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PART I – FINANCIAL SYSTEM STABILITY

1. OVERVIEW

Despite the relatively benign evolution of banks' activity, profitability and solvency in 2009, the Portuguese banking system is currently subject to important risk elements, which are strongly interconnected. In fact, turmoil in international financial markets resurfaced in 2010, impacting on the financial intermediation in the Portuguese economy. Against the background of high levels of uncertainty, strong differentiation in sovereign risk was recently observed on a European level. This was particularly clear in some economies, including Portugal, which recorded significant and unanticipated increases in public deficits and debt – current and prospective – in conjunction with the maintenance of a set of fragilities of a structural nature. The risk differentiation was exacerbated from late April and directly put strains on banks' liquidity situation, not only in terms of funding costs but also in their capacity to access international debt markets. Notwithstanding the recent policy decisions adopted by the ECB and the European Union governments, these conditions are particularly challenging for Portuguese banks and will tend to imply significantly more restrictive conditions on access to credit by the non-financial private sector. In addition, the conjugation of the necessary public finances consolidation process with the desirable dynamics of increasing savings of private economic agents will tend to imply economic adjustment costs in the short term. These will translate into a greater materialisation of market and credit risk. Therefore, the transition of the Portuguese economy to a more sustainable economic and financial position over the medium term should be accompanied by stricter limits to banks' leverage and further efforts to strengthen capital ratios, in line with the current proposals for the reformulation of financial regulation and financial architecture on a global level.

Normalisation of international financial markets over the course of 2009, but a strong deterioration of public finances in most advanced economies

Over the course of 2009, financial markets tensions following the bankruptcy of the Lehman Brothers investment bank that persisted from the end of 2008 to the first few months of 2009, eased significantly. The normalisation of these markets and the consequent halt of the spiral of negative effects mutually affecting the financial system and the economy were due, to a large extent, to the prompt and decisive actions of the authorities in most advanced economies. Notwithstanding the magnitude and geographical scope of the package of implemented measures, the financial crisis of 2007-2009 led to an unprecedented global recession in the post war period, deeply synchronised across economies.

In this period, there was a significant deterioration in the public finances situation in several countries, reflecting, *inter alia*, the functioning of automatic stabilisers, the discretionary measures targeted at the economy and the impact of the direct support measures for financial systems. Particularly since the end of 2009, the deterioration of the public finances led to an upward revaluation of the risk premiums required by investors to hold sovereign debt, particularly from some countries in the euro area, including Portugal, which are also characterised by several structural vulnerabilities (see Box 2.2 *Increase in sovereign risk premium in 2010: an analysis of different indicators*, in this Report).

Marked sovereign risk differentiation in the context of the euro area in 2010 and the unprecedented response of the authorities on a European level

The heightened sovereign risk discrimination among euro area countries was particularly acute at the end of April and beginning of May 2010, with an increase in international investors' aversion to hold a very broad range of public and private debt, which was also reflected in high levels of volatility in equity markets on a global level. In particular, there were signs of dysfunctionality over the whole spectrum of debt market maturities, including highly significant increases in yields and difficulties in placing issues also in private debt markets, particularly in the case of banks. On the 8 and 9 of May, the exacerbation of these tensions led the Council of the European Union and European Union Member States to establish a financial stabilisation mechanism, with a commitment to accelerate the consolidation of the public finances in several countries. In addition, the ECB announced several policy measures, including the prorogation of the undertaking of fixed rate full allotment credit operations with 3 and 6 months maturities, as well as a program for the acquisition of public and private debt securities of euro area countries. These measures, as a whole, contributed to mitigate tensions in financial markets, even though high levels of volatility and significant sovereign risk differentiation in the euro area still persist.

This framework determined, on one hand, the necessity to implement forceful adjustments to public finances and to the Portuguese economy as a whole. The adoption of the package of measures designed to credibly and enduringly ensure these adjustments will, in the short term, tend to imply costs for the growth of economic activity, with consequences on the materialisation of credit and market risks. This process will tend to occur in other advanced economies, notably within the European Union. On the other hand, it is necessary for transmitting confidence to investors regarding the credibility of the public finances consolidation plan, with consequences on the normalisation of the Portuguese Treasury's funding conditions, as well as for achieving sustainable economic growth over the medium and long term. In the specific case of the banking sector, the measures announced should promote the reduction of the sovereign risk premium and contribute to a more generalised and broad-based access to stable funding. The ensuing leeway should contribute to an adjustment of the economy that is not too abrupt, but without leading to the delay of the first steps towards a faster correction of unsustainable imbalances, in particular, taking into consideration the fact that the measures implemented by the ECB will not persist indefinitely. In other words, in addition to the correction of the budget deficit, endogenous adjustments in the behaviour of private economic agents are desirable, translated, in particular, in an increase in savings rates. The banks' capacity to attract and maintain stable funding is crucial for avoiding the occurrence of sudden slowdowns in financial intermediation in the economy.

The Portuguese banking system continued to cope with the international economic and financial crisis

The financial situation of the Portuguese banking system evolved favourably in several domains in 2009. Information available for the first quarter of 2010 points to the maintenance of this evolution (see Box 4.1 *Financial situation of the largest Portuguese financial groups in the Portuguese banking system in the first quarter of 2010,* in this Report). Firstly, there was an improvement in the own funds adequacy ratio, largely due to significant capital increases. Secondly, profitability indicators remained at comfortable levels, comparing favourably with other European banks. It should be noted that there was a very significant reduction of net interest income, which is the main component of net operating income, owing to the historically low level of short-term interest rates, notwithstanding the fact that it was partly sustained by the strong steepness of the yield curve. This latter effect is associated with banks' financing at low interest rates, including the financing with the ECB, with a

corresponding investment in debt securities, with higher yields. Impairment in the loan portfolio also increased, although remaining at relatively contained levels, whereas there was some reduction in operating costs. In turn, for the year as a whole, banks' net income benefited from the increase in income from market operations which recovered from the highly negative situation in place between the end of 2008 and the first few months of 2009. Reference should also be made to the contribution of international activity to the results of several of the largest banking groups. On the one hand, this represents a geographical diversification of activities and, on the other, exposes banks to the specific risks associated with activity in these economies. Finally, during the course of 2009, there was an improvement in the liquidity position in several domains, both as regards more structural aspects, with the prolongation of the slight declining trend in ratios between credit and deposits, and in terms of the coverage of liabilities of more volatile nature by liquid assets over shorter time horizons. Despite the positive performance in 2009, Portuguese banks are exposed to the above-mentioned reassessment of risks in international financial markets.

Across-the-board slowdown in credit in 2009, albeit maintaining positive growth

In the course of 2009, a marked slowdown was observed in all bank loan market segments, with growth rates at positive levels of around 2 per cent in the first few months of 2010. In the case of mortgage loans and loans to households for other purposes (including consumer credit) the growth rates were relatively stable, with a very slight tendency to accelerate in the case of mortgage loans. In turn, although the trend in loans to non-financial corporations was not so marked in the most recent period, there are signs indicating that the rate of growth may continue to fall. Overall, the slowdown in credit in 2009 was in line with demand developments, measured by the most relevant expenditure aggregates in each of the segments. There is also some evidence that factors on the credit supply side also contributed to this evolution. The qualitative information provided by the banks suggests that they were more stringent in their approval of new loans or credit lines, although progressively less so during the course of 2009. However, information relating to the first quarter of 2010 suggests an intensification of the tightening of loan approval criteria. This information is in line with the downgrading of the ratings of the Portuguese Republic and Portuguese banks in 2010, as well as the increase in tensions in sovereign debt markets in the euro area, with consequences in other markets. In general, the banks stated that greater restrictions on such criteria took the form of higher spreads on credit operations, particularly on higher risk debtors and that they were more demanding on the terms of collateral received (either in terms of loan-to-value ratios or in terms of the appraisal of collateral). Information on interest rates charged by the banks clearly corroborates the responses to the survey in the case of mortgage and corporate loans, whereas in the case of consumer credit there was an increase at the end of 2008 followed by a reduction. The latter segment is characterised by higher spreads and lower immediate sensitivity of the respective interest rates to money market rates and to the materialisation of credit risk.

Deterioration of credit quality but with signs of improvement

As regards the materialisation of credit risk, reference should be made to the fact that delinquency rates on mortgage loans remained contained, with the accumulation of new past due and doubtful loans clearly reducing after the first quarter of 2009. This development should be related with the historically low level of interest rates, leading to substantial reductions in the average mortgage instalment. Available evidence based on the Survey on Household Wealth and Indebtedness indicates that the most fragile situations potentially leading to default on mortgage loans, assessed as the ratio between debt service and current income, correspond to households composed by younger people and those with lower income levels. It should, however, be noted that the debt servicing

ratio observed in Portugal for these cohorts of the population compares favourably in the European context. On the other hand, the percentage of low income households with access to the mortgage market is very small in Portugal, similarly to what is observed in other euro area countries. It is also usual for mortgage loans taken out by households in the younger age brackets to include personal guarantees in addition to the collateral itself. This situation is an important risk mitigator in mortgage loans granted to this segment of the population. Debtors in the younger age brackets have the lowest default rates (see Box 4.3 *Credit to households and defaults: a characterisation based on the Central Credit Register*, in this Report). In turn, the delinquency rates on loans to households for consumption and other purposes have virtually stabilised since the third quarter of 2009 at a clearly higher level than that of the last recession. It should be noted, however, that the materialisation of credit risk in this segment, when assessed in terms of the flow of new overdue and other doubtful loans was much lower in March 2010 than in December 2008, although still high from a historical viewpoint. The trend towards an increase in the proportion of longer maturities in consumer credit observed over the last few years is consistent with the information obtained from the Survey on Household Wealth and Indebtedness for 2006 that auto loans are the major component of consumer credit and are usually collateralised by the financed vehicle. Additionally the joint reading of the Survey on Household Wealth and Indebtedness for 2006 and 2000 enables to conclude that the universe of debtors in the consumer credit segment expanded significantly.

In 2009, delinquencies by non-financial corporations increased substantially and stood at higher levels than those of the last recession. In any event, the flow of new overdue and doubtful loans has been progressively reducing since mid 2009. In this segment, the recent reduction in the flow of new past dues was associated with the low level of bank interest rates (see Box 4.2 *Determinants on loan defaults by non-financial corporations*, in this Report). Credit to non-financial corporations is highly concentrated in a very small number of companies relatively to the universe of companies with debtor balances vis-à-vis the financial system, whereas the incidence of default decreases with the size of the system's total exposure to each debtor. In particular, the default rate of companies representing the financial system's largest exposures edged down recently and is much lower than retail exposures. Notwithstanding, large exposures are, due to their individual size, an element of risk that banks cannot disregard.

The need to accelerate budget consolidation and, in more general terms, the financial deleverage of the economy will tend to imply a greater materialisation of credit and market risk

The trajectory of the Portuguese economy in the short term will be conditioned by the necessary budget consolidation process, with consequences for the labour market situation. In turn, and more generally, the need for the financial deleverage of the Portuguese economy will translate into the reduction of the disparity between domestic savings and investment. Notwithstanding the fact that there has been a slight acceleration in bank loans over the last few months, the deleverage will lead to a slowdown of the demand for credit. On the other hand, in spite of the ECB's implementation of measures allowing a greater and across-the-board access to liquidity, these are expected to be exceptional and not permanent. Concurrently, the differentiation in the sovereign risk premium in the euro area continues to be non-negligible. Therefore, notwithstanding some reduction of tensions in sovereign debt markets observed from mid May 2010, banks' funding conditions in wholesale debt markets remained restrictive. In this respect, the downgrading of the ratings of the Portuguese Republic and Portuguese banks which regularly issue debt in international markets, in the first months of 2010, is a salient aspect regarding the markets assessment of the situation of the Portuguese economy. Against this background, lending conditions will tend to be affected, namely through an increase in

spreads and greater selectiveness in the approval of credit to the non-financial private sector, in line with what was observed in the first quarter of this year. Accordingly, the banks' behaviour regarding their supply of credit will also contribute to the Portuguese economy's financial deleverage process. The safeguarding of access to external funding by banks presupposes the limitation of Portuguese sovereign risk and is indispensable for a less abrupt financial deleverage process. In these circumstances, the acceleration of the budget consolidation process, compatible with the sustainability of the public finances over the medium term, is of paramount importance. The full implementation of the measures already announced, as well as other additional measures that may be deemed necessary, will therefore be fundamental.

The prospects for the banks' generation of profits are surrounded by several risk factors. On the one hand, the expected slowdown of credit, resulting from the economy's financial deleverage process, in conjunction with the still low level of nominal interest rates (notwithstanding the expected increase of the spreads on credit operations) suggests that net interest income will remain at historically low levels. At the same time, there are several risks associated with the exposure to the equities market (through banks' own portfolios and particularly through bank employees' pension funds' portfolios), in a setting of high volatility in this market. On the other hand, the necessary budget consolidation adds an element of uncertainty over the trajectory for the recovery of economic activity and the labour market. This, coupled with the maintenance of private sector indebtedness at a high level, suggests the need for higher provisioning and the booking of more significant impairment losses in the credit portfolio. In this way, the recent improvement of indicators of credit quality may prove not to be sustainable.

Portuguese banks must adjust to the global reform of financial regulation over the medium term

Over the medium term, harmonised changes on a global level are expected in prudential regulation (see Box 2.1 *Recent developments in international financial regulation and architecture*, in this Report). These were raised by the current financial crisis which was associated with inaccurate risk assessments and misalignments of the incentives facing different participants in financial markets. The flaws identified in regulation led to proposals for the revision of the Basel Accord (which, in principle, will be part of a new Capital Adequacy Directive in the European Union) and which will be particularly demanding in what concerns own funds quality and minimum liquidity requirements. These aspects comprise important challenges for the management of credit institutions, including the Portuguese, recommending a cautious calibration and a gradual introduction allowing their adaptation to the new regulatory environment without excessive disruptions to financial intermediation in the economy.

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

	2003	2004	2005	2006	2007	2008	2009
Macroeconomic and financial indicators							
Real GDP (rate of change)							
US	2.5	3.6	3.1	2.7	2.1	0.4	-2.4
Euro area	0.8	2.0	1.8	3.1	2.7	0.5	-4.0
Portugal	-0.8	1.5	0.9	1.4	1.9	0.0	-2.7
Fiscal Balance (as a percentage of GDP)							
US	-4.9	-4.4	-3.2	-2.0	-2.7	-6.6	-12.5
Euro area	-3.1	-2.9	-2.5	-1.3	-0.6	-2.0	-6.3
Portugal	-2.9	-3.4	-6.1	-3.9	-2.6	-2.8	-9.4
Current capital account balance (as a percentage of GDP)							
US	-4.7	-5.3	-5.9	-6.0	-5.2	-4.9	-2.9
Euro area	0.3	0.8	0.1	-0.1	0.1	-1.5	-0.6
Portugal	-6.0	-7.5	-9.4	-9.9	-9.4	-12.0	-10.3
Oil price (USD brent; y-o-y rate of change)	-1.4	34.0	43.1	8.2	55.4	-58.4	94.4
Key interest rates - Monetary policy							
US	1.00	2.25	4.25	5.25	4.25	0.25	0.25
Euro area	2.00	2.00	2.25	3.50	4.00	2.50	1.0
3-month Euribor	2.1	2.2	2.5	3.7	4.7	2.9	0.7
Yields on (10-year) Government bonds							
US	4.3	4.2	4.4	4.7	4.0	2.3	3.8
Euro area	4.3	3.7	3.3	3.9	4.3	2.9	3.4
Stock markets (annual rate of change)							
S&P 500	26.4	9.0	3.0	13.6	3.5	-38.5	23.5
Dow Jones Euro Stoxx	18.1	9.9	23.0	20.3	4.9	-46.3	23.4
PSI Geral	17.4	18.0	17.2	33.3	18.3	-49.7	40.0
PSI Financial Services	4.0	12.0	24.4	34.8	4.9	-62.9	14.7
Financial situation of the non-financial private sector							
Households							
Indebtedness							
As a percentage of GDP	75	80	85	90	94	96	99
As a percentage of disposable income	106	113	120	128	135	135	138
Loans granted by resident financial institutions[a]							
Annual rate of change	11.7	10.3	10.7	9.4	8.3	4.4	2.2
of which:							
House purchase	11.9	10.5	11.2	9.9	8.5	4.3	2.6
Consumption and other purposes	11.2	9.5	9.4	7.7	7.8	4.9	0.7
Net lending (+) / borrowing (-)[b]							
As a percentage of GDP	3.1	2.8	3.2	2.1	0.7	1.1	3.6
As a percentage of disposable income	4.4	4.0	4.5	3.0	1.0	1.6	5.0
Current saving[b]							
As a percentage of GDP	7.5	6.9	6.6	5.8	4.3	4.5	6.4
As a percentage of disposable income	10.6	9.8	9.3	8.1	6.2	6.4	8.8
Investment in real assets[b]							
As a percentage of GDP	5.1	5.1	5.1	4.0	4.2	4.4	3.6
Non-financial corporations							
Total debt[c]							
As a percentage of GDP	118	116	120	122	132	142	151
Annual rate of change	5.4	4.5	6.4	6.4	11.9	10.5	5.2
Financial debt[d]							
As a percentage of GDP	110	108	112	115	123	134	143
Loans granted by resident financial institutions[a]							
Annual rate of change	5.5	3.6	4.6	5.9	12.7	11.2	2.8
Net lending (+) / borrowing (-)[b]							
As a percentage of GDP	-4.7	-4.5	-5.9	-7.4	-8.1	-10.4	-6.9
Current saving[b]							
As a percentage of GDP	8.2	8.1	6.6	5.4	4.8	3.0	3.7
Investment in real assets[b]							
As a percentage of GDP	13.8	13.6	13.7	13.7	13.9	14.8	11.5

Notes: y-o-y year-on-year. n.a. not available. **(a)** Loans granted by monetary financial institutions and other financial intermediaries. **(b)** Net lending/borrowing, savings and investment ratios to GDP up to 2006 use National Accounts base 2000; in 2007 to 2009 those ratios are based on INE's quarterly accounts. Investment in real assets corresponds to the sum of GFCF, changes in inventories, acquisitions less disposals of valuables and acquisitions less disposals of non-produced non-financial assets. **(c)** It includes loans granted to non-financial corporations by other institutional sectors excluding loans/additional capital granted to non-financial corporations having their head-office in Madeira's off-shore by non-resident intra-group corporations; commercial paper and bonds issued by non-financial corporations held by other sectors and trade credits received from other sectors. **(d)** Corresponds to total debt excluding trade credits granted to non-financial corporations.

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

	2003	2004	2004*	2005*	2006*	2007*	2007**	2008**	2009**
Activity and profitability									
Annual rate of change of total assets	7.4	3.8	-	12.3	10.5	11.7	-	7.5	7.1
ROE - Return on equity[e]	16.2	14.5	13.1	19.4	20.6	18.0	17.7	5.6	7.6
ROE - Return on equity - adjusted[e],[f]					18.8			10.1	8.8
ROA - Return on assets[e]	0.91	0.87	0.65	1.03	1.30	1.18	1.15	0.34	0.45
ROA - Return on assets - adjusted[e],[f]					1.18			0.62	0.57
Net interest income (as a percentage of average assets)	2.00	1.94	1.91	1.86	1.89	1.88	1.95	1.92	1.62
Income from services and commissions (net, as a percentage of average assets)	0.69	0.76	0.72	0.77	0.78	0.76	0.77	0.73	0.71
Cost to income ratio	57.4	57.2	71.7	58.3	53.4	53.7	54.5	55.6	56.8
International exposure (for domestic banks):									
Share of external assets in total assets[g]	21.6	20.5	30.5	27.6	30.0	26.8	26.7	28.2	29.3
of which:									
Local assets denominated in local currency	1.7	1.6	7.2	6.4	6.7	8.0	7.9	8.2	8.4
International assets by counterparty sector:									
Banking sector	14.1	14.8	13.7	12.7	14.0	8.2	8.2	6.3	5.4
Non-bank sector	5.8	4.0	9.7	8.5	9.3	10.7	10.6	13.7	15.6
Capital adequacy[h]									
Overall capital adequacy ratio	10.0	10.4	10.2	11.3	10.9	10.0	10.4	9.4	10.5
Tier-I ratio	7.1	7.3	7.0	7.1	7.7	6.5	7.0	6.6	7.8
Market risk									
Coverage ratio of the pension funds of bank employees (as a percentage of regulatory capital)	0.1	-0.4	-0.4	1.2	5.3	5.1	4.5	1.2	3.9
Liquidity risk									
Customer credit-to-resources ratio	129.1	128.3	130.9	137.5	145.6	153.9	153.4	151.9	151.9
Coverage of interbank liabilities by highly liquid assets[i]	100.7	99.5	110.0	98.5	99.2	88.1	76.9	68.7	
Coverage of interbank liabilities by highly liquid assets - Instruction No. 13/2009								83.9	109.8
Liquidity gap[i]									
up to 3 months	1.6	2.4	1.4	-0.9	-1.5	-2.5	-1.5	-1.9	
up to 3 months - Instruction No. 13/2009								-7.6	-3.2
up to 1 year	-6.3	-3.6	-5.4	-8.2	-8.9	-11.4	-9.9	-7.0	
up to 3 months - Instruction No. 13/2009								-15.0	-12.6
For domestic banks									
Customer credit-to-resources ratio	124.8	127.2	129.2	134.2	140.6	150.8	144.8	142.3	143.8
Coverage of interbank liabilities by highly liquid assets[i]	120.1	120.8	127.3	126.5	115.7	107.8	113.7	102.6	
Coverage of interbank liabilities by highly liquid assets - Instruction no. 13/2009								127.3	161.3
Liquidity gap[i]									
up to 3 months	0.5	0.7	0.6	-0.7	-0.9	-2.1	-1.4	-2.6	
up to 3 months - Instruction No 13/2009								-6.1	-3.4
up to 1 year	-6.5	-4.8	-5.4	-7.4	-8.9	-10.1	-9.0	-7.5	
up to 1 year - Instruction No. 13/2009								-12.8	-12.2
Credit risk									
Loans granted by resident financial institutions to the non-financial private sector[a]									
Annual rate of change	8.7	7.1	7.1	7.9	7.8	10.2	10.2	7.4	2.5
Credit and interest overdue (on a consolidated basis)									
As a percentage of credit to customers	2.4	2.0	1.8	1.7	1.5	1.5	1.6	2.0	3.0
As a percentage of assets	1.6	1.3	1.3	1.1	1.0	1.0	1.1	1.5	2.1
Non-performing loans of households									
As a percentage of loans to households	2.0	1.8	1.8	1.7	1.5	1.6	1.6	1.9	2.4
Non-performing loans of non-financial corporations									
As a percentage of loans to non-financial corporations	2.1	1.7	1.7	1.7	1.5	1.4	1.4	2.2	3.9
Annual flow of new credit overdue and other doubtful credit[j]									
As a percentage of bank loans adjusted for securitisations									
Households	0.5	0.2	0.2	0.2	0.3	0.4	0.4	0.7	0.6
Adjusted for loan sales to the non-financial sector				0.3	0.4	0.4	0.4	0.7	0.6
Non-financial corporations	0.5	0.5	0.5	0.6	0.4	0.6	0.6	1.2	1.9
Adjusted for loan sales to the non-financial sector				0.6	0.5	0.6	0.6	1.3	2.1

Sources: Bloomberg, Eurostat, *FMI, INE*, Thomson Reuters and Banco de Portugal.
Notes: y-o-y - year-on-year; n.a. - not available. *The break in the series results from the implementation of the International Accounting Standards (IAS), which also implied a redefinition of the group of banking institutions under analysis. ** Break in the series related to the widening of the group of banking institutions under analysis. Breaks in the series do not apply to indicators based on Monetary and Financial Statistics, which consider resident banking 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 in 2006 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. In turn, the adjusted indicators in 2008 and 2009 are obtained excluding BPN and BPP banks from the set of institutions under analysis. (g) From 2004 onwards, figures on external assets are based on a new information report. Comparable figures from 2004 to 2007are based on estimates on total assets for the whole set of domestic banks. Comparable figures from 2007 to 2009 are based on assets for domestic institutions. (h) From 2008, all analysed institutions have computed the capital adequacy ratio in accordance with Basel II criteria, which mainly affected the determination of capital requirements. (i) Up to 2008, this indicator is computed using information from Notice No. 1/2000, which is applicable only to financial institutions which collect deposits. (j) Change in amounts outstanding of credit overdue and other non-performing loans recorded in the balance sheet of resident MFIs adjusted for write-offs/write-downs and reclassifications. Sales outside the banking system included in the adjusted flow correspond to credit overdue and other non-performing loans not written-off/written-down, in accordance with the quarterly report defined in Instruction of Banco de Portugal No 2/2007.

