liabilities	258 386	288 208	315 738
Capital	14 025	17 782	21 735
Total liabilities and net wealth	272 411	305 989	337 473

Source: Banco de Portugal.
Note: n.a. - not available.

Table A.8

PROFIT AND LOSS ACCOUNT OF THE BANKING SYSTEM (INTERNATIONAL ACCOUNTING STANDARDS) On a consolidated basis EUR millions			
	2004	**2005**	**2006**
1. Interest income	12 622	13 977	17 278
2. Interest expenses	7 504	8 601	11 291
3. Financial margin (1-2)	5 119	5 375	5 987
4. Income from capital instruments	161	217	162
5. Income from services and commissions (net)	1 923	2 212	2 478
6. Income from financial assets and liabilities measured at fair value	346	505	-9
7. Income from available-for-sale financial assets	104	663	455
8. Income from foreign exchange revaluation	208	53	496
9. Income from the sale of other financial assets	72	366	743
10. Other operating profit and loss	602	417	624
11. Gross income (3+4+5+6+7+8+9+10)	8 535	9 809	10 936
12. Staff costs	3 667	3 300	3 349
13. General administrative costs	1 891	1 956	2 026
14. Depreciation and amortisation	562	465	449
15. Provisions net of restitutions and annulments	279	187	133
16. Impairment losses and other net value adjustments	1 012	1 138	1 091
17. Appropriation of income from associates and joint ventures (equity method)	624	217	233
18. Income before taxes and minority interests (11-12-13-14-15-16+17)	1 749	2 981	4121
19. Taxes on profit	228	401	724
20. Income before minority interests (18-19)	1 521	2 580	3 398
21. Minority interests (net)	236	383	576
22. Net profit and loss (20-21)	1 284	2 197	2 822

Source: Banco de Portugal.

Table A.9

BALANCE SHEET OF THE DOMESTIC INSTITUTIONS (INTERNATIONAL ACCOUNTING STANDARDS) On a consolidated basis EUR million			
	2004	**2005**	**2006**
Cash and claims on central banks	6 955	5 548	6 200
Claims and investment in other credit institutions	21 629	25 780	27 085
In the country	n.a.	4 795	4 709
Abroad	n.a.	20 985	22 376
Financial assets at fair value through profit or loss	12 038	16 302	17 806
Equity	n.a.	622	1 131
Debt instruments	n.a.	11 720	12 190
Other	n.a.	3 960	4 485
Available-for-sale financial assets	13 206	13 117	17 051
Equity	n.a.	3 775	5 761
Debt instruments	n.a.	8 383	10 919
Other	n.a.	959	371
Net credit to customers	157 128	171 226	190 964
Investment held to maturity	495	693	663
Hedging derivatives	669	680	886
Securitised non-derecognised assets	5 214	5 316	7 392
of which: credit to customers	5214	5 316	7 314
Investment in subsidiaries	2 396	3 204	3 721
Tangible and intangible assets	2 962	3 220	3 593
Other assets	9 006	12 983	11 763
Total assets	231 697	258 068	287 125
Resources from central banks	1 010	851	1 736
Resources from other credit institutions	24 751	27 441	31 258
In the country	n.a.	4 610	3 570
Abroad	n.a.	22 833	27 688
Resources from customers and other loans	124 770	130 933	139 028
Liabilities represented by securities	49 509	56 715	67 919
Subordinated liabilities	8 959	8 702	8 853
Financial liabilities held for trading	1 921	3 150	3 670
Hedging derivatives	539	822	1 369
Liabilities for non-derecognised assets in securitisation operations	0	2 363	4 130
Other liabilities	8 693	12 439	11 204
Total liabilities	220 151	243 415	269 168
Capital	11 546	14 654	17 957
Total liabilities and net wealth	231 697	258 068	287 125

Source: Banco de Portugal.
Note: n.a.- not available.

Table A.10

PROFIT AND LOSS ACCOUNT OF THE DOMESTIC INSTITUTIONS (INTERNATIONAL ACCOUNTING STANDARDS) On a consolidated basis EUR millions			
	2004	**2005**	**2006**
1. Interest income	10 255	11 192	13 662
2. Interest expenses	5 959	6 669	8 569
3. Financial margin (1-2)	4 297	4 523	5 093
4. Income from capital instruments	141	198	153
5. Income from services and commissions (net)	1 610	1 835	2 033
6. Income from financial assets and liabilities measured at fair value	280	470	-14
7. Income from available-for-sale financial assets	120	643	412
8. Income from foreign exchange revaluation	213	29	487
9. Income from the sale of other financial assets	66	364	695
10. Other operating profit and loss	540	356	569
11. Gross income (3+4+5+6+7+8+9+10)	7 267	8 419	9 427
12. Staff costs	3 178	2 917	2 915
13. General administrative costs	1 667	1 717	1 785
14. Depreciation and amortisation	482	386	365
15. Provisions net of restitutions and annulments	197	180	142
16. Impairment losses and other net value adjustments	835	993	940
17. Appropriation of income from associates and joint ventures (equity method)	587	164	162
18. Income before taxes and minority interests (11-12-13-14-15-16+17)	1 498	2 390	3 443
19. Taxes on profit	196	296	587
20. Income before minority interests (18-19)	1 302	2 094	2 856
21. Minority interests (net)	197	362	547
22. Net profit and loss (20-21)	1 105	1 732	2 308

Source: Banco de Portugal.

Table A.11

EUR millions	Banking system							For the sets of institutions which adopted IAS/AAS		
	1998	1999	2000	2001	2002	2003	2004	2004	2005	2006
1. Own funds										
1.1. Original own funds	9 715	11 026	12 991	13 238	13 351	13 966	14 950	13 729	14 891	17 874
1.2. Additional own funds	3 834	4 269	5 026	7 030	7 809	8 313	8 567	8 337	10 776	9 942
1.3. Deductions	821	513	2 273	2 999	2 829	2 617	2 319	2 092	1 948	2 405
1.4. Supplementary own fund	13	27	0	1	0	2	2	1	0	0
Total own funds	12 740	14 809	15 745	17 270	18 331	19 664	21 200	19 975	23 719	25 411
2. Own funds requirements										
2.1. Solvency ratio	8 748	10 652	13 184	14 094	14 687	15 304	15 747	15 096	16 213	17 960
2.2. Position risks	234	181	284	289	220	365	531	488	493	468
2.3. Settlement and counterparty risks	38	48	31	41	41	45	53	53	67	70
2.4. Foreign exchange rate risks	135	79	135	87	87	87	44	41	57	92
2.5. Other requirements	0	0	21	1	0	0	1	1	1	2
Total own funds requirements	9 154	10 959	13 655	14 513	15 035	15 802	16 377	15 679	16 830	18 591
Per cent										
3. Ratios										
3.1. Own funds / Total requirements	139.2	135.1	115.3	119.0	121.9	124.4	129.5	127.4	140.9	136.7
3.2. Own funds / (Total requirements x 12.5)	11.1	10.8	9.2	9.5	9.8	10.0	10.4	10.2	11.3	10.9
3.3. Original own funds / (Total requirements x 12.5)	8.5	8.0	7.6	7.3	7.1	7.1	7.3	7.0	7.1	7.7

Source: Banco de Portugal.