2. MACROECONOMIC AND FINANCIAL RISKS

The perception of financial stability risks, on a global level, turned gradually less unfavourable during the course of 2009, in a context of easing tensions in the financial markets and a less negative evolution of economic activity. However, over the course of this period, there was a significant deterioration in the public finances of diverse countries, reflecting *inter alia* the impact of automatic stabilisers and support measures for the financial system and the economy. Notwithstanding the fact that such measures were essential for arresting the spiral of negative effects between the financial system and the economy, doubts concerning the sustainability of the public finances implied a new increase in the sovereign risk premium, particularly from the end of 2009 and especially in the case of several countries in the euro area, including Portugal. This increase in risk premium was particularly marked at the end of April and start of May 2010. Given the heightening of tensions in the sovereign debt markets, the Council of the European Union, Member States of the European Union and the Council of the ECB announced a collection of measures to promote financial stability in Europe, in mid May. These measures enabled tensions in the financial markets to be mitigated, although there is still a high level of volatility and significant sovereign risk premium differentiation among countries in the euro area.

This environment represents an opportunity to make the necessary adjustments to the public finances and, more globally, the Portuguese economy. The adoption of the stringent series of measures to ensure these adjustments will, over the short term, tend to imply costs for the growth of economic activity, with consequences on the materialisation of credit and market risk. Such measures, however, are a *sine qua non* for achieving sustainable economic growth over the medium and long term. As specifically regards the banking sector, the measures announced will help to reduce the sovereign risk premium and promote access to stable financing. This framework will help to make the adjustment of the economy less abrupt but should not delay the correction of unsustainable imbalances, particularly on account of the fact that such measures are not permanent.

It should also be pointed out that, over the medium term, there are risks to financial stability related with banks' adjustment process to the implementation of changes in financial regulation currently under discussion, although such changes comprise an essential step for the creation of a more stable financial system, resistant to adverse shocks.

Economic activity will recover in 2010, but at differentiated rates, after a sharp contraction, on a global level, in 2009

The international financial crisis, which began in 2007 and took a turn for the worse in September 2008 after the bankruptcy of the Lehman Brothers investment bank, gave rise to the most profound global economic recession since the second world war. The world economy contracted by 0.6 per cent, in 2009, reflecting a recessionary environment in most of the advanced economies (with a contraction of 3.2 per cent in economic activity in 2009).[1] However, global intervention by governments and central banks, often concerted, helped to arrest the negative effects of the interaction between the financial system and the economy, preventing the economic recession from assuming identical proportions to those observed in the Great Depression. On the one hand, central banks implemented globally accommodating monetary policies, complemented by non-conventional measures, with the

(1) Data from the World Economic Outlook, published by the IMF in April 2010. The evolution of the world economy in 2009 is discussed in more detail in "Chapter 1 International Environment", Banco de Portugal, *Annual Report* 2009. It should be noted that the global GDP valued at market exchange rates, instead of purchasing power parities, decreased more in 2009 (-2.0 percent), which reflected the lower relative weight of emerging market economies and developing countries in world GDP when using market exchange rates.

objective of guaranteeing the financial system's access to liquidity and mitigating the tensions noted in the interbank money markets since August 2007. On the other hand, governments implemented fiscal measures designed to stimulate the economy and support the financial system, with the objective of ensuring financial stability and fuelling the recovery of economic activity.

In such a context, the prospects relating to the impact of the financial crisis on economic growth turned progressively less negative. Starting in the second quarter of 2009, there was a gradual improvement in conditions in the financial markets. In turn, international trade flows began to show signs of a certain recovery, after the marked contraction at the end of 2008 and in the first quarter of 2009. Against this background, according to IMF forecasts, the world economy will grow 4.2 per cent in 2010. The recovery trajectories of economic activity should, however, evidence a certain heterogeneity, in contrast with the high level of synchronisation, on a global level, observed in the recessionary period.[2]

Economic activity in the advanced economies will grow by around 2.3 per cent in 2010, whereas growth in emerging market economies will be above 6 per cent. There are, however, significant differences in the expected recovery trajectories within each of the said groups. Notwithstanding the fact that the US economy was at the epicentre of the financial crisis, its recovery will be faster and more significant than that of the European economy. There are several factors which may help to explain these differences. Firstly the fiscal measures designed to stimulate the economy were of a different type and magnitude in these economies. In addition, European companies have higher debt ratios than their US counterparties and are more dependent on bank loans for financing, as US companies make more significant use of private debt markets. As a substantial increase in bank credit restrictions was noted, this structural difference may hinder the recovery of investment and the restructuring of companies in Europe. Lastly, US exports are expected to evidence a higher level of recovery than European exports, reflecting differences in the geographical composition of export markets. Even within the European Union there are different rates of economic recovery, as growth will be slower and more moderate in countries with current account deficits and significant internal imbalances, as well as in countries facing substantial disruptions in their financial system and corrections to overvalued property markets.

In such a context, prospects for growth of the Portuguese economy are poorer than those estimated for the euro area, after a decade of relatively moderate growth. As a small, open economy heavily integrated from an economic and financial viewpoint, with several structural vulnerabilities, the Portuguese economy was essentially affected by the international financial and economic crisis on account of the contraction of external demand and greater restrictions in access to finance. Notwithstanding the recovery in world demand, the prospects for the Portuguese economy are conditioned by the necessary fiscal consolidation process which implies several short term costs. Notwithstanding, this adjustment of the economy is essential to enable sustainable economic growth over the medium and long term.

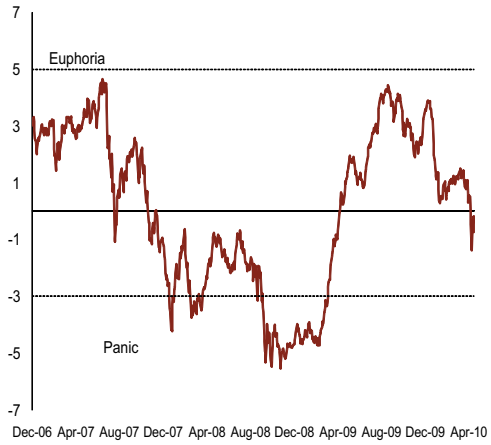
Globally positive evolution of international financial markets during the course of 2009, arrested at the end of the year

In the first few months of 2009, the financial markets continued to face significant disruptions. From the second quarter onwards, there was a reduction in the levels of uncertainty and risk aversion and a gradual normalisation of finance conditions (Chart 2.1). This evolution partly reflected the measures implemented by governments and central banks, in addition to the gradual upward revision of

(2) See "Box 1.1 *The global economic recession: comparison with past episodes*", Banco de Portugal, *Annual Report* 2009.

Chart 2.1

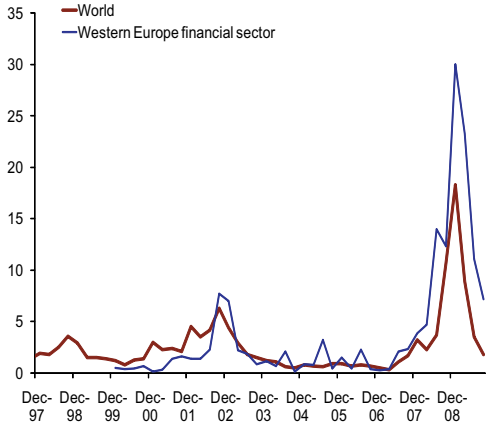
GLOBAL RISK APPETITE INDICATOR



Source: *Credit Suisse*.
Note: Last observation: 14 May 2010.

Chart 2.2

DOWNGRADE-TO-UPGRADE RATIOS



Sources: Bloomberg and Moody's.

world economic growth forecasts. In such a context, banks and non-financial corporations started to announce positive results. These were better than expected by the analysts and helped to reinforce the positive development of financial markets.[3] The assessment of the rating agencies was also less negative, resulting in a sharp reduction in the ratio between downgrades and upgrades (Chart 2.2).

Improved conditions in the financial markets were transversal to different types of financial assets. The interbank money markets began to show signs of a certain normalisation during the course of 2009, reflecting the impact of the measures to reduce uncertainty in the financial system taken by central banks and governments (Chart 2.3). In turn, there was a sharp increase in value in stock markets starting in March 2009, accompanied by an improvement in the profitability of non-financial corporations and the gradual restructuring of banks' balance sheets (Chart 2.4). The stocks of Portuguese companies and banks generally accompanied this trend towards an increase in value. At the same time, the situation in the debt markets also evidenced a certain normalisation over the course of the year, with an increase in primary market issues and a significant reduction of risk premiums. Portuguese banks benefited from this framework and were again able to issue a significant volume of non-guaranteed state debt with longer maturity periods starting in May 2009, as discussed in "Section4.4 *Liquidity Risk*", of this Report.

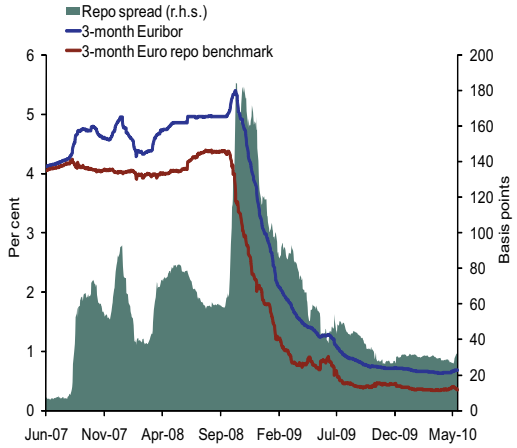
This globally positive evolution in financial markets in 2009 was arrested at the end of the year. The increase in risk aversion, in this period, partly reflected the reigning uncertainty over the prospects for economic activity and reversal of the financial system and economic support measures. However, the major factor behind the increase in volatility in the financial markets was associated with the increase in sovereign risk in this period. It should be remembered that, at the end of 2008, and start of 2009, sovereign risk premiums had increased substantially, reflecting the transfer of risk from the financial system to governments, following the announcement of state guarantees for banks' debt issues and financial system recapitalisation programmes.[4] During the course of 2009 sovereign risk premiums were gradually reduced, reflecting the reduction of the probability of the use of financial system support measures.

(3) The evolution of international financial markets in 2009 is discussed in more detail "Chapter 1 *International Environment*", Banco de Portugal, *Annual Report* 2009.

(4) The increases in risk premiums were particularly significant in this period for Austria, Belgium, Ireland and the Netherlands.

Chart 2.3

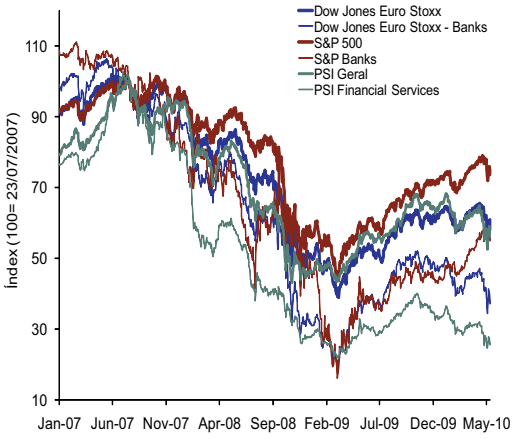
THREE MONTHS MONEY MARKET INTEREST RATES - EURO AREA



Source: Thomson Reuters.
Note: Repo spread calculated as the difference between the interest rate on non-collateralised money market operations (3 month Euribor) and the interest rate on collateralised operations in this market (3-month euro repo benchmark). Last observation: 14 May 2010.

Chart 2.4

DEVELOPMENTS IN STOCK MARKETS



Source: Bloomberg.
Note: Last observation: 14 May 2010.

However, the end of 2009 and start of 2010 witnessed the appearance of tensions in sovereign debt markets which were passed on to other financial markets. These tensions reflected uncertainty over the sustainability of the public finances in various countries, particularly after the announcement of problems with the Dubai World state-owned investment company and of the Greek fiscal deficit, which was of a much higher magnitude than previously anticipated. These developments had a contagion effect on other countries, which in the case of Portugal, was reinforced by the disclosure of a higher than expected fiscal deficit for 2009.[5]

There has been a marked deterioration in the public finances of various countries, comprising a major risk to global financial stability

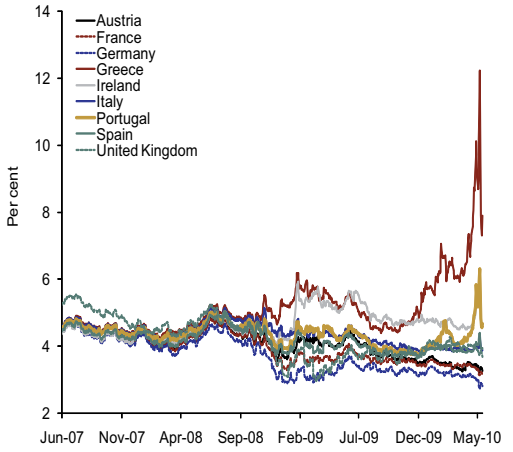
One of the main risks for financial stability in the current framework is related with concerns over the sustainability of the public finances in diverse countries. The support measures for the financial system and the economy were, as already stated, essential for arresting a downward spiral of negative effects between the financial system and the economy. However, there has been a highly significant deterioration of the deficit and sovereign debt in most of the advanced economies, including the United States, United Kingdom and countries in the euro area. The deterioration of agents' perception of the sustainability of the public finances has, accordingly, been more marked in countries which have recorded significant, unanticipated increases in their fiscal deficits and/or with structural vulnerabilities. Euro area countries which have been more penalised in the financial markets over the course of the last few months include Italy, Spain, Ireland, Portugal and Greece (most notably the latter two countries) (Chart 2.5). In this setting, the implementation of fiscal consolidation measures is a priority for such countries and may contribute towards an acceleration of the necessary adjustment processes, namely, in the case of Portugal, through an increase in the internal savings rate.

In this framework, the Portuguese fiscal situation and the assessment thereof by the financial markets comprises an important risk element. In 2009, the Portuguese fiscal deficit was only exceeded, in

(5) See "Box 2.2 *Increase in sovereign risk premium in 2010: an analysis of different indicators*", of this Report.

Chart 2.5 (a)

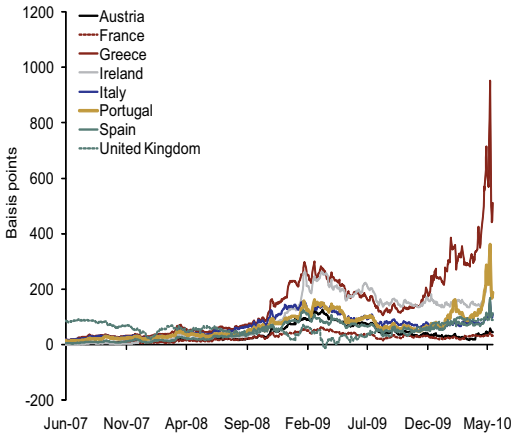
EUROPEAN GOVERNMENT BOND YIELDS (10 YEARS)



Source: Thomson Reuters.
Note: Last observation: 14 May 2010.

Chart 2.5 (b)

SPREADS *VIS-À-VIS* GERMANY OF EUROPEAN GOVERNMENT BOND YIELDS (10 YEARS)



Source: Thomson Reuters.
Note: Last observation: 14 May 2010.

euro area countries, by Ireland, Greece and Spain.[6] The trend towards a deterioration of the public finances was, however, common to almost all of the countries in the euro area. At the end of 2009, 13 of the 16 euro area countries suffered from excessive deficits, under the scope of the Stability and Growth Pact. In accordance with European Commission guidelines, Portugal's excessive fiscal deficit should be corrected by 2013. The Stability and Growth Programme, announced in March 2010, encompasses a collection of measures designed to limit expenditure and increase public revenues. These measures include wage containment, control of several social payments, the postponement or decision not to proceed with several investments, the limitation of several fiscal benefits and an IRS capital gains tax of 20 per cent. Given the deterioration of international investors' assessment of the public finances situation in Portugal, starting mid April, it was announced at the end of the month that the implementation of several of the measures would be brought forward. In addition, at the start of May, the terms and conditions of the loan to be made to Greece by European Union countries and the IMF were defined. However, the announcement of this aid mechanism was not sufficient to contain the escalation of tensions in sovereign debt markets. In this framework, on 9 May a package of measures was announced by the Council of the European Union, accompanied by a commitment to accelerate fiscal consolidation by Member States.[7] This package includes the possibility of financial support to Member States for up to a total amount of EUR 500 billion, governed by strict rules defined by the European Union and IMF.[8] In such a context, the Portuguese government announced in May the adoption of additional fiscal measures with the objective of accelerating the fiscal consolidation process.[9] The ECB also announced a series of temporary measures, including interventions in sovereign and private debt markets and the reactivating of several of the measures implemented at the end of 2008 (fixed rate tenders with the full allotment of demand for 3 and 6 months, liquidity swaps

(6) The situation of the public finances in Portugal is discussed in more detail in "Chapter 3 *Fiscal policy and situation*", Banco de Portugal, Annual Report 2009.

(7) http://ec.europa.eu/economy_finance/articles/euro/documents/2010-05-12-with(2010)250_final.pdf.

(8) Under the scope of this package, the IMF may also provide financial support of up to EUR 250 billion.

(9) These measures apply to the reduction of public expenditure (anticipation of the elimination of the economic stimulus measures, reduction of transfers to the state's business sector, reinforcement of reduction of central government expenditure, 5 per cent reduction of the remunerations of political officeholders and managers of state-owned companies, reduction of capital expenditure and reduction of transfers to regional and local government), in addition to revenue increases (increase of 1 pp in all rates of VAT, additional charges on the income of singular persons of between 1 and 1.5 per cent, application of an IRC surcharge on taxable profits of more than EUR 2 million and the application of a consumption credit surcharge and introduction of tolls on shadow toll motorways).

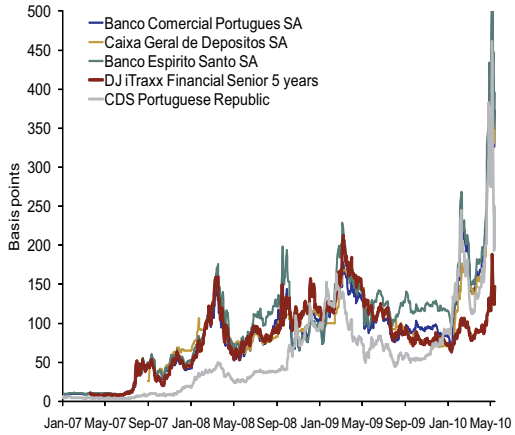
and liquidity-providing operations in US dollars).[10] These measures were essential for arresting the trend towards a sharp increase in sovereign risk, with a lowering of tensions in the sovereign debt markets having been observed. Notwithstanding, the degree of sovereign risk differentiation on an international level remains high.

In conceptual terms, the increase in the sovereign risk premium may affect the banks in several ways. On the one hand, the banks will tend to post effective and/or potential asset losses, deriving from the sharp fall in the prices of Government bonds in their portfolios. On the other hand, the increase in sovereign risk necessarily implies an increase in bank's funding costs and greater difficulty in access to financing in wholesale debt markets. This latter channel is more relevant for Portuguese banks. More specifically, Portuguese banks, which revealed a high degree of adaptability since the onset of the international financial crisis in 2007, have been recently penalised in the financial markets by the perception of risks relating to the sustainability of public finances, in the context of a low internal savings rate and high levels of sovereign debt held by non-residents, as discussed in "Section 4.4 *Liquidity Risk*" of this Report (Chart 2.6). These vulnerabilities have also been reflected in rating agencies' assessments of the Portuguese banking system, resulting in several downgrades of the ratings allocated to the banks, in line with the evolution of the rating on the Portuguese Republic (Table 2.1).

The increase in the sovereign risk premium affects banks' financing costs not only on account of the deterioration of the country's economic prospects, but also because it diminishes the value of the government guarantees on banks' debt issues and limits the capacity to implement new financial system support measures, increasing its vulnerability to potential future shocks. A worsening of bank's financing conditions will tend to be reflected in more restrictive lending terms to the non-private financial sector which, in turn, will tend to accelerate the necessary economic adjustment process, with impacts on the evolution of domestic expenditure and the valuation of assets. As already discussed, the package of European measures announced on 9 May led to a reduction of sovereign risk premiums, especially in countries in which the increase had been more significant (Greece, Portugal, Spain, Italy and Ireland), notwithstanding the fact that the said premiums remain at historically high levels in

Chart 2.6

CREDIT DEFAULT SWAP SPREADS FOR PORTUGUESE BANKS (5 YEARS SENIOR)



Sources: Bloomberg and Thomson Reuters.
Note: Last observation: 14 May 2010.

(10) http://www.ecb.int/press/pr/date/2010/html/pr100510.en.html.

Table 2.1

RATINGS ON THE LONG TERM DEBT OF THE FIVE LARGEST PORTUGUESE BANKING GROUPS AND OF THE PORTUGUESE GOVERNMENT

	S&P		Moody's		Fitch	
	31-12-2008	30-04-2010	31-12-2008	30-04-2010	31-12-2008	30-04-2010
CGD	AA-	A-	Aa1	Aa2	AA-	A+
BCP	A	BBB+	Aa3	A1	A+	A+
BST	AA	A	Aa3	Aa3	AA	AA
BPI	A	A-	A1	A1	A+	A+
BES	A	A-	Aa3	A1	A+	A+
Portuguese Republic	AA-	A-	Aa2	Aa2	AA	AA-

Sources: Bloomberg and Fitch Ratings.
Note: For the banks, the S&P ratings refer to the LT Local Issuer Credit category; Moody's ratings refer to the Long Term Bank Deposits category; Fitch's ratings refer to the LT Issuer Default Rating category. For the Portuguese Republic, all ratings refer to the Local Currency LT Debt category.

the context of the euro area. The measures announced by the ECB also helped to guarantee access to stable financing from the central bank, in a context of persistent restrictions on access to banks' financing in wholesale debt markets.

The necessary adjustment of the Portuguese economy will tend to progressively reduce the financial system's vulnerability to changes in international investors' risk assessment

As shown by the recent tensions in sovereign debt markets, the sustainability of the public finances is a highly important factor for financial stability on a global level. The tensions in international financial markets resulting from doubts over the sustainability of the public finances profoundly interact with other risk or vulnerability elements, such as the increase in credit risk and the potential inversion of the valuation trend towards the increase in the prices of financial assets which, in 2009, contributed to a significant improvement in the profitability of the banking system, on a global level. As referred to above, these elements are leveraged in the case of Portugal, given the need for economic adjustment in the near future. This adjustment is, therefore, essential for reducing the vulnerability of the economy and the financial system to changes in risk assessments by financial market players.

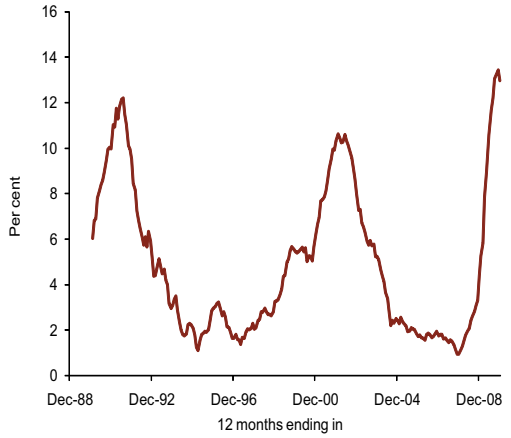
Deterioration of credit quality on an international level, notwithstanding the fall in interest rates

In the United States, the deterioration of credit quality in specific segments following the inversion of the strong growth trend in house prices was one of the factors originating the turmoil in the financial markets noted since August 2007. The deterioration of credit quality, in this country, was gradually transmitted to other market segments, giving rise to significant impairment in banks' balance sheets and originating the bankruptcy of several financial institutions. On a global level, the strong contraction of economic activity, starting at the end of 2008, also translated into a substantial increase in credit risk, notwithstanding the substantial reduction of interest rates (Chart 2.7). In Portugal, there was a deterioration in default indicators, which, in the case of loans to non-financial corporations and households for consumption and other purposes totalled much higher amounts than those observed in the preceding recession. However, starting in the third quarter of 2009 these indicators evidenced signs of improvement, although there are still significant risks regarding their evolution (see "Section 4.5 *Credit Risk*" of this Report).

The sharp deterioration of credit quality, on a global level, occurred in a context of a marked contraction of loans to companies and households. This evolution is likely to reflect a reduction in demand for bank loans, as a result of the deterioration of economic agents' investment and consumption

Chart 2.7

GLOBAL DEFAULT RATES



Source: Moody's.
Note: Default rates for speculative grade bonds.

prospects, in addition to several restrictions on the supply side, reflecting difficulties in access to finance (especially during the course of 2008 and start of 2009) and the perception of an increase in credit risk.

On a global level, the prospects for economic recovery, starting in 2010, should give rise to an inversion of the credit cycle. Notwithstanding the fact that banks' balance sheet restructuring processes have still not been completed, access conditions to wholesale market financing improved substantially during the course of 2009. In this environment, adequately capitalised banks should be in a position to accommodate the expectable recovery in demand for loans. However, these prospects may be conditioned by uncertainty over the assessment of the sustainability of the public finances, particularly in several European countries.

In the case of Portugal and as the recovery of the Portuguese economy will be conditioned by the necessary fiscal consolidation process, with consequences for the situation in the labour market, the materialisation of credit risk is expected to continue to be a relevant factor for Portuguese banks. Additionally, the need to accelerate the Portuguese economy's adjustment process, for the purpose of decreasing the disparity between savings and internal investment, will also tend to have implications on the quality of Portuguese banks' credit portfolio. Therefore, notwithstanding the fact that bank loans have resumed a certain acceleration over the course of the last few months, the need for adjustment should translate into a slowdown in demand for credit. At the same time and notwithstanding the reduction of tensions in sovereign debt markets observed starting mid May 2010, banks' financing conditions in the wholesale debt markets remain restrictive. This evolution will tend to affect lending to the non-private financial sector. It should be noted that, in the first quarter of 2010, the results of the Bank Lending Survey evidenced a more restrictive approach to loan approvals in Portugal, following gradually lower increases in the tightening of lending criteria during the course of the preceding year.

Although banks benefited from the positive evolution of financial markets in 2009, the first few months of 2010 were characterised by a high degree of volatility and uncertainty

As already referred to, conditions in the international financial markets evidenced a certain degree of normalisation starting from the second quarter of 2009. Over the course of the year, there were strongly positive developments in stock and private debt markets, making a positive contribution to the recovery of banks' profitability levels (Chart 2.8). This impact was particularly positive for investment banks and others more exposed to the financial markets and also made a positive contribution to results associated with financial operations and assets of other banks. As discussed in "Section 4.1 *Activity and profitability*" of this Report, the profitability of Portuguese banks also benefited from these developments in financial markets.

In such a framework, a risk which may eventually be relevant for the stability of the financial system on a global level is associated with the possibility of arrest or even reversal of the trend towards the appreciation of financial assets and of growth in trading volumes. The tensions in sovereign debt markets observed since the end of 2009 have been reflected in a new increase of volatility and uncertainty in financial markets. Therefore, uncertainty over the sustainability of several of the developments observed in the financial markets in 2009 may condition the banking system's profitability prospects. It should also be pointed out that for Portuguese banks, this element of risk could affect not only the results associated with financial assets and commissions on financial operations, but especially bank employees' pension funds, as discussed in "Section 4.3 *Market risk*" of this Report. Taking into consideration the results of the stress test exercises performed over the course of the last few years, the exposure of these pension funds to changes in stock prices and actuarial discount rates comprises an element of vulnerability which may have a negative effect on the solvency ratios of several Portuguese banks.

The financial crisis gave rise to proposals for the reform of financial regulation and financial architecture on a global level

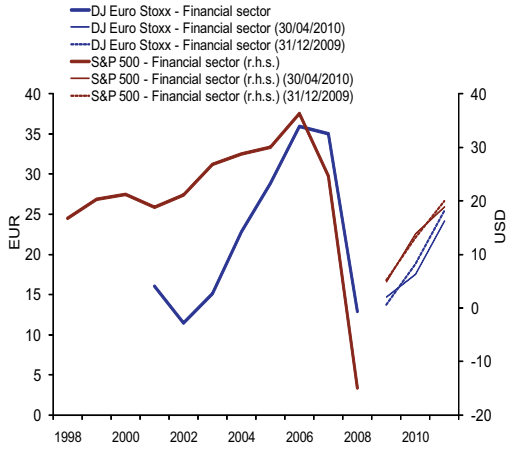
The international financial crisis has exposed diverse vulnerabilities and fragilities in the international financial system and its regulation, generating consensus on an international level on the need to improve several elements of the regulation of the financial system. In concrete terms, the discussion centres on the need to introduce counter-cyclical measures in several aspects of financial regulation, on the importance of mitigating the systemic impact of several institutions which may be considered too big or to interconnected to fail and on the need to promote the correct alignment of incentives in the financial system, especially as regards risk management practices and remuneration policies. Furthermore, a revision of the financial system's regulation perimeter and several regulatory issues have also been discussed, particularly as regards capital adequacy, the degree of financial system leverage and liquidity risk.

Notwithstanding the existence of broad consensus on the need to improve the regulation of the financial system, there are important divergences over their implementation. In "Box 2.1 *Recent developments in international financial regulation and architecture*" of this Report a summary is provided of the principal proposals under discussion and/or being implemented. Special reference should be made to the proposals presented by the Basel Committee, as they should be implemented on a global level by all banks with an international activity. These proposals, which were under public consultation up to 16 April 2010, include measures designed to reinforce the quality of bank's capital (particularly Tier 1 capital), mitigate financial system leverage, improve the management and supervision of liquidity risk, introduce counter-cyclical measures in the regulation of the financial system and reduce the underlying systemic risk in the resolution of cross-border banking groups.[11] The impact of

(11) The Basel Committee's main proposals can be viewed at http://www.bis.org/bcbs/index.htm.

Chart 2.8

EARNINGS PER SHARE OF FINANCIAL CORPORATIONS - DJ EURO STOXX AND S&P 500



Source: Thomson Reuters (I/B/E/S).
Notes: Figures up to 2008 are analysts' estimates on 31st January of $t+2$ relationg to t (i,e., the figures for 2008 relate to estimates for that year made in January 2010). The estimated figures relate to analysts' forecasts for t at the date indicated in the key.

these proposals will be assessed by a quantitative impact study on several banks, on an international level. It should also be pointed out that the European Commission has put a proposal for changing the Capital Requirements Directive up for public consultation.[12] This change aims to incorporate a substantial part of the proposals of the Basel Committee and includes other proposals to be implemented on a European level. The new Directive is expected to be applied to most credit institutions and investment companies in the European Union.

In general terms, the reform of financial regulation is essential to ensure the stability of the financial system over the medium to long term, mitigating the elements of vulnerability which have fuelled the effects of the financial crisis. However, it is important to ensure that this reform process will not be a factor of disruption for the banks and on the economy. Firstly, consideration must be given to the fact that there is a vast number of initiatives in progress in this domain. Accordingly, banks must, at the same time, strengthen their capital ratios, limit their leverage, diminish imbalances between the maturity of their assets and liabilities and accumulate a liquidity buffer, to refer to only a few of the changes under discussion. Secondly, it is important to take into consideration the eventual competitive distortions which may derive from these changes as there are highly substantial difficulties in the measures to be implemented in different countries and in different types of financial institutions. In this regard, reference should be made to the fact that the European Commission will most probably apply the changes proposed by the Basel Committee to all credit institutions, whereas in the United States the scope of application is likely to be much more restricted. Lastly, the implementation of these changes in terms of financial system regulation must necessarily take into account its effects on financial intermediation. Notwithstanding the fact that most of these measures help to make the banks more resistant to shocks, preventing disruptions in credit to the economy in unfavourable periods, the effects of the simultaneous implementation of such measures on financial intermediation should be considered. Their calibration should, therefore, be carefully assessed. Moreover, transition periods should allow banks to gradually adapt to compliance with the new regulatory requirements without immediate disruptions to their financial intermediation function and, consequently, economic activity.

(12) This proposal may be viewed at http://ec.europa.eu/internal_market/consultations/docs/2010/crd4/consultation_paper_en.pdf.

Box 2.1. Recent developments in international financial regulation and architecture

The international financial crisis of 2007-2009 had a marked impact on the world economy, giving rise to the deepest, most synchronised global recession since the second world war.[1] One of the elements originating this crisis was the incorrect assessment of risk by different financial system players. The functioning of the financial system may be disrupted by several market failures, giving rise to the formation of prices which do not convey the most accurate information for the efficient allocation of resources. In addition, the importance of financial intermediation to economic activity creates a policy dilemma for the authorities. On the one hand, the regulatory framework is designed to contribute towards the mitigation of market failures which may, in extreme cases, lead to the collapse of financial intermediation (systemic risk). On the other hand, once systemic risk arises, the intervention of the public authorities with some type of direct support to financial institutions is virtually inescapable, particularly in the case of those institutions whose impact on the stability of the financial system as a whole may be materially relevant (i.e. too big or too interconnected to fail). The latter case comprises a typical situation of moral hazard, i.e. institutions will tend to assume greater risks if they expect to receive public support.

The recent financial crisis laid bare a series of market agents' behaviours, resulting from misalignments of incentives and which, when taken as a whole, cannot be ignored in the reform of financial regulation. Such behaviours include: excessive leverage in several of the largest international banks; the low levels of transparency of the positions assumed by the banks in complex financial instruments and the actual perimeter of contingent liabilities (e.g. through structured investment vehicles); the very high mismatch between the maturity of assets and liabilities, with several banks being overly dependent on very short term wholesale financing markets; the presumption that the repo and trading markets of several categories of assets (in addition to funding markets) would remain liquid under any circumstance; the tendency for investors to accept rating agencies' classification of their portfolio securities, to the detriment of their own assessment of the risks incurred; the tendency to attach greater importance to short term profitability, which was reflected in how the origination of financial instruments was performed, in how ratings were assigned, in the recognition of credit portfolio losses and on securities trading both on their own account and on behalf of third parties.

The most striking manifestation of systemic risk was the collapse of the Lehman Brothers investment bank, followed by international consensus on the need to review financial regulation, taking the lessons learned from the crisis into consideration. This ongoing debate includes issues such as:

i) the introduction of a counter-cyclical dimension in several aspects of financial regulation (notably, capital adequacy and the provisioning of credit risk), to ensure, on the one hand, that the banks accumulate buffers in normal periods to improve their resilience to adverse shocks affecting their activity and, on the other, to counteract the incentives for behaviour which contribute to the amplification of credit cycles and of asset prices, notably real assets;

ii) the need to mitigate the systemic impact of several institutions which may be considered too big or too interconnected to fail, associated with the importance of complementing microprudential supervision by a macroprudential approach;

iii) a revision of several items of the regulatory framework, particularly as regards capital adequacy, the degree of leverage in the financial system and liquidity risk;

iv) a revision of the financial system's regulation perimeter, especially as regards off-balance sheet activities, hedge funds and major cross-border international groups, thus requiring greater coordination among financial system regulators on an international level;

v) the need to promote the correct alignment of incentives for agents which are part of the financial system, notably as regards risk management practices and remuneration policies, in order to anchor incentives to medium and long term results.

(1) *See "Box 1.1 The global economic recession: comparison with past episodes" , Banco de Portugal, Annual Report 2009.*

A significant part of these issues has been discussed by different entities and forums (regulators, central banks, supranational entities, governments) and has also involved more academic contributions to provide a technical basis for several of the changes in progress in terms of financial system regulation. Several of the most relevant contributions are summarised in Table 1, grouped by the type of problem being dealt with. In this respect, at the end of 2008 a group of NYU Stern researchers submitted a series of analyses and policy recommendations, with a greater focus on the United States (Acharya and Richardson, 2009).[2] These authors submitted a collection of proposals related with the regulation of large financial groups and hedge funds, the remuneration of managers, the role of the US Federal Reserve and international coordination in the reform of financial regulation.[3] In turn, Brunnermeier et al (2009) published a set of proposals at the start of 2009 on the regulation of systemic risk, regulation perimeter of the financial system, counter cyclical regulation and liquidity risk regulation. Dewatripont et al (2009) also prepared a wide range of economic and financial proposals for the G20 Summit of April 2009 in the first quarter of 2009. As regards macro and microprudential issues, proposals for mitigating the pro-cyclical nature of Basel II, mechanisms for the prevention and management of financial crises and mechanisms for the resolution of insolvent banks, are, inter alia, discussed. At the start of 2010, Beck et al (2010) contributed to this discussion with the publication of an e-book dealing with the interaction between financial stability and competition in the European context.

Table 1

MAIN ACADEMIC CONTRIBUTIONS TO THE DISCUSSION ON THE REFORM OF FINANCIAL SYSTEM REGULATION

Issue	Academic Contributions
Improvement in capital quality	Brunnermeier *et al*. (2009): several proposals for the strengthening of capital positions, particularly taking systemic impacts into consideration. Acharya *et al.* (2009): lower reliance on rating agencies' information is proposed.
Supervision and management of liquidity risk	Brunnermeier *et al*. (2009): creation of incentives for obtaining financing over medium and long maturities; possible interaction between a liquidity buffer and the solvency ratio. Acharya *et al.* (2009): proposals for imposing limits on liquidity ratios (e.g. liquid assets/short term financing). Perotti and Suarez (2009): proposal for a system of charges on liquidity risk.
Introduction of counter-cyclical elements in financial regulation (e.g. dynamic provisions)	Brunnermeier *et al.* (2009): macroprudential regulation should essentially be counter cyclical; Spanish provisioning model. Acharya *et al.* (2009): provisions based on loan loss forecasts. Dewatripont *et al.* (2009): adjustment of solvency ratio by a multiplier reflecting deviations from GDP in terms of average long term growth. Kashyap *et al.* (2008): need to reduce the costs of financial crises.
Limits on bank's degree of leverage	Brunnermeier *et al.* (2009): non-systemic financial institutions may have a systemic impact in a crisis situation owing to herding effects.
Management of financial crises with implications in various countries	Acharya and Richardson (2009): need for international coordination. Brunnermeier *et al.* (2009): proposals on an institutional framework for the management of international financial crises. Beck *et al.* (2010): need for coordination, focusing on the European Union.
Definition of processes for the resolution of insolvent banks	Acharya *et al.* (2009): need to create ex ante processes for the resolution of banks, especially those which could originate systemic risks. Dewatripont *et al.* (2009): need for international cooperation. Beck *et al.* (2010): procedures for the resolution of insolvent banks; cost sharing in the EU.
Remuneration policies for managers/ alignment of incentives	Brunnermeier *et al.* (2009): supervisors should define remuneration policies guidelines. The failure to comply with these guidelines should have impacts on capital adequacy ratios. Acharya and Richardson (2009); Acharya *et al.* (2009): discussion on the limits to be imposed on managers' remunerations.
Regulation of off-balance sheet exposures (derivatives, hedge funds, conduits)	Acharya and Richardson (2009); Acharya *et al.* (2009): the potential systemic impact of hedge funds justifies their inclusion in the financial system's regulation perimeter. Dewatripont *et al.* (2009): proposals on the regulation of credit derivatives.
Too big to fail; regulation of systemic risks	Brunnermeier *et al.* (2009): financial institutions should internalise the systemic costs they generate in the financial system; identification of systemic institutions. Acharya and Richardson (2009): the prudential regulation of large financial institutions should be based on their contribution in terms of systemic risk in the financial system or the economy. Acharya *et al.* (2009): creation of a systemic risk regulator; need for the identification and measurement of systemic risks; creation of taxes/charges on systemic risks; separation of activities of too big to fail institutions.
Macroprudential approach as a complement to microprudential supervision	Brunnermeier *et al.* (2009): several microprudential ratios may be adjusted to take each institution's systemic risk into account

(2) *These proposals were latterly published by Wiley Finance in March 2009.*

(3) *Acharya et al (2009) updated and reviewed several of these proposals at the end of 2009 taking the developments in this domain during the course of the year into account.*

While there is broad consensus on the need to put forward reforms designed to meet the above listed objectives, as regards the effective implementation thereof, there are many undecided aspects regarding their proper incorporation into the legislative process, regarding the calibration of quantitative requirements and the comprehensive nature of the requirements for the transparency of the transaction and holding of certain financial instruments.

International coordination endeavours to reform financial regulation

Growing global financial and economic integration has contributed to a situation in which the main shocks at the source of the financial crisis were almost immediately transmitted to almost all of the advanced economies, as well as to emerging market economies. Given that financial and economic integration constitutes an important underlying factor behind world economic growth, the coordination and articulation of financial regulation reform among countries has been afforded priority on the political agenda of the advanced economies. This coordination is essential to avoid competitive distortions between different economies, which could occur if the implementation of such reforms was differentiated, as discussed in "Chapter 2. Macroeconomic and financial risks" of this Report.

At the Washington summit of November 2008, the G20 leaders announced a series of measures to reinforce financial regulation, in an endeavour to improve the transparency of financial markets, improve financial system regulation, reinforce international cooperation in this domain and reform international financial institutions.[4] As regards the latter item, it was decided that the Financial Stability Forum (FSF) should have a wider range of members (namely emerging market economies) and that the IMF, in collaboration with the FSF and other international bodies, should reinforce its work with the objective of improving the ability to identify vulnerabilities, foresee potential pressure points in the financial system and take prompt action in the management of financial crises. Latterly, at the London summit of April 2009, the G20 leaders decided to provide the FSF with a broader remit, creating the Financial Stability Board (FSB)[5] for the said purpose. This new body's main responsibilities include an analysis of vulnerabilities affecting the financial system (including the identification of measures operating as mitigating factors), promoting the coordination and exchange of information among the different authorities with responsibilities in terms of financial stability and collaborating on the definition of rules and principles for the regulation of the financial system and accounting standards.[6]

In turn, the Basel Committee has been endeavouring to improve the regulation, supervision and risk management of the financial system, on a global level, taking the lessons learned from the global financial crisis into consideration. These efforts include proposals to reinforce the quality of banks' own funds (particularly Tier 1 capital), mitigate the leverage of the financial system, improve the management and supervision of liquidity risk, introduce counter-cyclical features in financial system regulation and reduce systemic risk in the resolution of cross-border banking groups.[7] These proposals were under public consultation up to 16 April 2010 and were accompanied by a quantitative impact study. The Basel Committee aims to complete the calibration of the above referred to measures by the end of 2010, with the objective of their implementation before the end of 2012. The European Commission has also put up a proposal for changes to the Capital Requirements Directive, which was also subject to public consultation.[8] This change aims to incorporate a substantial number of the Basel Committee's proposals and includes other proposals to be implemented on a European level. The new Directive is likely to be applied to most credit institutions in the European Union. The European Commission has also published a document on the management of cross-border crises in the European banking system, which discusses the implementation of coordinated procedures for crisis management, including the resolution of banking groups with activity in different Member States.[9]

(4) *The G20 communiqué of November 2008 can be viewed at http://www.g20.org/Documents/g20_summit_declaration.pdf.*

(5) *The G20 communiqué of April 2009 can be viewed at http://www.g20.org/Documents/Fin_Deps_Fin_Reg_Annex_020409_-_1615_final.pdf.*

(6) *The G20 leaders restated the commitment to strengthen financial system regulation, on an international level, in September 2009, making special reference to the need to improve the quality of banks' own funds, mitigate pro-cyclical elements, adapt remuneration policies of managers and improve the framework for the resolution of cross-border and systemic banking groups (http://www.g20.org/Documents/pittsburgh_summit_leaders_statement_250909.pdf).*

(7) *The Basel Committee's main proposals can be viewed at http://www.bis.org/bcbs/index.htm.*

(8) *http://ec.europa.eu/internal_market/consultations/docs/2010/crd4/consultation_paper_en.pdf.*

(9) *http://ec.europa.eu/internal_market/bank/docs/crisis-management/091020_communication_en.pdf.*

In turn, in response to G20 requests, the International Accounting Standards Board (IASB), as the body responsible for the definition of harmonised accounting standards internationally, has been implementing different measures with the objectives of: i) reducing the complexity of the accounting standards on financial instruments; ii) improving the recognition of loan-loss provisions; iii) improving the standards for the recognition of provisions, off-balance sheet exposures and valuation uncertainty; and, lastly, iv) improving the harmonisation of accounting standards on an international level.[10]

The new financial regulation architecture on a European level

There are currently three committees on a European level with advisory functions for the financial system: the Committee of European Banking Supervisors (CEBS), Committee of European Insurance and Occupational Pensions Supervisors (CEIOPS) and Committee of European Securities Regulators (CESR). These three committees were created pursuant to the Lamfalussy process, in 2001. Their main functions are to advise the European Commission, to issue recommendations and promote cooperation with national supervisory authorities, in particular in the colleges of supervisors.

The financial crisis of 2007-2009 demonstrated the importance of close articulation and cooperation among countries sharing responsibilities for the supervision of large financial groups,[11] *giving rise to considerations on possible changes to the architecture of regulation on a European level. This reflexion culminated in the publication of the Larosière report in February 2009.*[12] *The report proposes the transformation of the committees into European authorities and expanding their powers. In concrete terms, this proposal provides for these new authorities to: i) coordinate the work of domestic supervisors; ii) resolve potential conflicts among domestic supervisors in colleges of supervisors on issues related with cross-border financial groups; iii) promote the harmonisation of national supervision rules; and iv) supervise several pan-European institutions, such as credit rating agencies, regulated on a European Union level. In addition to the creation of these new authorities, with responsibilities on a microprudential supervision level, the Larosière report also proposed the creation of a body responsible for macroprudential policy and the preparation of early warnings on macroprudential risks.*[13]

The legislative proposals on the creation of the new regulatory framework, which has been summarised in Figure 1 were submitted in September 2009.[14] *The new framework is based on two different pillars: microprudential supervision (European Banking Authority - EBA, European Insurance and Occupational Pensions Authority - EIOPA and European Securities and Markets Authority - ESMA) and macroprudential supervision (European Systemic Risk Board - ESRB).*

The new financial regulation architecture in Portugal: the twin peaks model

The strong level of integration among banks, insurance and pension funds is an important argument in favour of the adoption of an integrated approach to financial supervision. Such an approach enables the exploitation of interconnections among the different financial system sub-sectors and to take all of the associated risks into account. There is, in turn, a clear distinction between the supervision of financial institutions and the supervision of securities markets. These two spheres of supervision have different objectives, which may be in conflict in several situations. Whereas the supervision of financial institutions aims to protect such institutions' depositors and customers, securities markets supervision has the main objective of protecting the interests of investors and shareholders.

Against this background, several changes to the institutional model for financial supervision are also in progress on a national level. Pursuant to this process, the Ministry of Finance and Public Administration submitted a propo-

(10) *The IASB's response to the G20 proposals can be viewed at: http://www.iasb.org/Financial+crisis/Response+to+the+credit+crisis.htm.*

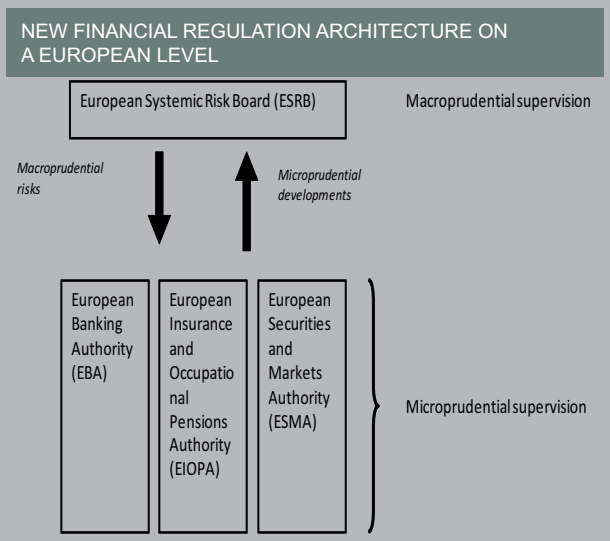
(11) *Currently, in the European Union, this cooperation essentially takes place under the scope of colleges of supervisors, which involve authorities with responsibilities in the supervision of different parts of cross-border banking groups.*

(12) *This report can be viewed at http://ec.europa.eu/internal_market/finances/docs/de_larosiere_report_en.pdf.*

(13) *These warnings will be included in the IMF/Financial Stability Board Early Warning Exercise.*

(14) *http://ec.europa.eu/internal_market/finances/docs/committees/supervision/20090923/com2009_499_en.pdf.*

Chart 1



sal for a new institutional framework for public consultation in September 2009.[15] In general terms, this proposal recommends the transformation of the present tripartite financial supervision model, with a regulator for banking activity (Banco de Portugal), a regulator for insurance (ISP) and another regulator for the financial markets (CMVM), in a "twin peaks" type model. This model would have two autonomous entities with across the board responsibilities in the oversight and supervision of all financial system sectors (banking, insurance and markets), but with specific attributions in terms of the emphasis of supervision. One of these entities would, accordingly, be responsible for prudential supervision of financial institutions, whereas another would be responsible for the market conduct supervision function.

Within this domain, there may be some discussion on whether functions related to the protection of consumers of financial products (generally referred to as market conduct supervision) should or not be integrated with the prudential supervision functions of financial institutions. It should, in this respect, be noted that the regulation and supervision of banking and insurance products and services, in addition to the way they are disclosed and sold to customers, may have implications on the profitability and solvency of financial groups. Given this, there are significant advantages in a joint assessment of the information necessary for the performance of both functions. In other words, there is a close interaction between the market conduct and prudential spheres, which should be taken into consideration in the design of the new institutional architecture for the regulation of the financial system.

The proposal submitted by the Ministry of Finance and Public Administration also provides for the reformulation and reinforcement of the powers of the National Council of Financial Supervisors (CNSF) and the attribution of legal status to the National Financial Stability Committee (CNEF).

(15) *http://www.gpeari.min-financas.pt/arquivo-interno-de-ficheiros/Consulta-publica-reforma-da-supervisao-em-Portugal.pdf.*

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Box2.2. Increase in sovereign risk premium in 2010: an analysis of different indicators

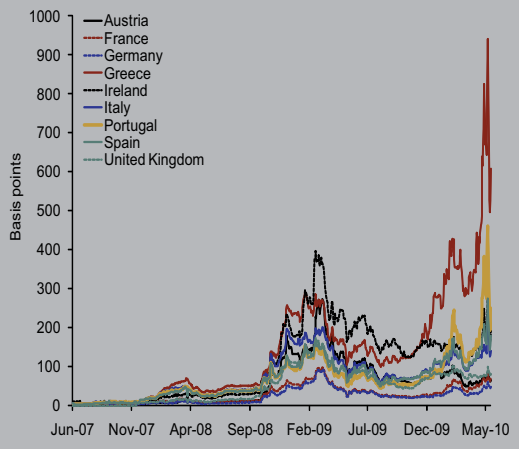
Starting at the end of 2009 and particularly in the second quarter of 2010, there was an increase in the sovereign risk premium which, in the case of several of the advanced economies, was unprecedented in magnitude. Given the strong interconnection between sovereign risk and financial stability, this recent evolution justifies an analysis based on a diversified collection of indicators, using financial market data, with the objective of analysing different dimensions of this issue.

There was a profound change in the relationship between sovereign and bank risk premiums in the last quarter of 2008 and the first quarter of 2009. During this period, the announcement of public guarantees on bank's debt issues and the creation of recapitalisation plans for the banking system implied the transfer of a significant proportion of the risks underlying the financial system to the respective governments. In this context, if on the one hand the financing conditions of banks, as reflected in their risk premiums, eased substantially, on the other hand, there was a significant increase in sovereign risk premium (Chart 1). This increase in the risk premium was more expressive in countries facing greater turmoil in their financial system and/or which implemented measures having very high (potential) public costs. Increases in risk premiums, in this period, were particularly significant for Austria, Belgium, the Netherlands and Ireland. The Irish government, for example, guaranteed all Irish banks' liabilities in the last quarter of 2008, amid across-the-board difficulties in the Irish banking system, leading to a significant increase in the risk premium on sovereign debt. Latter evidence of the deterioration of the financial situation of several Irish banks contributed to a further increase in the risk premium on Irish sovereign debt at the start of 2009. Sovereign risk premiums were gradually and generally reduced, during the course of 2009, reflecting the decreased probability of the use of financial system support measures, in a context in which financial markets were showing signs of a gradual easing. However, at the end of 2009 and at the start of 2010 there was a new increase in these risk premiums.

This recent increase in sovereign debt market tensions essentially reflected medium and long term uncertainty over the sustainability of the public finances in several countries (particularly in the euro area), as well as over their debt refinancing capacity over the short term. This instability in sovereign debt markets became apparent after the revision of Greece's public deficit, which was much higher than originally forecast, and the revisions of the credit

Chart 1

CREDIT DEFAULT SWAPS SPREADS FOR EUROPEAN SOVEREIGN ISSUERS (5 YEARS SENIOR)



Source: Thomson Reuters.
Note: Last observation: 14 May 2010.

rating on this country's public debt. The major short term refinancing needs also increased the pressure in this market owing to fears of an eventual liquidity crisis over the short term. These fears justified the more significant increase in yields on the shorter maturities, as shown in Chart 2. Particularly in the case of Greece, the inclination of the yield curve turned negative, essentially reflecting potential liquidity constraints over the shorter maturities.

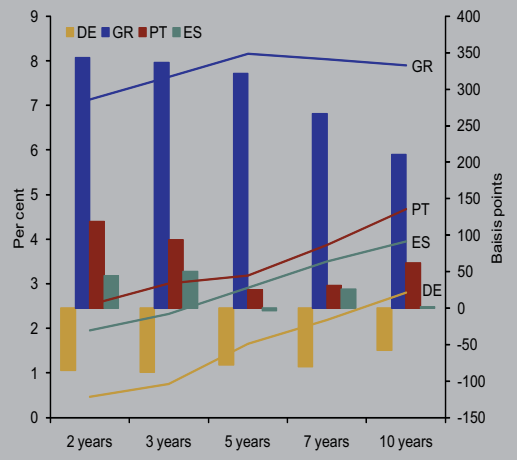
Financial markets' less favourable assessment of sovereign credit risk since the end of 2009 was not restricted to Greece and spread to other countries with significant unanticipated increases in fiscal deficits and which suffered from additional structural vulnerabilities, notably Italy, Spain, Ireland and Portugal. The evolution between the sovereign debt markets of countries in the euro area was highly differentiated, as illustrated by the increase in the dispersion of sovereign risk premiums (Chart 3).

The escalating cost of financing of the Greek government, starting in mid-April, and prospective refinancing difficulties over the short term gave rise to European initiatives, together with the IMF, for the purpose of providing a EUR 110 billion line of credit to overcome such difficulties. The loan's terms and conditions were defined at the start of May but were not sufficient to mitigate the escalation of tensions in the sovereign debt markets. In such a context the Council of the European Union announced a package of measures, accompanied by a fiscal consolidation commitment from Member States on 9 May. This package included a financial stabilisation mechanism for up to an amount of EUR 500 billion (EUR 750 billion with the contribution of the IMF), subject to strict rules defined by the European Union and IMF. In turn, the ECB also announced a collection of temporary measures, including interventions in public and private debt markets and the reactivating of several of the measures implemented at the end of 2008 (fixed rate tenders with full allotments at 3 and 6 month maturities, liquidity swap lines and liquidity-providing operations in US dollars). These measures, together with the commitments assumed by the Member States, enabled the inversion of the sharp increase in interest rates on sovereign debt, although sovereign risk differentiation remained at high levels.

Chart 4 provides an analysis of the principal components of ten-year Government bond yields of several countries in the euro area.[1] This analysis makes it possible to distinguish the common component in the evolution of these yields from the specific component of each country. The estimates show that the common component dominated

Chart 2

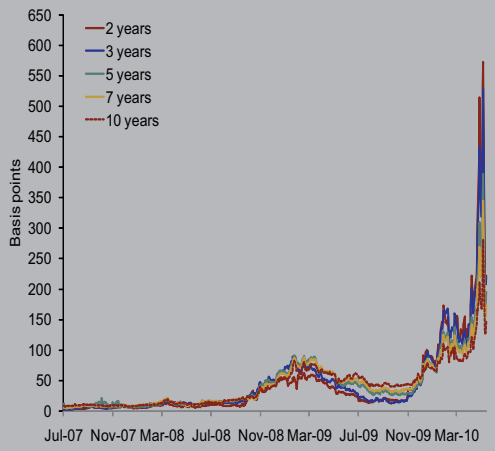
GOVERNMENT BONDS YIELD CURVE ON 14 MAY 2010



Source: Thomson Reuters.
Note: The bars represent changes since 31 December 2009 (r.h.s).

Chart 3

STANDARD DEVIATION OF SOVEREIGN DEBT SPREADS OF EURO AREA COUNTRIES IN COMPARISON TO GERMANY

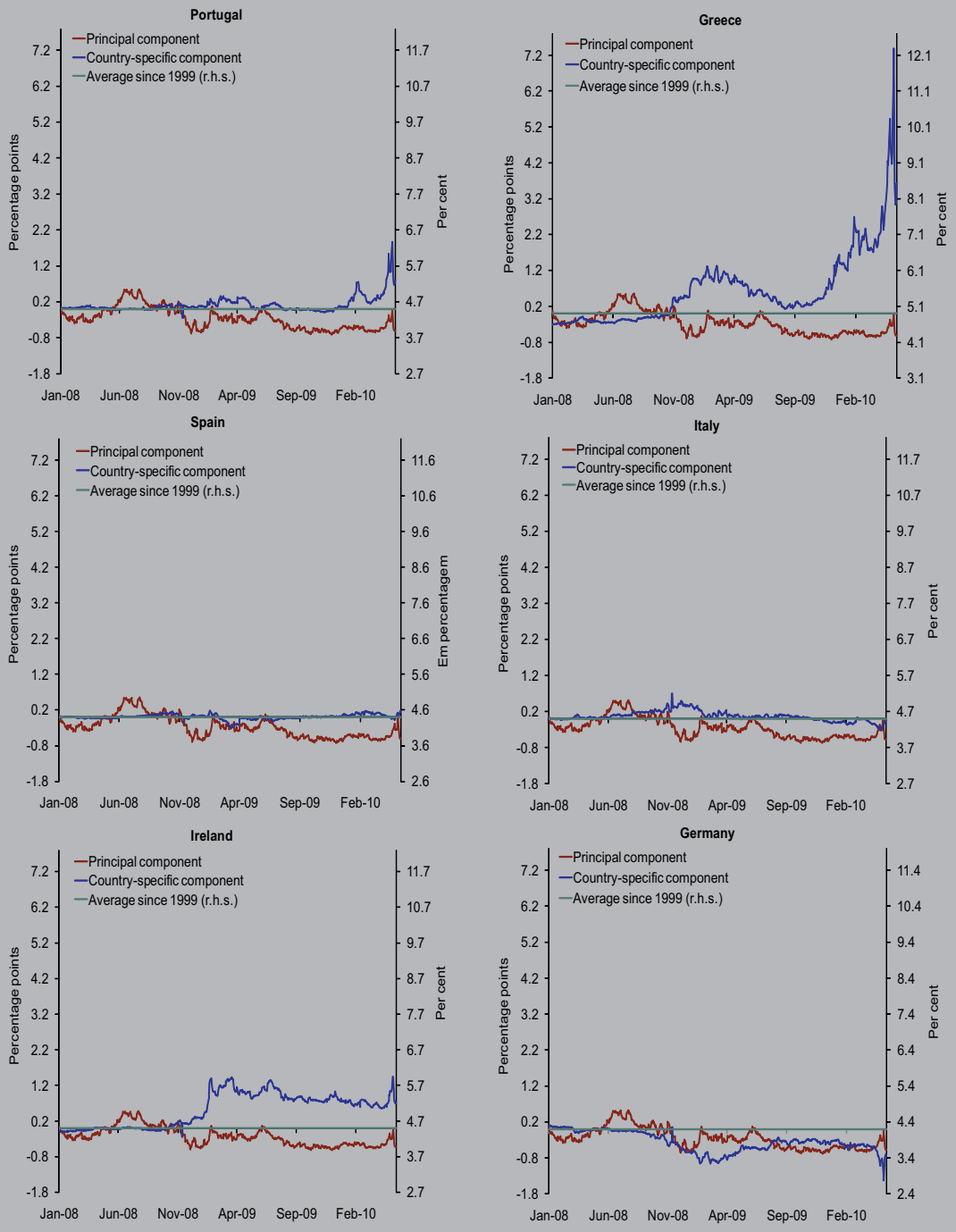


Sources: Thomson Reuters and Banco de Portugal calculations.
Note: Last observation: 14 May 2010.

(1) *The analysis is based on the period since the start of the euro area and includes bond yields from Germany, Portugal, Italy, France, Spain, Belgium, Ireland, Netherlands, Finland, Austria and Greece.*

Chart 4

PRINCIPAL COMPONENT ANALYSIS OF 10 YEAR GOVERNMENT BOND YIELDS - DEVIATIONS FROM AVERAGE



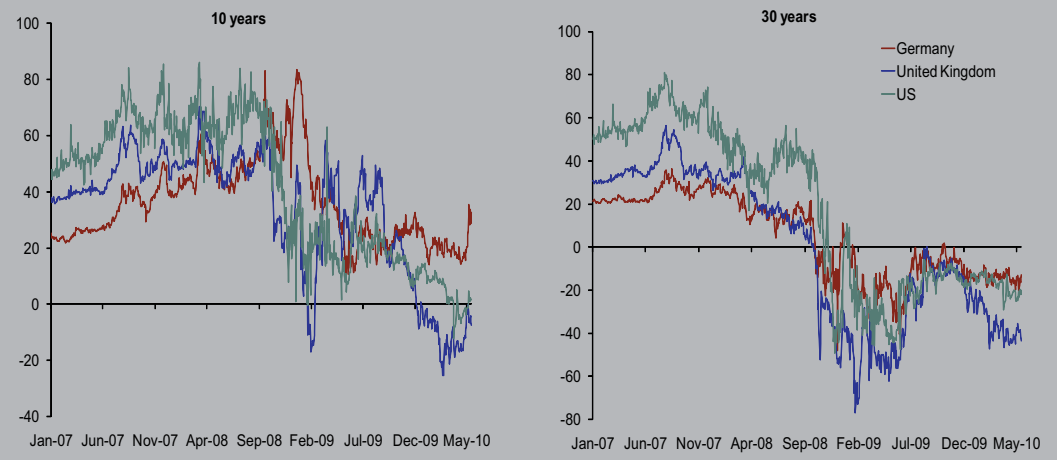
Sources: Thomson Reuters and Banco de Portugal calculations.
Note: Last observation: 14 May 2010.

the evolution of bond yields and was responsible for around 90 per cent of the change, although this value has been reduced in the more recent period. The common component has been depressing bond yields to levels below their historic average, particularly since May 2009. In the case of Germany, the specific component has also put downward pressure on sovereign debt yields, reflecting not only the fiscal situation, but also the increase in investors' demand for more liquid and historically safer securities. Moving in the opposite direction, the specific component was behind the increase in sovereign debt financing costs in several countries, particularly Ireland, Greece and, more recently, Portugal, reflecting the different assessment made by financial markets agents.

Notwithstanding the fact that the tensions in sovereign debt markets were essentially concentrated in countries with a significant deterioration of their fiscal situation and suffering from structural vulnerabilities, the impact of the international financial crisis on the perception of the long term sustainability of the public finances was transversal to most of the advanced economies, albeit with different levels of magnitude. This affirmation can be evaluated on the basis of an analysis of the spread between interest rate swaps and Government bond yields, which reflects the relationship between financial system and sovereign credit risk.[2] Traditionally, this spread has been positive, reflecting the perception that banking system risk is higher than sovereign credit risk.[3] However, Chart 5 shows that the evolution of these spreads for Germany, United Kingdom and the US started to become very volatile in 2007. There are several factors which may justify the evolution of spreads for this period. Firstly, in the period immediately following the bankruptcy of the Lehman Brothers investment bank, the spread on ten year maturities in the United Kingdom and the US fell sharply, reflecting a transfer of risk from the banking system to the state, following the announcement of several measures of support for the financial system. Secondly, deteriorating prospects over the long term sustainability of the public finances in most advanced economies, as a result of the impacts of the most serious financial and economic crisis since the second world war, may also have conditioned the evolution of these spreads. There has been a decreasing trend, common to the three above referred economies, on spreads for 10 and 30 year maturities, particularly since the last quarter of 2009. Thirdly, in a context of high levels of uncertainty and strong risk aversion, investors tend to increase their demand for safe-haven assets, considered to be more liquid and with less risk. This factor may justify the increase in the spreads on ten year maturities for Germany in the period following the bankruptcy of the Lehman Brothers, as opposed to the fall noted

Chart 5

SPREAD BETWEEN SWAPS AND GOVERNMENT BOND YIELDS (BY MATURITY)



Sources: Thomson Reuters and Banco de Portugal calculations.
Note: Last observation: 14 May 2010.

(2) *Interest rate swaps are traded in the over-the-counter market and are, therefore, subject to counterparty risk. They reflect banking system risk given that the counterparts involved are generally banks. However, as upon maturity only the differential between the flows is exchanged (and not the principal amount), counterparty risk is minimised. Both instruments are highly liquid.*
(3) *In the period between 2006 and the onset of the crisis in mid 2007, the spreads oscillated at around 20, 35 and 50 bp. for Germany, United Kingdom and the US, respectively.*

in the United Kingdom and in the US. The increase in spreads for the three economies since the end of April 2010 could also be related with this factor. Lastly, the decrease in spreads may reflect investors' increased preference for swaps relative to sovereign debt securities, as both instruments have similar returns and risks although swaps do not require such a large amount of investment capital. Furthermore, the sharp increase in the supply of long-term sovereign debt securities in this period may also have contributed to this decrease.

3. FINANCIAL SITUATION OF THE NON-FINANCIAL PRIVATE SECTOR

In a context of a downturn in economic activity, in 2009, albeit gradually less markedly so over the year with a certain easing of conditions in the international financial markets, there was a considerable decrease in the borrowing requirements of the non-private financial sector. This development translated an increase in the savings rate and a reduction of the investment rate in the case of both private individuals and non financial corporations. Nevertheless, the debt of the non-private financial sector as a whole, as a percentage of GDP, continued to increase to one of the highest levels in the euro area. Given the present context of significant sovereign risk differentiation on a global level, the reinforcement of budget adjustment and the increase in private savings, in addition to the progressive adjustments to the current financial imbalances of households and particularly companies, are crucial elements in guaranteeing the financial stability of the economy and for ensuring the effective role of the financial system in the intermediation of the resources necessary for a sustained economic development.

Private individuals

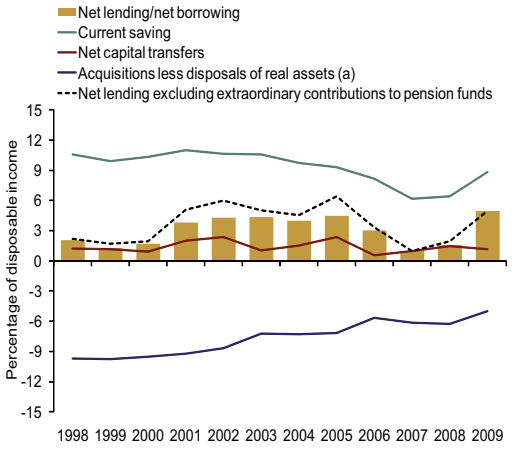
There was an increase in private individuals' net lending in 2009, essentially reflecting the increase in the savings rate and decrease in the investment rate of households.

In the context of a contraction in economic activity, a marked deterioration in the budget situation and in the labour market as well as greater uncertainty over future income, there was an increase in the savings rate of private individuals, reinforcing the increase occurring in 2008 and inverting the downward trend noted during the course of the decade (Chart 3.1). Notwithstanding the increase in unemployment and fewer jobs, individuals' disposable income posted positive, albeit small, nominal growth, significantly influenced by the change in remunerations per worker. The marked fall in interest rates also permitted a reduction in interest paid by households, making an important contribution to the evolution of disposable income, in 2009. This path of households' disposable income played a crucial role in the increase of the savings rate, in 2009. In particular, in accordance with the permanent income hypothesis, unexpected and temporary fluctuations of disposable income tend to be evidenced in similar fluctuations in current savings. There has also been a huge increase in uncertainty over the last few years, associated with the global economic and financial crisis, which contributed towards an increase in precautionary savings.[1] In turn, in an increasingly less negative environment in terms of economic activity and a certain easing of the disruption in wholesale debt markets, there was a continued increase in restrictions on lending, although gradually less intense during the course of the year. In such a context, there was a deceleration in lending to individuals, in both mortgage loans (although with the growth path evidencing a slight inversion from the end of the year), and lending for consumption and other purposes (see "Section 4.6 *Credit risk*", of this Report). These developments occurred in an environment of relatively stable house prices and a fall in interest rates on outstanding mortgage loan amounts (Chart 3.2). However, wider interest rate spreads on new mortgage loans and the stricter criteria for the approval of loans to households (such as more demanding restrictions in terms of the guarantees required) contributed towards lower demand for mortgage loans and had a negative influence on households' investment in such assets. Reflecting the downturn in housing investment, there was a decrease in the fixed capital investment rate of

(1) See "Box 5.1 *Determinants of household saving ratio in Portugal*", Banco de Portugal, *Annual Report* 2009.

Chart 3.1

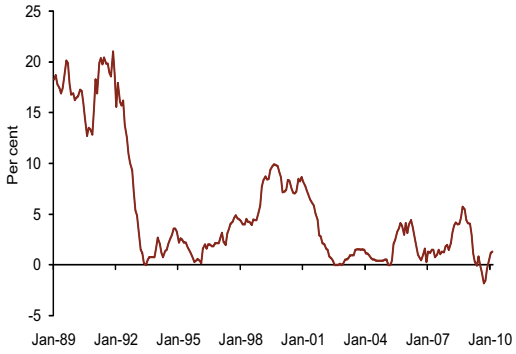
SAVINGS, INVESTMENT AND NET LENDING OF PRIVATE INDIVIDUALS



Source: *INE*.
Note: (a) Comprises gross fixed capital formation, changes in inventories, acquisitions less disposals of valuables and acquisitions less disposals of non-produced non-financial assets.

Chart 3.2

CONFIDENCIAL IMOBILIÁRIO INDEX
Year-on-year change



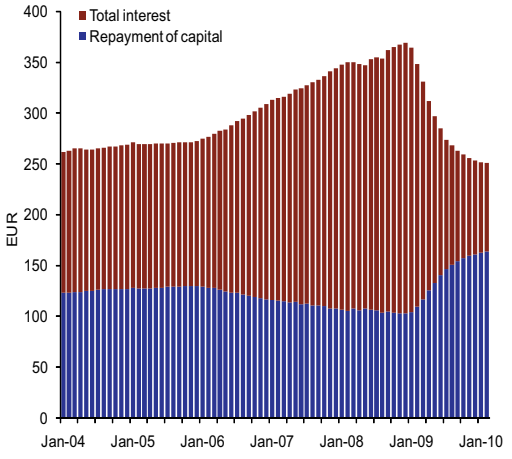
Source: *Confidencial Imobiliário*.
Note: Last observation: February 2010.

individuals which, in conjunction with the higher savings rate, translated into an increase in the net lending of private individuals to a level close to that of the first half of the decade. In comparison to the recessionary period of 2003, net lending of the sector was slightly up in 2009. Nevertheless, in comparison to the time in question, much smaller amounts are involved in net acquisition of financial assets and particularly in the net incurrence of liabilities.

According to information compiled by *INE*, the average value of mortgage loans instalments paid was down by almost 18 per cent over 2008, with the proportion of the interest rate component falling substantially in terms of the total instalment. In the case of the more common debt repayment regime, comprising constant instalments, the reduction in the interest rate component has been partlyoffset by an increase in the share of capital repayment. At the start of 2009, the interest rate component represented around 70 per cent of the total average mortgage loan instalment, falling to slightly more than a third of the said amount at the end of the year (Chart 3.3).

Chart 3.3

AVERAGE MORTGAGE INSTALMENT



Source: *INE*.
Note: Last observation: February 2010.

Reflecting a gradual recovery in the value of financial assets in the portfolio of private individuals, in 2009 deposits stabilised with net acquisitions of assets with market risk having been recorded.

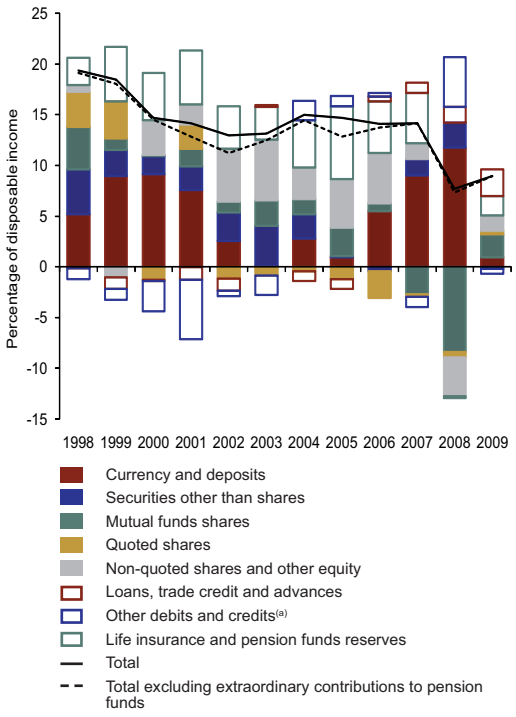
The developments noted in international financial markets, during the course of 2009, permitted a certain recovery in the value of financial assets in the individuals' portfolio, principally quoted shares and, to a lesser extent, debt securities and investment fund units. It should be noted that, in the preceding year, the value of private individuals' portfolio had been significantly affected by capital losses in the said assets, following the crisis in the international financial markets starting in the summer of 2007. This effect gave rise to a significant recomposition of portfolios towards the withdrawal of savings originally placed with investment funds which were then converted into deposit accounts.[2] These extraordinary movements stopped, particularly during the course of the second half of 2009, as returns on assets with higher market risk (shares and unit trust investment funds) started to look more attractive again (Chart 3.4).

Reference should also be made to the expressive increase in loans and commercial credit provided by this sector to other institutional sectors (the former comprising shareholders' and corporate partners' loans, especially to non-financial corporations), which, as a whole, accounted for almost 3 per cent of disposable income.

At the end of 2009, the proportion of deposits (including savings certificates) as part of private individuals' total financial assets was at around 37 per cent, close to the levels at the start of the decade (Chart 3.5).

Chart 3.4

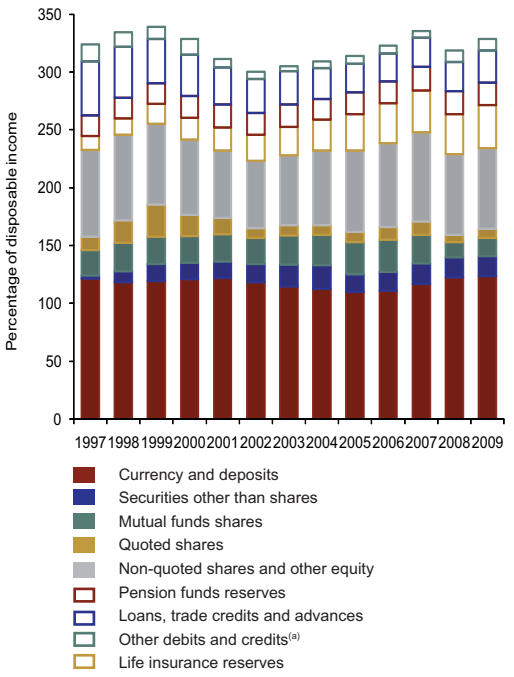
FINANCIAL ASSETS OF PRIVATE INDIVIDUALS
Transactions



Sources: *INE* and Banco de Portugal.
Notes: Consolidated amounts. (a) Includes other technical insurance reserves and other accounts receivable.

Chart 3.5

FINANCIAL ASSETS OF PRIVATE INDIVIDUALS
Outstanding amounts



Sources: *INE* and Banco de Portugal.
Notes: Consolidated amounts. (a) Includes other technical insurance reserves and other accounts receivable.

(2) See "Box 2.1 *Effects of the crisis in the international financial markets on the households' financial assets portfolio in Portugal*", Banco de Portugal, *Annual Report* 2009.

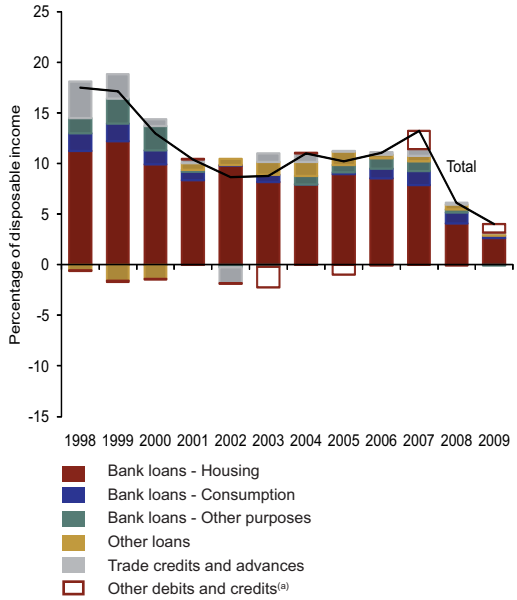
The indebtedness of individuals as a percentage of disposable income stabilised at a high level in the last three years, after a trend of significant increase.

The deceleration in loans to private individuals in 2009 kept pace with the pronounced downturn in economic activity (Chart 3.6). The trend of mortgage loans growth has been downwards since 2006, when it was around 10 per cent. This path was accentuated over the last two years in the context of the crisis in international financial markets and its effects on economic activity in general. Demand for loans for consumption and other purposes has, in turn, also kept pace with the developments in individuals' expenditure, particularly in durable goods, with a sharp deceleration of the annual rate of change on bank loans to individuals for consumption since the start of 2008 to values close to those observed in 2005 (see "Section 4.6 *Credit risk*", of this Report). This evolution is globally in line with the developments observed over the course of the last two decades in Portugal, which suggest that developments in loans to private individuals leads economic activity dynamics by around a year. It has been particularly noted, in the case of mortgage loans, that demand for credit, as in the case of investment, tends to be greater in periods in which expectations of a recovery in activity are reinforced. In turn, in the low stages of the economic cycle, banks tend to prefer to make collateralised loans, which is typically the case with mortgage loans, particularly when the prices of such assets are not overvalued.[3]

Notwithstanding the marked deceleration in total loans to individuals, this sector's financial debt was slightly up as a percentage of disposable income (to almost 138 per cent, against 135 per cent at the end of 2008), essentially in the mortgage loans segment (which represents just under 75 per cent of the total debt of individuals, while remaining at higher levels than the average for the euro area (Charts 3.7 and 3.8). This development, however, has not compromised the sector's solvency

Chart 3.6

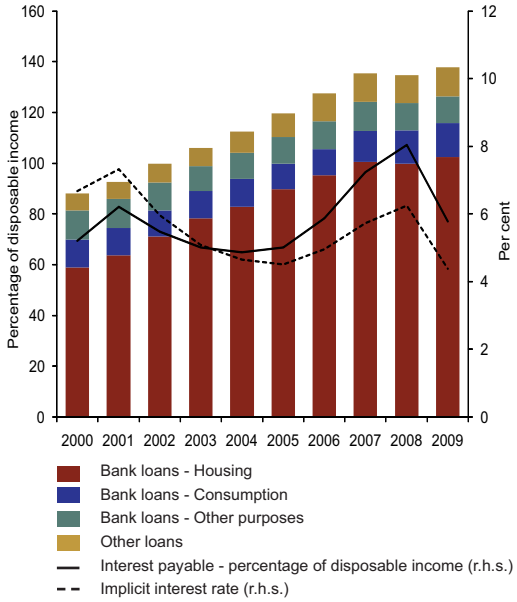
FINANCIAL LIABILITIES OF PRIVATE INDIVIDUALS
Transactions



Sources: *INE* and Banco de Portugal.
Notes: Consolidated amounts. (a) Includes securities other than shares and other accounts payable.

Chart 3.7

PRIVATE INDIVIDUALS' DEBT
Outstanding amounts



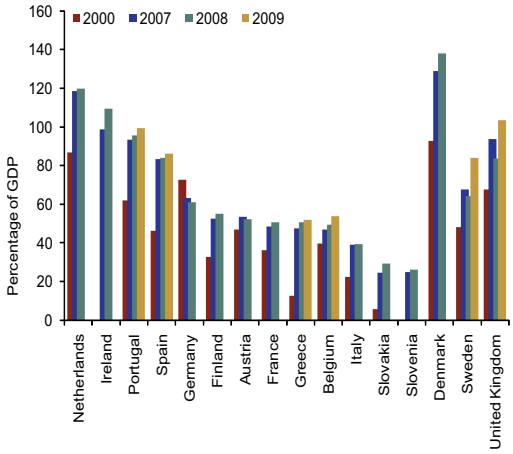
Sources: *INE* and Banco de Portugal.
Note: Estimates of Banco de Portugal on interest payable related to the financial debt of private individuals.

(3) See Box "2.2 *Cyclic evolution of loans to non-financial corporations and households*", Banco de Portugal, *Annual Report* 2009.

position, in aggregate terms. A relative stabilisation of the ratio between total wealth (financial and non-financial) and total debt has been noted in more recent years following the previously noted downward trajectory (Chart 3.9). At the end of 2009, estimates are that total private individuals' debt represented less than one-fourth the amount of the respective total wealth.

Chart 3.8

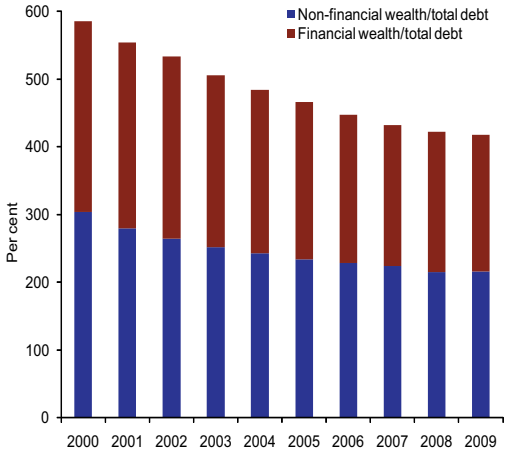
PRIVATE INDIVIDUALS' FINANCIAL DEBT



Sources: *Banco de España*, Eurostat, and Banco de Portugal.
Note: Consolidated amounts except for Ireland and the United Kingdom.

Chart 3.9

RATIO BETWEEN WEALTH AND DEBT



Source: Banco de Portugal.

The information available on the distribution of wealth, income and indebtedness of Portuguese households, resulting from the Household Wealth and Indebtedness Survey (*IPEF*) carried out in the last quarter of 2006 and first quarter of 2007, suggests that, in the years preceding the referred survey, there were increases in households' participation in the debt market, in the level of average debt and in the debt service to income ratio of indebted households. As regards households' participation in the debt market for other purposes than housing, the results have indicated an intensification of access to this market, particularly by households in intermediate income levels and those with a representative under the age of 50. The results have also indicated that participation in the debt market and debt levels were particularly sensitive to household income and the age of the household's representative, growing in line with income up to a maximum on an intermediate stratum and decreasing with age and the educational qualification of the representative and being higher in households in which the representative was employed. At the same time, it was noted that access to the credit market, particularly mortgage loans, was highly limited for households in the lower income brackets. As regards the monthly debt service to income ratio, particularly high levels were noted in the case of younger households with mortgage loans, although comparing favourably in the context of the euro area.[4] Situations involving greater vulnerability appeared in the lower income strata and with younger people although the risks associated with this situation were relatively limited *vis-à-vis* the stability of the financial system, to the extent that the debt of households in situations of greater vulnerability accounted for a relatively small proportion of the total. Additionally, the fact that a significant proportion of such credit benefited from mortgage collateral and also frequently personal guarantees given by family members (usually ascendants) has been a mitigating factor in terms of the financial stability risks associated with loans to private individuals.[5]

(4) See "Box 4.3 *Aspects of higher risk mortgage loans in the United States and Europe*", Banco de Portugal, *Financial Stability Report* 2008.

(5) See "Box 4.2 *The main characeristics of loans to households for house purchase in Portugal*", Banco de Portugal, *Financial Stability Report* 2008. See also "Box 4.3 *Credit to households and default: a characterisation based on the Central Credit Register*", of this Report.

Notwithstanding significantly higher unemployment in 2009, the evolution of individuals' disposable income was relatively favourable. This fact contributed to the reversal of the increase in defaults in this sector, in an environment of falling interest rates to very low levels (see "Section 4.6 *Credit risk*", of this Report). Prospects for economic activity in the near future remain, however, highly uncertain with no expectations of increases in real disposable income similar to 2009, over the short term. On the contrary, budget restrictions for most Portuguese households will tend to be accentuated in light of expectations of poor developments in the labour market and the need to accelerate the consolidation process in the public finances. There may well be a deterioration of the financial situation in this sector over the short term which should be reflected in an increase in respective defaults to the banking system.

Non-financial corporations

There was a decrease in netborrowing of non-financial corporations in 2009, reflecting a slight increase in the savings rate and a sharp reduction in the investment rate, as a percentage of GDP.

In the context of a sharp downturn in economic activity, the net borrowing of non-financial corporations was down *vis-à-vis* 2008, although still significant and higher than observed in the recessionary period of 2003 (Chart 3.10). According to the currently available information, there was an increase in the savings rate of non-financial corporations, principally resulting from a decrease in income taxes (Chart 3.11). The operating surplus of this sector was again down, albeit slightly, in line with lower corporate operating profitability. According to quarterly information supplied by Banco de Portugal's Central Balance Sheet Database, the operating profits of non-financial corporations were substantially down over the course of 2009[6] (Chart 3.12). Lower levels of economic activity, evidenced in the sharp downturn in sales of goods and services, together with the positive nominal growth of employee costs, translated into an erosion of operating profitability. In contrast with this path, intermediate consumption and the financial costs of non-financial corporations were reduced, reflecting, in the former case, mainly the evolution of the cost of energy and, in the second, a significant decrease in debt costs, in spite of the increase in spreads charged on non-financial corporations' debt (Chart 3.13). Notwithstanding this latter development, data currently available indicate that the share of property income paid by this sector as a return on capital employed (interest and dividends) to GDP virtually stabilised in 2009. This reflected, on the one hand, the increase in the stock of debt of non-financial corporations, and, on the other, the increase in net distributed income of corporations which is offsetting the decrease in the proportion of interest costs[7] (Chart 3.11). Together with the increase in the current saving of non-financial corporations, the sharp decrease in fixed capital formation implied a reduction in this sector's net borrowing in 2009, to below the level observed in 2006 albeit, as already stated, above that in the recessionary period of 2003 (Chart 3.10).

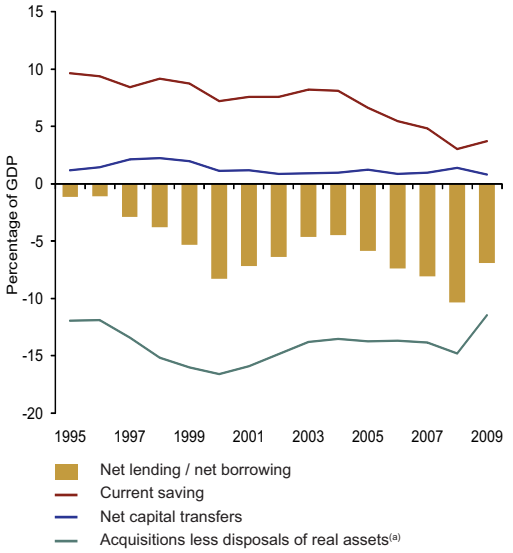
2009 continued to witness a marked increase in non-financial corporations' claims in the form of trade credits and loans to other institutional sectors (Chart 3.14). This development may reflect increasing difficulties in accessing bank credit. The sector's liabilities similarly have significantly increased. Reference is made to the increase in payment and collection periods, which is consistent with the economic recession observed in 2009 (Chart 3.15). Excluding the referred financial assets, net ac-

(6) For an in-depth characterisation of surveys of companies participating in Banco de Portugal's Central Balance Sheet Database, annual (CBA) and quarterly (CBT) surveys, see Banco de Portugal, Supplement 5/2005 of the *Statistical Bulletin*, December 2005 and Supplement 1/2008 of the *Statistical Bulletin*, May 2008. It should be noted, in the case of the quarterly survey and, to a lesser extent, the annual survey up to 2005, that there is an important bias in the case of the larger companies. Starting 2006, with the use of the Simplified Statistical Information, there was a marked improvement in CBA representativeness which is close to 100 per cent in terms of total GVA of non-financial corporations.

(7) In 2009, the income distributed by non-financial corporations was particularly affected by the payment to non-residents of very large dividends by companies headquartered in the Madeira offshore zone, which companies do not usually operate with residents in Portugal.

Chart 3.10

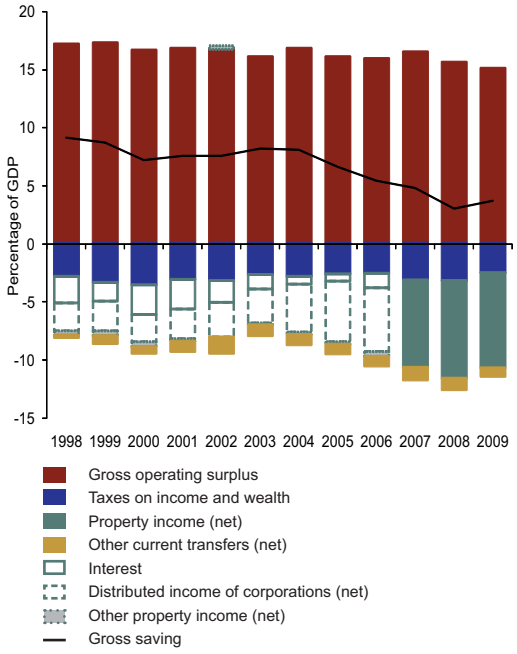
SAVINGS, INVESTMENT AND NET BORROWING OF NON-FINANCIAL CORPORATIONS



Source: *INE*.
Note: (a) Comprises gross fixed capital formation, changes in inventories, acquisitions less disposals of valuables and acquisitions less disposals of non-produced non-financial assets.

Chart 3.11

CONTRIBUTIONS TO THE GROSS SAVING OF NON-FINANCIAL CORPORATIONS



Sources: *INE* and Banco de Portugal.
Note: Net means the difference between resources and uses. From 2007 (inclusive) based on quarterly accounts.

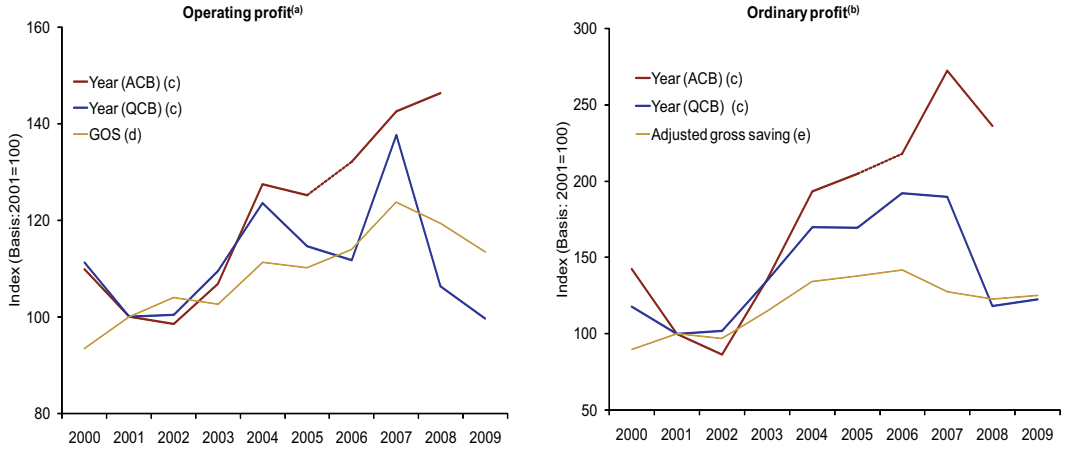
quisitions of shares and other equity, including investment units in investment funds were recorded, keeping pace with the recovery in their market value. Also purchases of other non-financial corporations' equity posted an important increase, which may be associated with the reinforcement of group consolidation processes.

A sharp increase in financial leverage of non-financial corporations has been noted over the last few years.

During the course of 2009, there was a marked deceleration of bank loans to non-financial corporations. This development occurred in parallel with the intensification of issues of shares and debt securities by the said companies, especially the larger ones (Chart 3.16). A significant part of the net issues of debt securities by non-financial corporations occurred in the first half of the year, benefiting from the reduction of the respective risk premiums in a context of an easing of tensions in international financial markets. Such developments, in the context of a substantial downturn in corporate investment, contributed to lower demand for credit but were partly counteracted by the borrowing requirements of companies with greater liquidity difficulties. Notwithstanding the deceleration of bank loans, the sector's financial debt increased by almost 10 pp of GDP, reflecting the increase in securitised debt and the significant amounts of loans provided by shareholders and partners. As a consequence, the financial leverage of non-financial corporations remained high, notwithstanding the appreciation of capital, in line with the recovery of stock markets (Chart 3.17). Reference should be made to the fact that, in accordance with currently available information, when annual capital fluctuation is excluded, financial leverage has been on the increase since 2006 and accentuated in 2009. At the end of the year, the financial debt of non-financial corporations (excluding companies headquartered in the Madeira offshore zone), totalling 143 per cent of GDP was one of the highest in the euro area (Charts 3.18, 3.19 and 3.20).

Chart 3.12.A

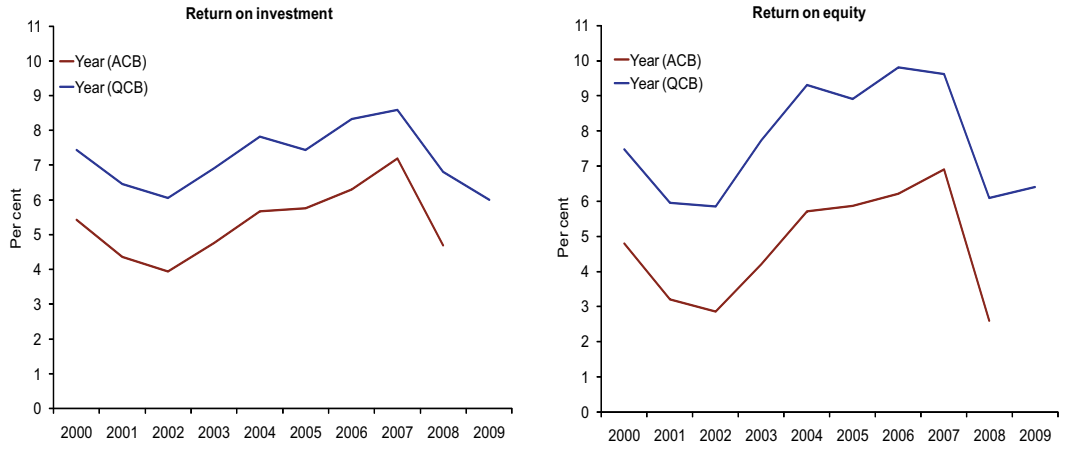
NON-FINANCIAL CORPORATIONS' PROFITS



Source: Banco de Portugal.
Notes: Indexes of year-on-year changes based on the accumulated amounts of the year for the same corporations in the Central Balance Sheet Database in two consecutive years. (a) Operating profit = GVA - personnel costs + other operating income (net of operating costs) - taxes (except indirect) - depreciation and provisions for the year. (b) Ordinary profit = operating profit + financial profit. (c) ACB: Annual Central Balance Sheet Database. QCB: Quarterly Central Balance Sheet Database. Break in series in 2006 for the ACB; since then indicators are based on Simplified Corporate Information. The non-financial corporations' GVA representativeness in the ACB was around 60 per cent up to 2005 and close to 100 from 2006. The representativeness in the QCB varies between 41 and 45 per cent. (d) GOS: gross operating surplus in the year. (e) Gross saving plus distributed income of corporations (uses) less net reinvested earnings on direct foreign investment.

Chart 3.12.B

RATES OF RETURNS IN NON-FINANCIAL CORPORATIONS

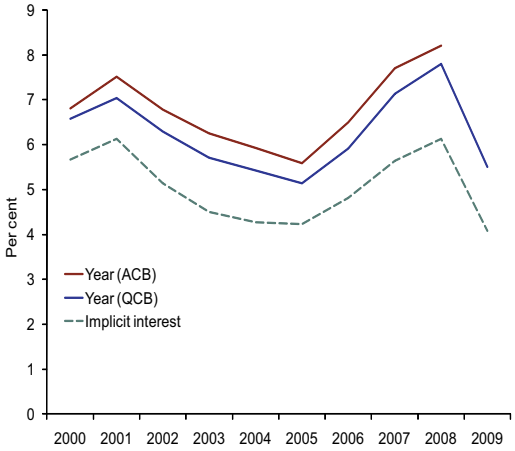


Source: Banco de Portugal.
Notes: Return on investment = (ordinary profit + interest costs) / (shares and other equity + financial debt). Return on equity = ordinary profit / shares and other equity. ACB: Annual Central Balance Sheet Database. QCB: Quarterly Central Balance Sheet Database. The ratios are calculated from the latest available figure using rates of change based on data for the same corporations in two consecutive years. Since 2006, ACB ratios are based on the Simplified Corporate Information.

As in the case of the Portuguese banking system, non-financial corporations are exposed to developments in the sovereign risk premium which influences both financing conditions in international debt markets (essentially affecting large companies) and, indirectly, access conditions to bank financing. Accordingly, in an environment of continued significant sovereign risk differentiation at the international level, the acceleration of the budget consolidation process is a particularly relevant factor. The short term effects on economic activity will tend to negatively impact the sector's profitability and on its respective capacity to invest. These facts could maintain and eventually accentuate the deterioration trend of the financial situation of several companies and, thus, originate further reductions in their activity, with consequences for the materialisation of credit risk in the banking sector.

Chart 3.13

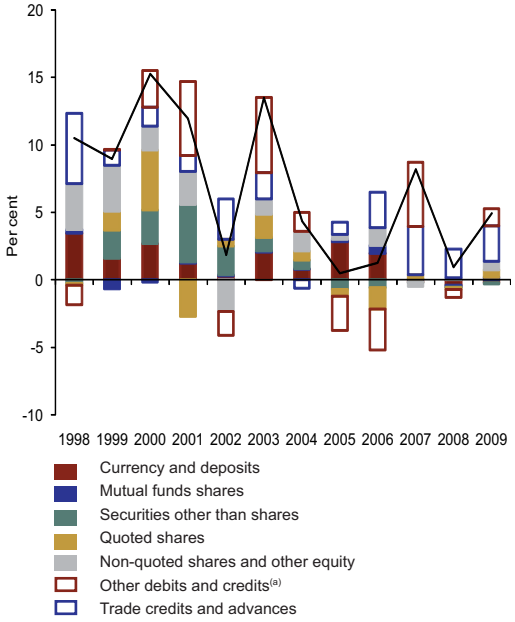
DEBT COST



Source: Banco de Portugal.
Notes: Debt cost = Interest costs / financial debt. ACB: Annual Central Balance Sheet Database. QCB: Quarterly Central Balance Sheet Database. The ratios are calculated by applying rates of change calculated on the basis of data for the same corporations in two consecutive years to the latest available figure. Since 2006, the ACB ratio was based on the Simplified Corporate Information.

Chart 3.14

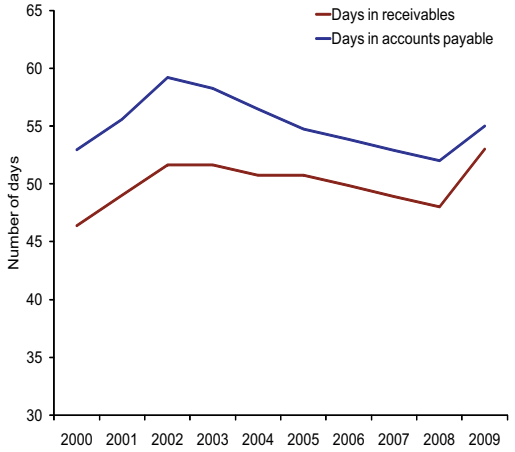
FINANCIAL ASSETS OF NON-FINANCIAL CORPORATIONS
Transactions



Sources: *INE* and Banco de Portugal.
Notes: Consolidated amounts. (a) Includes insurance technical reserves and other receivables.

Chart 3.15

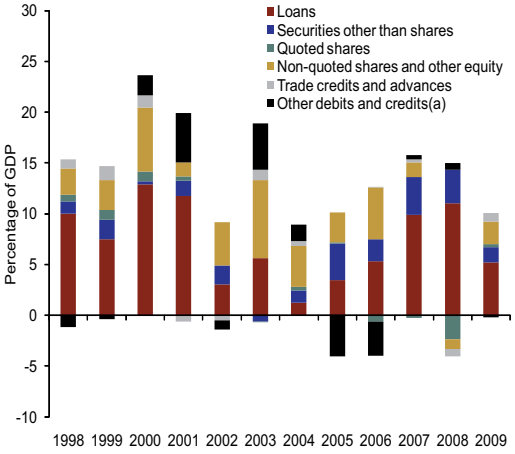
DAYS IN RECEIVABLES AND IN ACCOUNTS PAYABLE FROM/TO NON FINANCIAL CORPORATIONS



Source: Banco de Portugal.
Notes: Indicators based on the the same corporations of the quarterly Central Balance Sheet Database in two consecutive years. Data refer to December each year. Days in receivables = (Total trade credits and advances granted / turnover) x number of days in the period. Days in accounts payable = (Total trade credits and advances received / (purchases of goods for resale, raw materials, secondary and consumables + supplies and external services) x number of days in the period.

Chart 3.16

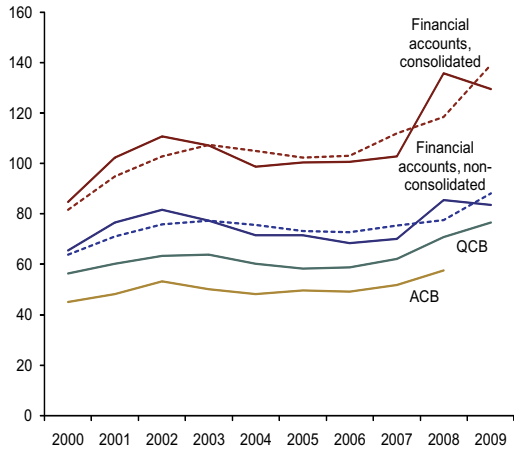
FINANCIAL LIABILITIES OF NON-FINANCIAL CORPORATIONS
Transactions



Sources: *INE* and Banco de Portugal.
Notes: Consolidated amounts. (a) Includes insurance technical reserves and other accounts payable.

Chart 3.17

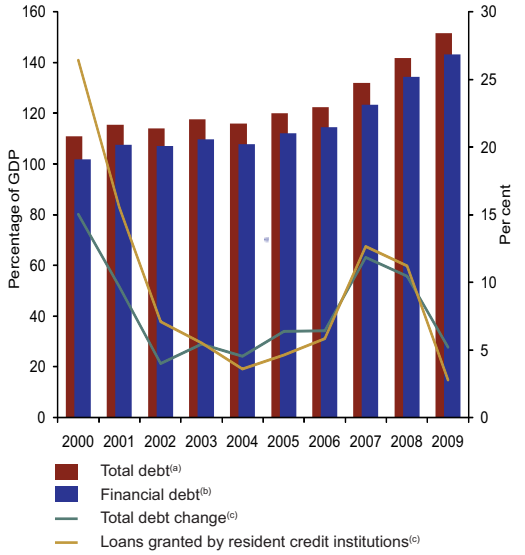
FINANCIAL LEVERAGE RATIO[a]



Source: Banco de Portugal.
Notes: (a) Defined by the quotient between financial debt and capital. Ratios calculated on the basis of the financial accounts; dotted lines represent the two aggregates (consolidated and non consolidated) adjusted for the yearly capital gains/losses. ACB and QCB ratios calculated from data in the annual and quarterly Central Balance Sheet Database, respectively; rates of change for each year were calculated based on data for the same corporations in two consecutive years and applied to the latest available figure for the financial debt ratio.

Chart 3.18

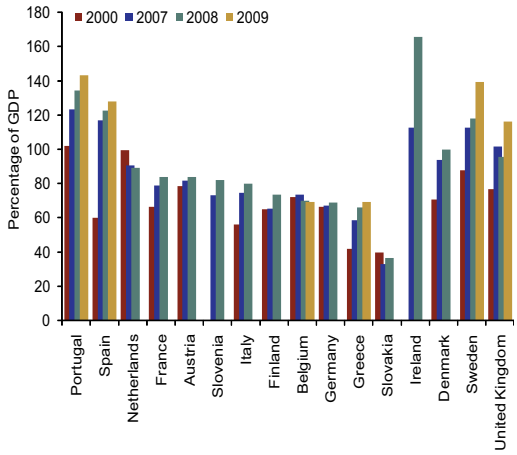
DEBT OF NON-FINANCIAL CORPORATIONS



Sources: *INE* and Banco de Portugal.
Notes: Consolidated amounts. (a) The total debt comprises financial debt plus trade credits and advances received from other sectors. (b) Financial debt includes loans from resident and non-resident credit institutions; loans/partners' loans granted by other sectors, notably non-resident companies of the same economic group (excluding loans to non-financial corporations headquartered in the Madeira offshore zone); commercial paper and bonds issued by non-financial corporations and held by other sectors. (c) Annual rate of change (right hand scale).

Chart 3.19

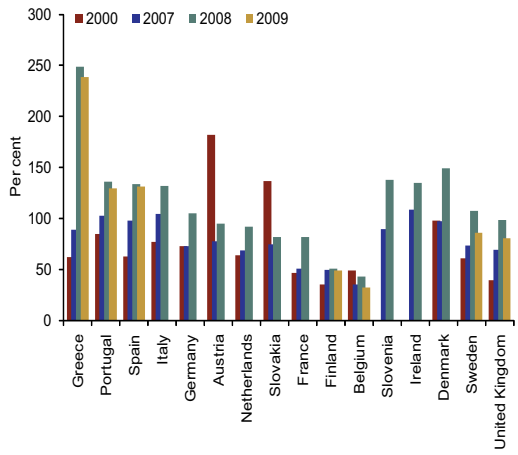
FINANCIAL DEBT OF NON-FINANCIAL CORPORATIONS



Sources: *Banco de España*, Eurostat and Banco de Portugal.
Note: Consolidated amounts except for Ireland and the United Kingdom.

Chart 3.20

FINANCIAL LEVERAGE RATIO OF NON-FINANCIAL CORPORATIONS



Sources: *Banco de España*, Eurostat and Banco de Portugal.
Notes: This ratio corresponds to the quotient between financial debt (i.e. loans and securities other than shares) and capital (i.e. shares and other equity. Consolidated amounts except for Ireland and the United Kingdom.

4. BANKING SYSTEM[1]

4.1. Activity and profitability

2009 continued to be marked by the interaction between the unprecedented crisis in international financial markets and economic activity, which was reflected in profound recessions in most of the advanced economies. The additional measures taken by the monetary authorities and diverse governments contributed, however, to diminishing the tensions in financial markets and mitigating their impact on economic activity, with a recovery in financial markets between March 2009 and the end of the year. In this context, activity of the Portuguese banking system continued to expand at a relatively high rate, in 2009, although at a clearly lower rate than prior to the present crisis. Balance sheet growth essentially derived from activity related with financial markets, reflecting their improvement, while operations with customers, both lending and borrowing, recorded a significant slowdown. However, institutions' activity expansion strategy increased balance sheet sensitivity to changes in risk assessments in the international financial markets, both on the assets and liabilities side. Profitability indicators for the whole of the Portuguese banking system were up in 2009. This path, however, reflected a highly significant base effect related with the highly negative results of the BPN and BPP banks in 2008.[2] With the exclusion of these institutions, the profitability indicators would have been slightly down, reflecting, to a large extent, the sharp reduction in net interest income, deriving from the decrease in the level of interest rates, and increase in credit-related provisions and impairment, although much less marked than in the preceding year, in line with the current stage of the economic cycle. The evolution of these components was mitigated by the favourable impact of the recovery of financial markets and containment of operating costs on results. In 2010, there are several pressures on the activity and profitability of the Portuguese banking system. On the one hand, the start of the year was characterised by falling stock markets and major tensions in sovereign debt markets in the euro area, leading to the adoption of several measures by European Union authorities. Financial markets, however, continue to be characterised by high volatility and significant sovereign risk differentiation on a global level. On the other hand, the growth of the Portuguese economy is expected to be negatively affected, over the short term, by the budget adjustment process. Negative impacts on the activity and profitability of the Portuguese banking system, resulting from the necessary financial economic deleveraging process, may, therefore, be expected.

(1) In the analysis made in this chapter, the aggregate defined as the Portuguese banking system refers to credit institutions and financial corporations operating in Portugal under the supervision of Banco de Portugal, except for the institutions headquartered in the Madeira offshore zone. Financial groups are therefore considered, on a consolidated basis, if they include at least one credit institution or an investment company and credit institutions and investment companies, on an individual basis, if they are not subject to consolidation in Portugal (including the branches of credit institutions or investment companies). The analysis of these institutions is important to the extent that they are subject to the new Capital Adequacy Directive, and are considered to be the benchmark universe in most European countries. It is not possible to provide data prior to 2007 for the aggregate under consideration as the adopting of the International Accounting Standards (IAS) was not transversal to all institutions with different accounting systems coexisting in 2005 and 2006. The data presented in this chapter are therefore based on different aggregates of institutions. In particular, up to 2004 the collection of institutions referred to banks and savings banks, with the exception of banks headquartered or operating exclusively in the Madeira offshore zone and/or operating mainly with non-residents. The branches of credit institutions headquartered in another European Union Member State - excluding those not classified as financial monetary institutions - as well as the branches of credit institutions headquartered in third countries were also considered as banks. From December 2004 to 2009, two groups of institutions were considered. A first, for the period December 2004 to December 2007, comprising thirteen banking groups using the IAS or AAS (adjusted accounting standards) for the production of their respective financial statements in 2005 (which, in December 2004, represented around 87 per cent of the total assets of the institutions up to then). The second set for the period March 2007 to 2009. The overlapping period relating to the different sets of institutions allows a consistent analysis of the changes. To facilitate the reading of this chapter, whenever necessary, the charts and tables have a straight line to indicate a break in the series.

(2) At the end of 2007, the BPN and BPP banks had market shares (valued by total assets of the banking system) of 1.8 and 0.5 per cent, respectively.

The expansion of activity was essentially sustained by the increase in the financial instruments portfolio, with a marked slowdown in lending operations

Activity in the Portuguese banking system, assessed by total assets, on a consolidated basis, was up 7 per cent in December 2009, comprising a slight slowdown in comparison to the preceding year (Table 4.1.1). The factors underlying such growth were, however, substantially different from the profile of the last few years. Asset growth, in 2009, particularly reflected the increases in the financial instruments portfolio and investments in central banks and other credit institutions, to the detriment of the credit portfolio, which represents the main assets component (Chart 4.1.1).

There was a sharper deceleration of credit to customers in 2009, which evolution was common to domestic activity and the activities of subsidiaries abroad. In a period of substantially lower interest rates, the credit path reflected a decrease in demand, in a context of a lower level of economic activity and higher unemployment, but also the increased restrictiveness of lending policies, although gradually less intense during the course of 2009. In the internal market, the downward trajectory of loans to the non-financial private sector intensified during the course of the year, particularly in the non-financial corporation segment. In the households segment, the deceleration was particularly evident in the case of loans for consumption and other purposes. It should, however, be noted that there was a slight increase in the rates of change on loans to households over the last few months of the year and first few months of 2010.[3]

Growth in the securities, derivatives and other financial investments portfolio was highly expressive in 2009. This evolution, on the one hand, reflected positive changes in market value, in line with favourable developments in financial markets during the course of the year, particularly higher prices in stock markets. On the other hand, the increase in the portfolio derived from net acquisitions of financial instruments, mostly in the second half of the year. Several banking groups acquired considerable volumes of debt securities, especially severeign debt securities and, to a lesser extent, non-subordinated debt securities and securities associated with securitisation operations.[4] In turn, growth in claims on central banks should be assessed in light of the levels of risk aversion and uncertainty which still exist.

There was a considerable increase in financing in wholesale debt markets, together with a sharp deceleration in customer deposits

In 2009, and unlike the preceding year, debt securities comprised the main source of financing for the expansion of banking activity, in line with the events recorded in the period preceding the onset of the financial crisis. Benefiting from the gradual easing of tensions in international wholesale debt markets, with favourable effects both on the risk premiums demanded by investors and quantities transacted, issues of debt securities (net of redemptions) by Portuguese banks increased considerably. As in 2008, sales of debt securities to customers were significant. Reference should also be made to the fact that only a very small part of the issues were made under the guarantee plan presented by the Portuguese government and was concentrated at the beginning of the year, when tensions in international financial markets were substantial.[5]

In turn, there was a highly significant slowdown in customer resources in the form of deposits, in 2009, reflected in almost year-on-year stabilisation at the end of the year. Reference should be made

(3) For a detailed analysis of the evolution of the credit portfolio and respective quality, see "Section 4.5 *Credit risk*", of this Report.

(4) The securities and financial investment portfolio is analysed in detail in "Section 4.3 *Market risk*", of this Report.

(5) A detailed analysis of the financing of the banking system during the course of 2009, in addition to its respective liquidity position, is provided in "Section 4.4 *Liquidity risk*", of this Report.

Table 4.1.1

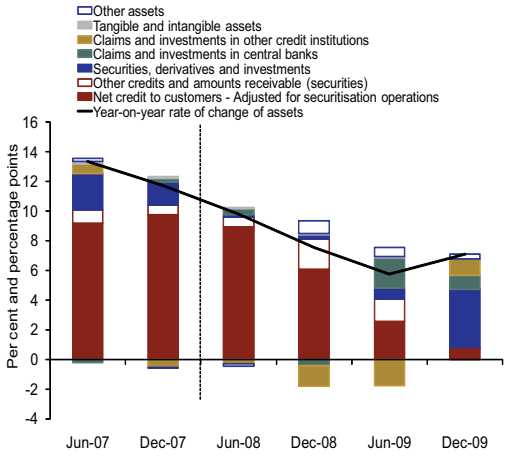
BALANCE SHEET OF THE BANKING SYSTEM
On a consolidated basis

	Structure (as a percentage of total assets)			Year-on-year rates of change (per cent)							
	2007	2008	2009	2008				2009			
	Dec.	Dec.	Dec.	Mar.	Jun.	Sep.	Dec.	Mar.	Jun.	Sep.	Dec.
Cash and claims on central banks	**2.1**	**2.1**	**2.1**	**24.7**	**38.0**	**23.0**	**5.8**	**-4.1**	**19.4**	**5.7**	**9.8**
Claims on other credit institutions	**1.0**	**1.0**	**1.0**	**6.2**	**10.7**	**-9.1**	**4.2**	**10.5**	**17.0**	**12.3**	**5.2**
Investments in credit institutions	**8.7**	**6.2**	**7.5**	**-2.0**	**-4.9**	**-1.9**	**-22.7**	**-7.2**	**-2.5**	**-17.8**	**29.0**
of which: in central banks	0.7	0.2	0.9	152.7	-43.6	-	-75.6	93.0	-	-37.9	446.0
Financial assets at fair value through profit or loss	**5.2**	**4.4**	**4.1**	**-9.0**	**-8.7**	**-12.3**	**-9.1**	**3.5**	**-14.6**	**2.4**	**-0.5**
Equity	0.4	0.2	0.4	-24.0	-9.2	-14.5	-32.7	1.2	22.7	92.0	79.2
Debt instruments	3.1	1.9	1.9	-24.8	-23.0	-32.7	-33.4	-22.6	-31.4	-6.7	8.4
Other	1.8	2.3	1.8	35.4	23.1	30.4	37.5	40.4	3.4	2.7	-16.2
Available for sale financial assets	**6.1**	**5.7**	**8.4**	**14.0**	**12.5**	**21.9**	**-0.7**	**-0.2**	**12.2**	**26.6**	**59.6**
Equity	1.8	1.2	1.5	-3.8	-20.0	-13.7	-28.6	-16.4	0.3	11.0	32.7
Debt instruments	4.2	4.1	6.5	21.0	21.6	32.6	5.6	0.9	16.9	32.9	70.4
Other	0.2	0.4	0.5	33.5	185.9	124.5	135.1	82.8	2.1	4.8	27.3
Investments held to maturity	**0.3**	**1.1**	**1.5**	**43.2**	**40.6**	**87.8**	**245.3**	**174.1**	**163.6**	**151.8**	**53.3**
Hedge derivatives	**0.3**	**0.5**	**0.3**	**15.0**	**-22.4**	**18.1**	**66.4**	**14.1**	**13.2**	**-2.1**	**-25.5**
Investment in subsidiaries	**0.8**	**0.6**	**0.7**	**-24.1**	**-9.7**	**-27.5**	**-26.6**	**-22.7**	**-12.6**	**-27.0**	**21.1**
Net credit to customers	**66.1**	**67.4**	**62.5**	**15.6**	**13.5**	**12.6**	**9.6**	**5.9**	**3.1**	**0.5**	**-0.6**
Gross credit	67.7	69.4	64.9	15.4	13.4	12.6	10.3	6.9	4.2	1.7	0.1
of which: overdue credit to customers	1.1	1.5	2.1	16.3	23.7	40.1	41.9	54.9	61.6	49.2	52.9
Impairment and value adjustments in credit to customers	-1.5	-2.0	-2.4	9.1	9.0	14.1	41.1	50.0	50.3	48.8	25.9
Securitised non-derecognised assets	**4.5**	**5.9**	**6.7**	**10.5**	**20.4**	**19.8**	**42.2**	**51.9**	**42.9**	**36.7**	**20.5**
of which: credit to customers	4.5	5.8	6.6	10.7	20.4	19.8	39.3	48.6	40.6	34.0	20.8
Tangible and intangible assets	**1.2**	**1.2**	**1.2**	**6.9**	**6.2**	**6.7**	**7.0**	**4.3**	**5.9**	**26.0**	**0.2**
Other assets	**3.5**	**3.9**	**4.0**	**-0.5**	**-4.5**	**18.5**	**21.2**	**17.8**	**14.3**	**9.0**	**8.4**
Total assets	**100.0**	**100.0**	**100.0**	**11.2**	**9.8**	**10.6**	**7.5**	**7.5**	**5.8**	**4.0**	**7.1**
Resources from central banks	**1.3**	**3.0**	**3.8**	**115.1**	**191.2**	**129.8**	**151.4**	**101.8**	**89.6**	**37.5**	**34.8**
Resources from other credit institutions	**16.3**	**15.6**	**14.6**	**10.0**	**2.6**	**7.7**	**2.7**	**1.7**	**-2.3**	**-4.1**	**0.5**
Resources from customers and other loans	**44.1**	**45.7**	**42.7**	**12.5**	**13.3**	**13.7**	**11.4**	**10.1**	**6.9**	**1.2**	**0.1**
Liabilities represented by securities	**21.9**	**19.8**	**22.9**	**11.6**	**9.9**	**4.4**	**-3.2**	**2.3**	**3.1**	**13.1**	**24.0**
Subordinated liabilities	**2.6**	**2.5**	**2.2**	**12.0**	**6.9**	**15.7**	**1.3**	**-3.3**	**5.6**	**-4.1**	**-3.2**
Financial liabilities held for trading	**2.3**	**3.6**	**2.9**	**42.7**	**22.0**	**46.0**	**71.4**	**78.1**	**45.1**	**12.0**	**-12.4**
Hedge derivatives	**0.5**	**0.5**	**0.3**	**5.2**	**-12.4**	**10.7**	**23.7**	**-11.3**	**-38.8**	**-23.8**	**-41.9**
Liabilities for non-derecognised assets in securitisation operations	**1.2**	**0.9**	**1.4**	**-8.0**	**-18.6**	**-37.3**	**-21.1**	**-21.8**	**-15.2**	**1.4**	**71.0**
Other liabilities	**3.4**	**3.0**	**2.9**	**-9.0**	**-5.7**	**-3.3**	**-7.1**	**-0.7**	**-1.0**	**-0.5**	**5.9**
Total liabilities	**93.6**	**94.5**	**93.8**	**11.8**	**10.2**	**10.9**	**8.5**	**8.3**	**6.0**	**3.8**	**6.3**
Capital	**6.4**	**5.5**	**6.2**	**3.0**	**3.6**	**5.5**	**-6.9**	**-4.1**	**2.5**	**7.5**	**20.5**
Total liabilities and capital	**100.0**	**100.0**	**100.0**	**11.2**	**9.8**	**10.6**	**7.5**	**7.5**	**5.8**	**4.0**	**7.1**
Memo:											
Total assets (EUR million)	*443 458*	*476 883*	*510 825*								
Credit to customers including non-derecognised securitisation operations	72.1	75.2	71.5	15.1	13.8	13.1	12.1	9.6	6.7	3.9	1.7
Credit to customers not represented by securities including non-derecognised securitisation operations	70.5	71.8	68.2	14.6	13.1	12.2	9.5	7.1	4.7	2.4	1.8
Resources from customers (including securities issued by the banks and placed with customers)	48.4	50.6	48.3	13.3	15.1	15.1	12.4	13.9	8.6	5.6	2.4

Source: Banco de Portugal.

Chart 4.1.1

CONTRIBUTIONS TO CHANGE OF ASSETS



Source: Banco de Portugal.
Notes: The break in the series represented in 2007 comprises a widening of the group of institutions under analysis. Securities, derivatives and investments include financial assets at fair value through profit or loss, available for sale financial assets, investments held to maturity, investments in subsidiaries and hedge derivatives. Net credit to customers - adjusted for securitisation operations excludes the component of other credit and amounts receivable (securities), classified in the credit portfolio.

to the fact that since the onset of the financial crisis in the summer of 2007, with consequent difficulties in access to the financial markets, these resources represented the main source of banking activity financing. The reduction of the relative importance of these resources was related with the progressive decrease in the level of risk aversion of economic agents, which translated into a recomposition of the respective financial assets portfolios. Economic agents opted to invest their savings in financial investments other than bank deposits, in 2009, particularly life insurance and, at a later stage, investment funds.[6] Economic agents' investment options were also influenced by the low returns on deposits, deriving from historically low interest rates in the money market, notwithstanding the adoption of more competitive resource-taking strategies by institutions, decreasing the interest margin on such operations.

Resources taken from central banks also played an important role in financing institutions in 2009, reflecting the participation of Portuguese institutions in the ECB's liquidity injection operations (at a fixed interest rate, maturity of one year and full allotment), particularly in the June operation. These operations are part of a series of measures adopted by the ECB since the onset of the financial crisis with the objective of mitigating liquidity shortages in markets and re-establishing confidence in the financial system.

In 2009, the expansion of activity was also financed, and not negligibly so, by the high growth of shareholders' equity, with a year-on-year change of close to 20 per cent at the end of the year. This growth essentially reflected increases in capital and capital-like instruments by various institutions, particularly in the first half of the year, in line with Banco de Portugal's recommendation that the original own funds adequacy ratio should be at least 8 per cent starting September 2009.[7] Therefore, the level of financial leverage in the Portuguese banking system, defined as the ratio between total as-

(6) See "Box 2.1 *Effects of the crisis in international financial markets on the households' financial assets portfolio in Portugal*", Banco de Portugal, *Annual Report* 2009.

(7) Recommendation made in Banco de Portugal, Circular no. 83/2008/DSB.

sets and shareholders' equity, decreased in 2009.[8] The decrease in leverage would have been even more significant with the exclusions of the BPN and BPP banks, in which the Portuguese authorities intervened directly at the end of 2008.

According to the information available for the major Portuguese banking groups, the trends observed in 2009, remained in force in the first quarter of 2010.[9] The expansion of activity therefore continued to be sustained by the increase in the securities and financial investments portfolio, whereas debt securities remained the main source of financing, notwithstanding the less favourable developments in the international wholesale debt markets in the first few months of 2010.

The domestic banking system's international exposure remains concentrated in developed countries and the non-banking private sector

The value of Portuguese banking groups' foreign assets, on a consolidated basis, in December 2009, was up by close to 11 per cent in year-on-year terms and represented around 29 per cent of domestic institutions' assets (Table 4.1.2).[10] As in past years, there was an increase in the proportion of assets with a maturity over 2 years and investments in the private non-banking sector. In 2009, particularly in the second half of the year, investments in the public sector recorded significant growth, although the proportion of such investments in terms of total international assets remained relatively contained (4.5 per cent at the end of the year). In terms of geographical counterpart, the structure of the exposure remained globally unchanged, with most of the exposure being to developed countries, in particular euro area countries (Chart 4.1.2).

Profitability of the Portuguese banking System remains low

In 2009, income before tax and minority interests in the Portuguese banking system, on a consolidated basis, was up by close to 38 per cent in year-on-year terms (Table 4.1.3). This increase implied an improvement in profitability indicators, with return on assets and equity of 0.45 and 7.6 per cent, respectively. However, the aggregate results, particularly in 2008, were significantly affected by the highly negative results of the BPN and BPP banks. As already stated, the national authorities intervened directly in these banks in the last quarter of 2008, owing to their particularly adverse financial situation, in a context of strong global pressure on the financial system. Excluding these banks, income before tax and minority interests, and profitability indicators would have recorded a negative change, with return on assets and equity of 0.57 and 8.8 per cent, respectively, at the end of 2009 (Chart 4.1.3).

An analysis of the empirical distributions of returns on assets and equity shows the existence of differentiations between institutions' changes, particularly among the major banking groups (Chart 4.1.4 and Chart 4.1.5). It should, however, be noted, that the levels observed for the principal institutions are still significantly lower than pre-crisis profitability levels. In international terms, and in accordance with the information available for a panel of European banks, profitability indicators showed an improvement in 2009, after the very low levels recorded in the previous year (Chart 4.1.6. and Chart 4.1.7.) In comparative terms, this path may have been related with European institutions' greater sensitivity to changes in financial markets and the differentiated impact of the evolution of interest rates on net

(8) Taking into account risk weighted assets and own funds, there was also a favourable path of the capital ratio in 2009. The prudential capital adequacy ratio analysis is made in "Section 4.2 *Own funds adequacy*", of this Report.

(9) The principal developments in the first quarter of 2010 are set out in "Box 4.1 *Financial situation of the major banking groups in the Portuguese banking system in the first quarter of 2010*", of this Report.

(10) The analysis of international exposure is made in accordance with BIS methodological guidelines for reporting and publicising "Consolidated banking statistics". This analysis only considers the subgroup of domestic institutions on a consolidated basis, as non-domestic institutions are included in the consolidation perimeter of the banking systems of the countries in which their head offices are located.

Table 4.1.2

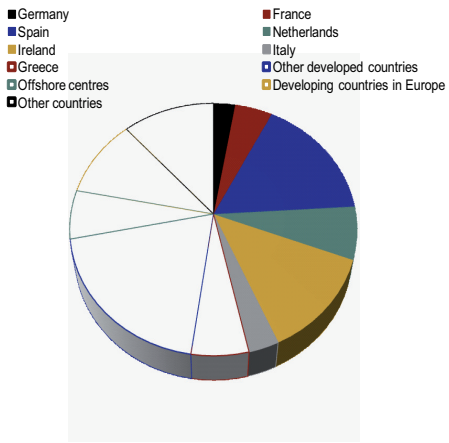
CONSOLIDATED FOREIGN CLAIMS OF THE DOMESTIC BANKING SYSTEM FROM THE PERSPECTIVE OF IMMEDIATE RISK - STRUCTURE
Per cent

	Dec.2007	Jun.2008	Dec.2008	Jun.2009	Dec.2009
Total (10^6 €)	93 586	102 780	106 059	113 005	117 787
As a percentage of total assets	26.7	28.2	28.2	29.0	29.3
International claims	70.3	71.9	70.9	72.1	71.4
Maturity					
Up to 1 year	30.4	33.6	24.2	21.8	19.0
From 1 up to 2 years	2.4	4.0	4.7	4.1	4.6
More than 2 years	31.4	30.6	34.8	38.7	39.4
Other	5.9	3.8	7.3	7.5	8.4
Institutional Borrower					
Banks	30.5	32.8	22.4	20.1	18.3
Public sector	3.3	2.8	2.3	2.8	4.5
Non-banking private sector	36.0	35.9	45.6	48.9	48.4
Other	0.5	0.4	0.7	0.3	0.2
Geographical Borrower					
Developed countries	48.6	51.1	48.3	53.3	51.9
Offshore centres	6.9	6.0	7.6	6.1	5.7
Developing countries in Europe	5.3	5.8	6.3	5.3	5.2
Other	9.4	9.0	8.7	7.4	8.5
Local assets in local currency	29.7	28.1	29.1	27.9	28.6
Geographical Borrower					
Developed countries	21.3	20.1	21.0	20.3	19.9
Offshore centres	0.5	0.0	0.4	0.4	0.5
Developing countries in Europe	5.1	5.2	4.8	4.3	5.1
Other	2.8	2.7	2.8	2.9	3.1
Memo:					
Local liabilities in local currency (10^6 €)	21 445	21 580	21 472	23 007	24 757

Source: Banco de Portugal.

Chart 4.1.2

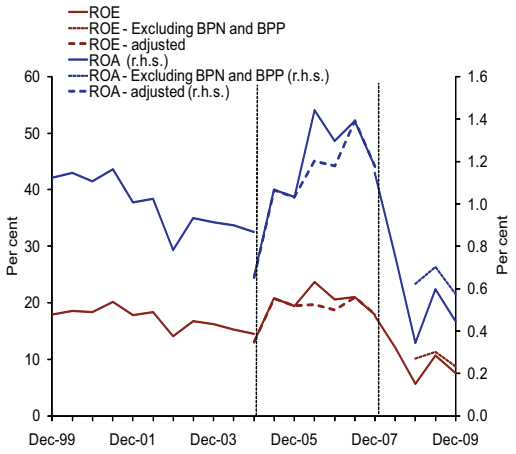
GEOGRAPHICAL STRUCTURE OF FOREIGN CLAIMS OF DOMESTIC BANKING GROUPS
December 2009



Source: Banco de Portugal.

Chart 4.1.3

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



Source: Banco de Portugal.
Notes: The break in the series in 2004 comprises the introduction of the international accounting standards which also implied a redefinition of the group of banking institutions under analysis. In turn, the break in the series in 2007 comprises the widening of the group of institutions under analysis. The adjusted profitability indicators are obtained after the deduction from results of the impact of the investments restructuring operation in companies (insurance area) by one of the major banking groups under consideration.

Table 4.1.3

PROFIT AND LOSS ACCOUNT OF THE BANKING SYSTEM

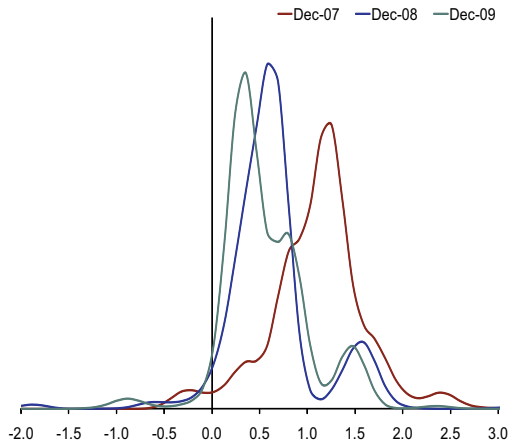
On a consolidated basis

	EUR millions						Structure (as a percentage of average assets)[a]						Year-on-year rate of change (per cent)					
	2008			2009			2008			2009			2008			2009		
	H1	H2	Year	H1	H2	Year	H1	H2	Year	H1	H2	Year	H1	H2	Year	H1	H2	Year
1.Interest income	15 203	16 740	31 943	12 952	10 095	23 047	6.77	7.07	6.92	5.39	4.05	4.71	26.0	20.2	22.9	-14.8	-39.7	-27.9
2.Interest expenses	10 894	12 185	23 079	8 658	6 480	15 138	4.85	5.15	5.00	3.60	2.60	3.09	35.4	24.5	29.4	-20.5	-46.8	-34.4
3.Net interest income (1-2)	**4 309**	**4 555**	**8 863**	**4 294**	**3 615**	**7 908**	**1.92**	**1.92**	**1.92**	**1.79**	**1.45**	**1.62**	**7.1**	**10.0**	**8.6**	**-0.3**	**-20.6**	**-10.8**
4.Income from capital instruments	220	63	283	183	39	222	0.10	0.03	0.06	0.08	0.02	0.05	39.3	0.9	28.4	-17.1	-37.6	-21.7
5.Income (net) from services and commissions	1 637	1 708	3 346	1 650	1 814	3 464	0.73	0.72	0.73	0.69	0.73	0.71	11.8	-2.2	4.2	0.8	6.2	3.5
6.Income from financial assets and liabilities at fair value through profit or loss	-214	241	27	371	116	487	-0.10	0.10	0.01	0.15	0.05	0.10	-	-	-	-	-51.7	1701.1
7.Income from available for sale financial assets	406	131	537	73	326	399	0.18	0.06	0.12	0.03	0.13	0.08	1.2	-80.7	-50.3	-82.1	149.2	-25.7
8.Income from foreign exchange revaluation	80	92	172	83	185	269	0.04	0.04	0.04	0.03	0.07	0.05	-28.2	-68.2	-57.1	4.5	101.1	56.3
9.Income from the sale of other financial assets	34	176	210	192	309	501	0.02	0.07	0.05	0.08	0.12	0.10	-82.3	-	28.5	466.6	75.7	139.0
10.Other operating profit and loss	363	305	667	276	159	434	0.16	0.13	0.14	0.11	0.06	0.09	12.1	-21.1	-6.0	-23.9	-47.9	-34.9
11.Gross income (3+4+5+6+7+8+9+10)	**6 835**	**7 270**	**14 105**	**7 121**	**6 563**	**13 684**	**3.05**	**3.07**	**3.06**	**2.96**	**2.63**	**2.80**	**-2.0**	**6.8**	**2.4**	**4.2**	**-9.7**	**-3.0**
12.Satff costs	2 063	2 127	4 190	2 098	2 117	4 215	0.92	0.90	0.91	0.87	0.85	0.86	9.5	-2.0	3.3	1.7	-0.4	0.6
13.General administrative costs	1 438	1 574	3 011	1 354	1 545	2 899	0.64	0.66	0.65	0.56	0.62	0.59	7.5	2.5	4.9	-5.8	-1.8	-3.7
14.Depreciation and amortisation	301	338	638	320	338	658	0.13	0.14	0.14	0.13	0.14	0.13	10.4	9.4	9.8	6.3	0.1	3.0
15.Provisions net of refunds and write-offs	36	580	616	139	283	421	0.02	0.25	0.13	0.06	0.11	0.09	-74.4	591.6	176.6	290.3	-51.3	-31.6
16.Impairment losses and other net value adjustments	1 360	2 703	4 063	1 789	1 749	3 538	0.61	1.14	0.88	0.74	0.70	0.72	65.6	198.5	135.3	31.5	-35.3	-12.9
17.Negative consolidation differences	0	0	0	0	-28	-28	0.00	0.00	0.00	0.00	-0.01	-0.01	-100.0	-99.8	-99.9	-	-	-
18.Appropriation of income from associated companies and joint ventures (equity method)	48	-49	-1	13	191	204	0.02	-0.02	0.00	0.01	0.08	0.04	-76.1	-	-	-73.0	-	-
19. Income before tax and minority interests (11-12-13-14-15-16-17+18)	**1 686**	**-101**	**1 585**	**1 435**	**750**	**2 185**	**0.75**	**-0.04**	**0.34**	**0.60**	**0.30**	**0.45**	**-38.1**	**-**	**-67.0**	**-14.9**	**-**	**37.8**
20.Income tax on profit	361	258	619	297	157	454	0.16	0.11	0.13	0.12	0.06	0.09	-24.2	-16.4	-21.1	-17.7	-39.0	-26.6
21.Income before minority interests (19-20)	**1 325**	**-359**	**966**	**1 138**	**593**	**1 731**	**0.59**	**-0.15**	**0.21**	**0.47**	**0.24**	**0.35**	**-41.1**	**-**	**-75.9**	**-14.1**	**-**	**79.1**
22.Minority interests	294	180	474	305	340	645	0.13	0.08	0.10	0.13	0.14	0.13	-24.4	-39.1	-30.8	3.8	88.6	36.0
23.Net icnome (21-22)	**1 031**	**-539**	**492**	**833**	**252**	**1 085**	**0.46**	**-0.23**	**0.11**	**0.35**	**0.10**	**0.22**	**-44.6**	**-**	**-85.2**	**-19.2**	**-**	**120.6**
Memo:																		
Income from financial operations and associated impairment	*-94*	*-138*	*-232*	*629*	*738*	*1 367*	*-0.04*	*-0.06*	*-0.05*	*0.26*	*0.30*	*0.28*	-	-	-	-	-	-
Provisions and impairment associated with credit to customers	*914*	*1 693*	*2 607*	*1 551*	*1 389*	*2 940*	*0.41*	*0.73*	*0.56*	*0.65*	*0.57*	*0.60*	*16.3*	*138.9*	*74.43*	*69.7*	*-18.0*	*12.8*

Source: Banco de Portugal.
Note: (a) Half-year data have been annualised.

Chart 4.1.4

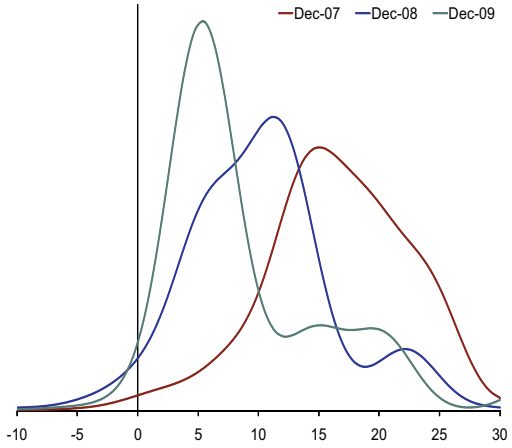
RETURN ON ASSETS
Empirical distribution



Source: Banco de Portugal.
Note: Empirical distribution obtained by the use of a Gaussian kernel in which institutions were weighted by assets; indicator calculated considering income before tax and minority interests.

Chart 4.1.5

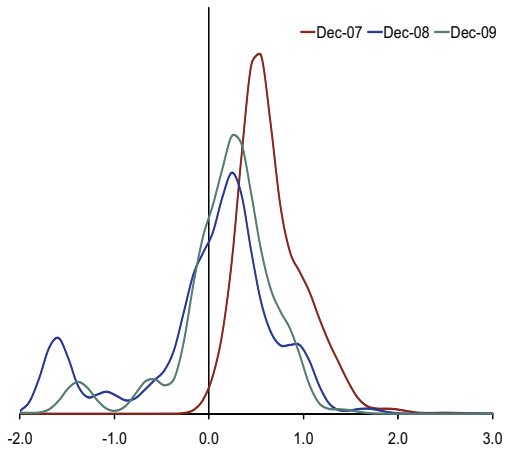
RETURN ON EQUITY
Empirical distribution



Source: Banco de Portugal.
Note: Empirical distribution obtained by the use of a Gaussian kernel in which institutions were weighted by assets; indicator calculated considering income before tax and minority interests.

Chart 4.1.6

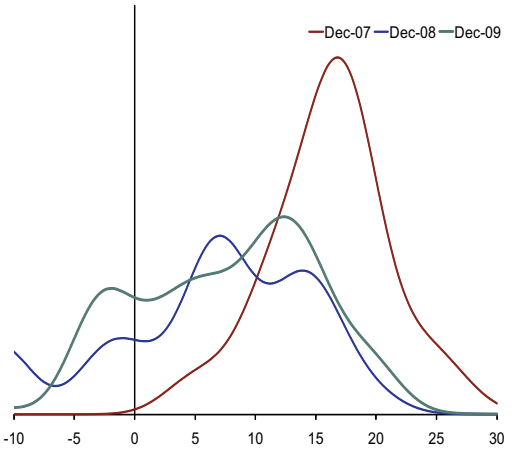
RETURN ON ASSETS OF A PANEL OF EUROPEAN BANKS
Empirical distribution



Source: *Bureau Van Dijk* - Bankscope.
Note: Empirical distribution using non-parametric methods, in the form of a Gaussian kernel, in which institutions were weighted by assets. The analysis involved 52 banking institutions from 14 countries in the European Union with accounts for 2009 available from the referred to source at the closing date for the date of this Report.

Chart 4.1.7

RETURN ON EQUITY OF A PANEL OF EUROPEAN BANKS
Empirical distribution



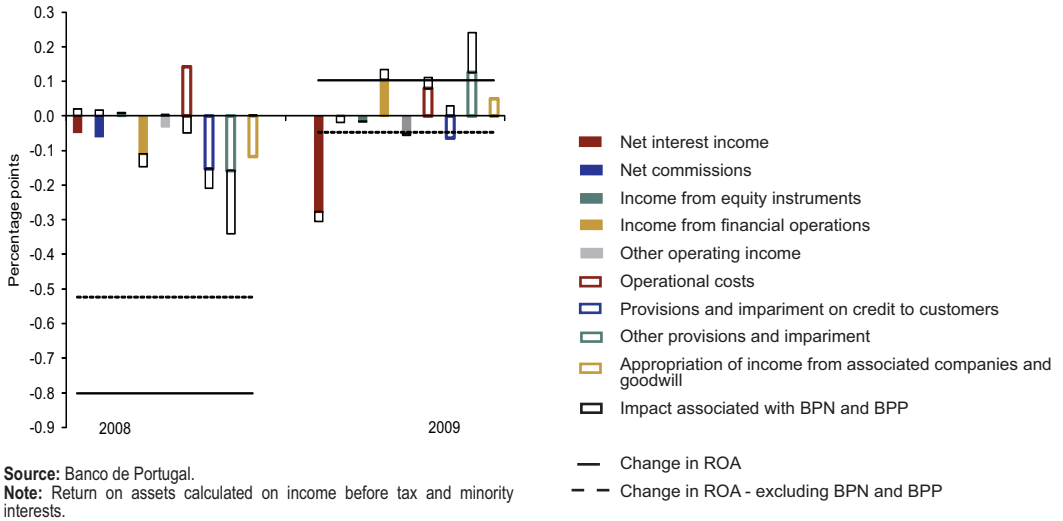
Source: *Bureau Van Dijk* - Bankscope.
Note: Empirical distribution using non-parametric methods, in the form of a Gaussian kernel, in which institutions were weighted by assets. The analysis involved 50 banking institutions from 14 countries in the European Union with accounts for 2009 available from the referred to source at the closing date for the date of this Report.

interest income. It should be noted that, notwithstanding the improvement, the proportion of European institutions with negative profitability indicators is still significant, in contrast with the situation observed in the Portuguese banking system.

As regards contributions to changes in profitability, of particular note was the highly negative impact of net interest income, which comprises the main component of Portuguese institutions' income. This impact was mitigated by the positive contributions associated with the recovery of income from financial operations and decrease of their respective impairments, reflecting the progressive improvement of financial markets, in addition to the containment of operating costs. The remaining results components had a reduced impact on the evolution of profitability in relative terms (Chart 4.1.8). In comparison with the major European banking groups, there were several differences in the breakdown of the path of profitability, with reference being made to the favourable contribution of net interest income in the case of European institutions.

Chart 4.1.8

YEAR-ON-YEAR CHANGE IN RETURN ON ASSETS - ROA
Breakdown of components



Source: Banco de Portugal.
Note: Return on assets calculated on income before tax and minority interests.

Net interest income was sharply down, as a consequence of lower interest rates on operations with customers

In 2009, given its relevance to financial institutions' income (60 per cent of gross income), reference should be made to the reduction of around 11 per cent in net interest income, which represented a highly negative contribution to the evolution of return on assets of close to 30 basis points. The reduction of net interest income was substantially more pronounced than in the recessionary period of 2003 (around 1 per cent). Unlike previous years, in 2009, the interest rate effect was the main factor underlying the path of this margin, reflecting the decrease in the spread between lending and borrowing rates. The total average implicit interest rate spread in the principal lending and borrowing operations was significantly down in 2009 (Table 4.1.4). The volume effect, in turn, continued to make a positive contribution, although smaller than in 2008. In a breakdown of net interest income by type of operation, the developments observed particularly reflected the reduction in margin on operations with customers, partially offset by the change in margin associated with money market operations and financial instruments (Chart 4.1.9).

Table 4.1.4

IMPLICIT AVERAGE INTEREST RATES OF THE MAIN BALANCE SHEET ITEMS[a]
Per cent

	2001	2002	2003	2004	2005	2006	2007	2008	2009	2007		2008		2009	
										H1	H2	H1	H2	H1	H2
Interest-bearing assets	**5.44**	**4.24**	**3.88**	**3.30**	**4.22**	**4.56**	**5.48**	**5.93**	**3.76**	**5.23**	**5.72**	**5.83**	**6.04**	**4.41**	**3.14**
of which:															
Interbank assets[b]	4.09	2.79	2.23	1.77	2.69	3.71	4.16	4.31	1.75	3.92	4.39	4.45	4.22	2.27	1.31
Non-interbank assets															
Credit	6.26	4.94	4.60	4.00	4.56	4.86	5.87	6.33	4.16	5.64	6.08	6.17	6.49	4.83	3.49
Securities	5.05	4.08	3.96	2.94	4.85	4.52	5.60	6.32	4.80	5.33	5.95	6.12	6.63	5.51	4.19
Interest-bearing liabilities	**3.59**	**2.61**	**2.28**	**1.87**	**2.32**	**2.71**	**3.49**	**3.92**	**2.26**	**3.23**	**3.73**	**3.82**	**4.02**	**2.67**	**1.86**
of which:															
Interbank liabilities[c]	4.42	3.00	2.42	2.02	2.89	3.58	4.39	4.64	2.02	4.13	4.66	4.65	4.64	2.44	1.59
Non-interbank liabilities															
Deposits	2.81	2.10	1.80	1.45	1.60	1.80	2.46	3.04	2.00	2.26	2.65	2.90	3.17	2.39	1.62
Securities	4.12	3.17	3.12	2.46	3.03	3.72	4.38	4.79	2.74	4.02	4.73	4.63	4.99	3.16	2.38
Subordinated liabilities	5.48	4.53	4.30	3.72	4.61	4.82	5.30	5.55	3.99	5.26	5.32	5.56	5.50	4.51	3.50
Spreads (percentage points)															
Interest bearing assets - Interest bearing liabilities	1.86	1.63	1.60	1.43	1.90	1.84	1.99	2.01	1.50	2.00	1.99	2.01	2.01	1.75	1.28
Credit - Deposits	3.45	2.84	2.81	2.56	2.96	3.05	3.41	3.29	2.16	3.39	3.43	3.27	3.32	2.44	1.87

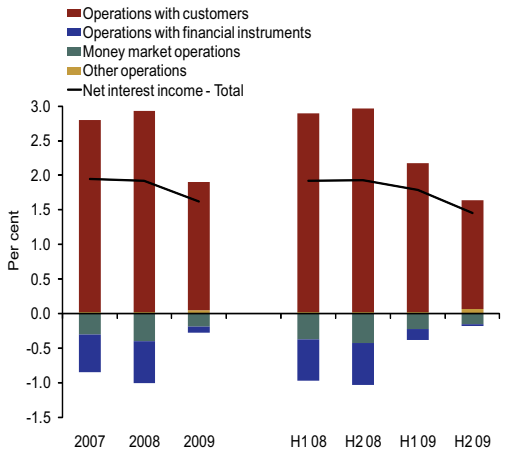
Source: Banco de Portugal.
Notes: The break in the series in 2004 comprises the introduction of the international accounting standards which also implied a redefinition of the group of banking institutions under analysis. In turn, the break in the series in 2007 comprises the widening of the group of institutions under analysis. (a) Implicit average interest rates calculated as a ratio between interest flows in the period under consideration and the average stock of the corresponding balance sheet item. (b) Includes cash, deposits with central banks, claims and investments in credit institutions. (c) Includes resources from central banks and other credit institutions.

The more favourable path of the margin in money market operations was essentially related with lower interest rates charged in this market. In the case of operations with financial instruments, the margin benefited, on the one hand, from the significant increase in the securities portfolio in terms of institutions' assets, and, on the other, the widening of the spread between the implicit lending and borrowing rates in these instruments. This change mainly reflected the decrease in interest rates associated with debt securities, in which a particularly relevant factor was that a significant proportion of such debt stock is indexed to Euribor. In turn, in customer operations, the marked compression of the spread between implicit interest rates on credit and deposits was the crucial factor behind the change in the margin, while the volume effect continued to make a positive contribution, notwithstanding the significant slowdown in lending in 2009.

The narrowing of the spread between lending and borrowing rates with customers is also visible in the evolution of the spread between interest rates on loans and customer deposits, provided by the Monetary and Financial Statistics. The net interest income path derived from the downward trend of spreads on deposits, whose effects were visible up to the last quarter of the year, and which was not offset by the sharp increase, followed by a relative stabilisation of spreads on loans (Chart 4.1.10). The path of spreads on customer operations reflects the changes in the customer relationship policies adopted by institutions since the onset of the current crisis, deriving from difficulties in access to financing in wholesale markets and the increase in the materialisation of credit risk.Interest rates on borrowing operations continued to draw close to money market interest rates, with the aim of taking in more customer resources. As a consequence of these developments and the time lag relating to the transmission of the evolution of the interest rates charged on new operations to the average interest rates of outstanding amounts, the interest rate on outstanding term deposit amounts was higher than the interest rate in the money market since April 2009. The increase in the proportion of deposits with longer maturities to total deposits also contributed to the fact that the average interest rate on the total outstanding deposit amounts was higher than money market rates at the end of 2009. However, over the last few months of the year, the trend towards a decrease in the bank's margin on such

Chart 4.1.9

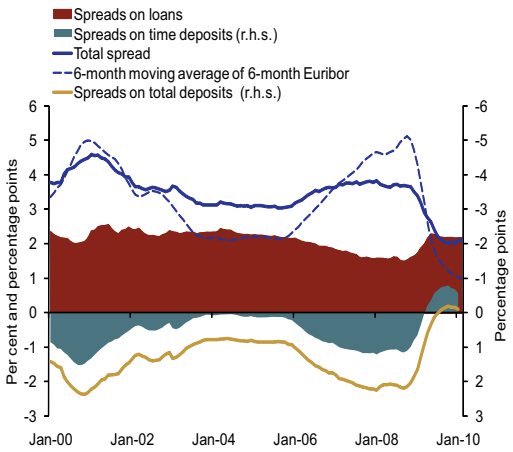
BREAKDOWN OF NET INTEREST INCOME
As a percentage of average assets



Source: Banco de Portugal.
Note: Half-year data have been annualised.

Chart 4.1.10

INTEREST RATE SPREADS IN OPERATIONS WITH CUSTOMERS



Source: Banco de Portugal.
Notes: The spread on lending operations was calculated as the difference between the interest rates on outstanding amount of loans (supplied in the Monetary and Financial Statistics) and the 6-month moving average of 6-month Euribor, whereas the spread on borrowing operations is the difference between the 6-month moving average of 6-month Euribor, and interest rates on outstanding amounts of deposits. The total spread comprises the difference between the interest rate on loans and deposits. Last observation: March 2010.

operations was arrested, and was probably related with the progressive normalisation of conditions in international financial markets over the course of 2009. It should, lastly, be noted that, notwithstanding the fact that the recessionary period of 2003 also recorded an approximation between interest rates on deposits and money market interest rates, particularly on term deposits, the interest rates on deposits never exceeded the Euribor rate. As already stated, this difference reflects the specificities of the present recessionary period in which, together with a much sharper contraction of economic activity, there were also significant liquidity restrictions in the financial markets.

In the case of lending operations, the change in the economic and financial environment was reflected in the adoption of more restrictive lending criteria, both in terms of price as in other contractual terms. Accordingly, in the first half of the year, there was a significant increase in interest rate spreads on outstanding loan amounts, reflecting higher spreads on new contracts, but particularly the impact of contracts approved (or renegotiated) in the previous year, deriving from the already mentioned time lag between the changes in interest rates on outstanding amounts and new operations. At a later stage, the spread associated with lending operations stabilised at a relatively higher level. This path was related, on the one hand, with the fact that a highly significant part of bank loans in Portugal are variable-rate loans, which implies a relatively fast adjustment of interest rate on outstanding amounts to the path of the money market interest rate. On the other hand, the relative stabilisation of spreads reflected the slowdown in credit and easing of restrictions on lending policies. According to the results of the Bank Lending Survey for 2009 and in accordance with the spreads charged on new operations, the trend towards the widening of spreads has been arrested. However, the information available for the first few months of 2010 suggests that institutions once again resorted to adopting restrictive lending policies, given the deterioration of risk perceptions and the tensions in financial markets at the beginning of the year. In this context, it should be noted that the levels of spreads charged on lending operations to customers are much higher than those recorded up to the onset of the financial crisis and are close to the levels charged in the recessionary period of 2003.[11] This fact is related with the materialisation of credit risk and less favourable evolution of economic activity, as suggested by the results of Castro e Santos (2010).[12]

Finally, reference should be made, as already stated, to the fact that net interest income's contribution to the change in the profitability of the Portuguese banking system was in contrast to that observed for the major European banks as a whole. Underlying this difference was the fact that, in these countries, the proportion of variable-rate loans was not as relevant as in Portugal. Therefore, whereas in Portugal, interest rates on lending to customers followed the fall in money market interest rates, this was not the case in the said countries, not only reflecting differences on a level of repricing dates but also the path of the respective reference rates.

Income from services and commissions recorded a moderate level of growth, reflected in a slightly negative contribution to the change in profitability. The unfavourable evolution noted in commissions associated with financial operations was offset by the growth in commissions associated with more traditional banking activity. This behaviour may be related with institutions' strategies of mitigating lower net interest income, as was the case in the recessionary period of 2003.

(11) For more details on the evolution of lending spreads see "Section 4.5 *Credit risk*", of this Report.

(12) Castro, G. and Santos, C. (2010), "Bank interest rate and loan determinants", Banco de Portugal, *Economic Bulletin*-Spring.

The recovery of results associated with financial markets and containment of operating costs partly offset the reduction in net interest income

There was a sharp recovery in income from financial operations in 2009, translating the main contribution to the change in institutions' revenues.[13] The increase in these results reflected gains recorded on assets measured at fair value through profit or loss, related with increases in prices in stock markets and the reduction of spreads in debt markets, noted since March 2009 and up to the end of the year, as well as the capital gains obtained on the sale of several financial instruments by some banking groups.

Provisions and impairment losses were significantly down in 2009, after the extraordinarily high levels recorded in the preceding year, to which significant contributions were made by the BPN and BPP banks. This evolution, to a large extent, reflected the reduction of the proportion associated with the securities and financial investments portfolio. The main factor underlying the decrease in these impairment levels was related with the recovery of international financial markets, which allowed the reversion of some of the losses recorded in 2008. The reduction of these impairments also benefited from the balance sheet adjustments made by some institutions, notably the sale of corporate holdings with larger losses in 2008, and the recognition of losses in the value of several securities. In turn, provisions and impairment losses associated with credit to customers once again posted relevant growth rates, in line with the current stage of the economic cycle, reflected in a negative contribution to the evolution of profitability. However, when compared to 2008, the rate of growth and impact on the profitability of these provisions were substantially lower. It should be noted that several banking groups, based on expectations of limited economic growth and continued high unemployment in 2010, have implemented more stringent risk management, reinforcing their discretionary provisioning levels.

In 2009, the path of operating costs once again made a positive contribution to the change in return on assets, in posting a slightly negative year-on-year rate of change. Cost containment essentially focused on the administrative costs component, but was also evident in the staff costs, which posted very limited growth. This fact occurred despite the increase in social costs on pension funds, related with the part recognition of negative actuarial deviations in several institutions' funds, significantly affected by the turmoil in financial markets in 2008. Notwithstanding the containment of operational costs, there was a deterioration of the cost-to-income ratio, as net operating income was down, with a ratio of 56.8 per cent at the end of the year (55.8 per cent excluding the BPN and BPP banks).[14] This was a general change among financial institutions and is reflected in a movement to the right of the empirical distribution of this indicator (Chart 4.1.11).

The results of international activity continued to account for a relevant proportion of aggregate results, notwithstanding a decrease in 2009

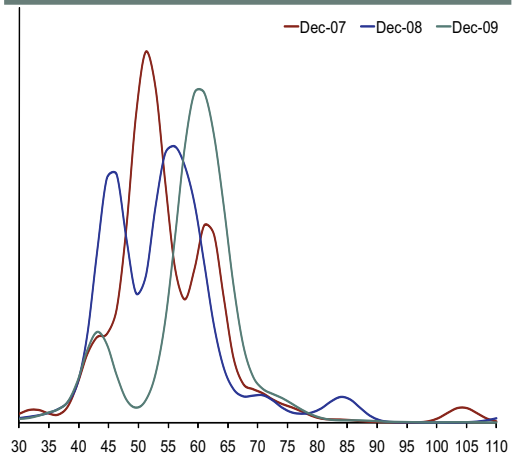
As opposed to past years, income associated with the activity of the subsidiaries of several of the main banking groups abroad in 2009 were down, although they continued to comprise a relevant element of consolidated results, albeit limited in international terms (Table 4.1.5.). The main factors underlying this evolution were the decrease in net interest income and increased impairment. The reduction in income from international activity was in line with the deceleration of global economic activity, with reference being made, in this context, to the impact on results of the activity performed in

(13) Income from financial operations comprises the sum of income from financial assets and financial liabilities measured at fair value through profit or loss, income from available for sale financial assets, income from foreign exchange revaluation and income from the sale of other financial assets. More in-depth information is given in "Section 4.3 *Market risk*", of this Report.

(14) The cost to income ratio is defined as the ratio between operating costs (comprising the sum of staff costs, general administrative costs and depreciation and amortisation) and gross income.

Chart 4.1.11

COST TO INCOME RATIO
Empirical distribution



Source: Banco de Portugal.
Note: Empirical distribution obtained by the use of a Gaussian kernel, in which institutions were weighted by total assets; indicator calculated as the ratio between operating costs (defined as the sum of staff costs, general administrative costs and depreciation and amortisations) and gross income.

Table 4.1.5

RELEVANCE OF INTERNATIONAL ACTIVITY IN BANKING SYSTEM INCOME
Per cent

	Relative weight of foreign subsidiaries		Year-on-year rate of change
	2008	2009	2009
Net interest income	16.3	15.6	-14.8
Commissions	15.9	16.2	6.9
Gross income	17.8	14.9	-19.2
Administrative costs	15.1	14.9	-2.2
of which: staff costs	15.6	14.5	-6.0
Impairment	6.4	10.0	40.6
Income before tax and minority interests	38.7	26.6	-33.4

Source: Banco de Portugal.

some Eastern European economies. This was offset by the favourable evolution of income obtained by several groups from their activities in Angola.

In the first quarter of 2010, in accordance with the information for the major banking groups in the Portuguese banking system, there was a decrease in income before tax and minority interests in comparison to the results for the same period last year, which implied a decrease in profitability indicators. The reduction of net interest income was, once again, the main factor underlying this evolution.[15]

Unfavourable developments in the international financial markets and the necessary public finances and Portuguese economy's adjustment process are risk factors for the path of activity and the profitability of the Portuguese banking system in 2010

The unfavourable developments in international financial markets, particularly in the wholesale debt markets, will significantly affect financing conditions for the Portuguese banking institutions, in terms of cost and quantity, with adverse consequences for the expansion of activity and profitability. Such

(15) For more detail on income path in the first quarter of 2010, see "Box 4.1 *Financial situation of the major banking groups in the Portuguese banking system in the first quarter of 2010*", of this Report.

developments will also affect the market value of several financial instruments, and will, therefore, have an impact on institutions' income and capital. It should, lastly, be noted that the public finance consolidation measures recently announced by the Portuguese government and, in more general terms, the economy's adjustment process, notwithstanding the need for sustained economic growth over the medium/long term, will have short term negative repercussions on the path of economic activity. This situation will tend to contribute to a limited evolution of credit activity in the domestic market, and will increase pressure on credit provisioning levels, owing to the greater materialisation of credit risk, with a negative impact on profitability.

4.2. Own funds adequacy[1]

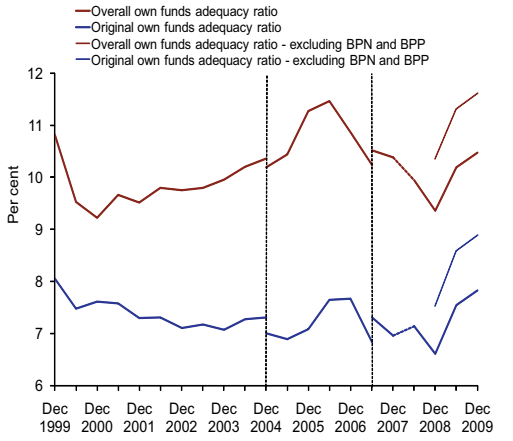
In 2009, the Portuguese banking system reinforced its capital position over 2008 levels, which were highly conditioned by the unfavourable developments of financial markets in the referred year (Chart 4.2.1). Evolution in 2009 resulted from the significant growth of own funds in comparison to the growth of capital requirements (Table 4.2.1). Accordingly, in December 2009, the global banking system's own funds adequacy ratio was 10.5 per cent, on a consolidated basis, while the original own funds adequacy ratio, Tier I, was 7.8 per cent. It should, however, be noted, that the banking system's own funds adequacy ratios continued to be negatively affected by the particularly adverse financial situation of the BPN and BPP banks (institutions intervened by national authorities at the end of 2008).[2] Excluding the amounts related with these institutions, the global own funds adequacy and Tier I ratios were 11.6 and 8.9 per cent, respectively.

Significant growth of own funds in line with capital increases made by several institutions and with the improvement in international financial markets

The increase in total own funds was underpinned by the expressive growth of original own funds, which were up around 21 per cent over December 2008. This growth essentially reflected the capital increases made by several institutions over the course of 2009 and the issue of other capital-like instruments, which, as a whole, totalled around EUR 4.5 billion (Chart 4.2.2).[3] It should be noted that

Chart 4.2.1

CAPITAL ADEQUACY RATIO



Source: Banco de Portugal.
Note: The break in the series in 2004 corresponds to the implementation of the International Accounting Standards, which also implied a redefinition of the group of banking institutions analysed. In turn, the break in the series in 2007 corresponds to the increase in the number of institutions under analysis. Starting 2008, the capital adequacy ratio was determined according to the Basel II criteria for all institutions under analysis, which basically changed the methodology used for the calculation of capital requirements.

(1) The set of financial institutions analysed in this section differs from the preceding section, as the branches of financial groups headquartered in European Union member countries are excluded.

(2) As already referred to in "Section 4.1 *Activity and Profitability*", the market shares (valued in terms of assets) of the BPN and BPP banks were 1.8 and 0.5 per cent, respectively at the end of 2007. In April 2010, BPP bank went into liquidation, and from this date was excluded from the universe of banking institutions under analysis.

(3) The accumulated value of capital increases made by institutions since the outbreak of the crisis in summer 2007 was around EUR 7 billion. For a description of the monetary policy and government support measures to the financial system see "Box 2.1 Measures taken by the Portuguese authorities relating to the financial system during the international financial crisis", Banco de Portugal, *Financial Stability Report* 2008. It should be noted that government's recapitalisation plan for credit institutions headquartered in Portugal was extended up to the end of 2010.

Table 4.2.1

CAPITAL ADEQUACY
On a consolidated basis

EUR million

	2008		2009	
	Jun.	**Dec.**	**Jun.**	**Dec.**
1. Own funds				
1.1. Total original own funds for solvency purposes	22 436	21 044	23 904	25 566
1.1.1. Original own funds (gross)	23 310	21 983	25 233	26 991
1.1.2. Deductions to the original own funds	874	939	1 329	1 425
1.2. Total additional own funds for solvency purposes	9 799	10 045	9 646	9 052
1.2.1. Additional own funds (gross)	10 649	10 949	10 861	10 353
1.2.2. Deductions to the additional own funds	850	904	1 215	1 301
1.3. Deductions to the total own funds	1 020	1 279	1 284	387
1.4. Total supplementary own funds eligible to cover the market risk	0	0	34	0
Total own funds	**31 215**	**29 810**	**32 300**	**34 232**
2. Capital requirements				
2.1. Capital requirements for credit risk, counterparty credit risk and free deliveries	22 492	23 001	22 898	23 584
2.2. Settlement risk	0	0	1	0
2.3. Capital requirements for position, foreign exchange and commodities risks	838	648	711	759
2.4. Capital requirements for operational risk	1 783	1 820	1 732	1 795
2.5. Capital requirements - fixed overheads	5	5	5	5
2.6. Large exposures - trading book	2	0	0	0
2.7. Other and transitional capital requirements	0	0	0	0
Total capital requirements	**25 121**	**25 474**	**25 346**	**26 142**
3. Ratios (per cent)				
3.1. Own funds/Total requirements	124.3	117.0	127.4	130.9
3.2. Own funds/(Total requirements x 12.5)	9.9	9.4	10.2	10.5
3.3. Original own funds/(Total requirements x 12.5)	7.1	6.6	7.5	7.8
Memo:				
Capital ratios excluding BPN and BPP				
Own funds/Total requirements	-	129.4	141.4	145.2
Own funds/(Total requirements x 12.5)	-	10.4	11.3	11.6
Original own funds/(Total requirements x 12.5)	-	7.5	8.6	8.9

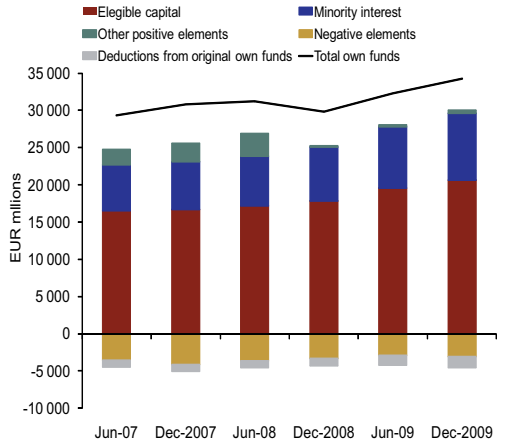
Source: Banco de Portugal.

to-date no private institution has made use of the recapitalisation plan for credit institutions based in Portugal. The more favourable developments observed in the financial markets since March 2009, particularly in stock markets, also made a positive contribution to the change in own funds. On the one hand, this evolution enabled some recovery of the value of equity securities classified in the available for sale financial assets portfolio, in addition to an increase in income related with financial operations. It should be remembered that the major turmoil recorded in financial markets in 2008 was the cause of significant decreases in the value of financial instruments assessed at market prices.[4] In this context, reference should be made to the fact that under the terms of Banco de Portugal Notice no.6/2008, issued in the fourth quarter 2008, the changes in the value of debt instruments (provided that they do not imply the recognition of impairment) have a neutral effect on the assessment of institutions' own funds. On the other hand, the evolution of stock markets was reflected in increases in the value of bank employees' pension funds, contributing to some reversal of accumulated actuarial

(4) The changes in the value of instruments classified in the financial assets at fair value through profit or loss affected own funds via the income for the year. The changes in value of instruments in the available for sale financial assets portfolio, in turn, directly affected own funds, with the registration method being differentiated between the instruments recording the losses and those recording potential gains. In particular, 45 per cent of the latent gains are recognized as a positive element of additional own funds, whereas potential losses are totally recognised as a negative element in original own funds.

Chart 4.2.2

BREAKDOWN OF ORIGINAL OWN FUNDS - TIER I



Source: Banco de Portugal.

losses.[5] The application of Banco de Portugal's Notice no.11/2008 was also an important factor, as it allowed actuarial losses recorded in 2008, less the expected yield from pension fund assets in the same year, to be gradually recognised in own funds up to 2012.[6]

The international financial and economic crisis continued to condition the evolution of capital requirements in 2009

Notwithstanding the contribution of the extraordinary measures taken by monetary authorities and governments, on an international level, to the decrease of tensions in financial markets and to the mitigation of their impact on activity economic, the interaction between the unprecedented crisis in international financial markets and economic activity continued to condition the evolution of capital requirements in 2009. An analysis of capital requirements for credit risk, counterparty credit risk and free-deliveries, which represent around 90 per cent of total requirements, shows that the change was globally in line with the evolution of bank lending.[7] However, according to available information, the change in the calculation methods of several of the capital requirements components by some banks, in terms of their risk assessment internal methods approved by Banco de Portugal, shall have contributed to a certain decrease in risk weighted assets.[8]

Several institutions operating under the prudential supervision Banco de Portugal's adopted more complex capital requirements assessment methodologies in 2009, than those used in the preceding year – in line with the New Capital Accord, Basel II. Reference should be made to the application of the internal ratings based approach for the calculations of several components of credit and coun-

(5) For further details on the value of the pension fund's portfolio see "Section 4.3 *Market Risk*", of this Report.

(6) In accordance with the mentioned Notice, institutions were allowed to extend the limit established for the corridor determining the amount of the actuarial deviations to be deducted from own funds (10 per cent of pension fund liabilities or the value of the funds, whichever the higher) for a period of 4 years, between 2009 and 2012, which extension is progressively decreased.

(7) For further details on the evolution of loans and advances to customers see "Section 4.1 *Activity and Profitability*", of this Report.

(8) With the New Capital Accord, the capital requirements calculation methodology was significantly revised, in an endeavour to improve the adequacy of the requirements *vis-à-vis* the effective risk profile of institutions' assets, in addition to better risk cover, translating, for example, into the introduction of requirements relating to operational risk. Basel II accordingly established the possibility of institutions' adapting different methods to assess the requirements, including the application of internal valuation models, developed by the institutions themselves, although subject to the approval of the respective national supervisors.

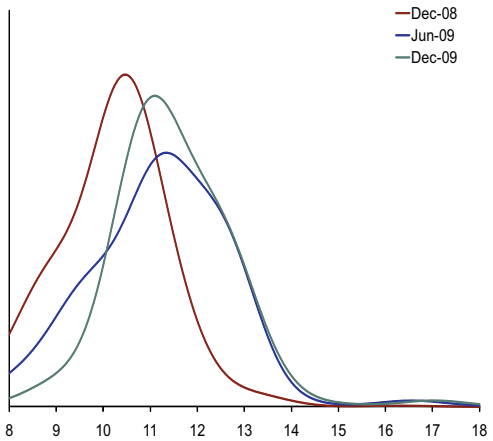
terparty risk requirements.[9] Although less relevant in terms of total capital requirements, reference should also be made to the application of standardised and advanced measurement approaches to determine the requirements for operational risk and the adoption of the internal model method for the calculation of several market risk components.

Improvement of capital ratios in 2009

In December 2009 and in comparison with the end of the preceding year, there was an across-the-board improvement in the capital ratio among banking institutions, as illustrated by the empirical distribution of own funds adequacy ratio right shift (Chart 4.2.3). The reinforcement of the capital position was particularly visible in the original own funds adequacy ratio which was concentrated in the 8 to 9.5 per cent bracket at the end of 2009 (Chart 4.2.4). In fact, a vast majority of institutions implemented initiatives designed to achieve a Tier I ratio of at least 8 per cent, starting September 2009, in accordance with the recommendation issued by Banco de Portugal in November 2008. In international terms, a comparison with a panel of European banking institutions shows that Portuguese banks continued to post comparatively low ratios for total own funds and for Tier I in 2009 (Chart 4.2.5 and Chart 4.2.6). However, reference should be made to the fact that an international comparison of solvency ratios is conditioned by the prudential regulatory differences between countries and by the characteristics of the several banking systems, such as return on assets or the relative proportion of bigger banks in the system as a whole, which influence the constituting of own funds above the minimum requirements. In addition, some European banks among those being analysed shall determine their capital requirements through internal approaches which may have a potential upside impact on the capital ratio. Finally, it should be noted that, despite the fact that the international crisis significantly conditioned domestic banks' activity, no reduction in the domestic banking system' ag-

Chart 4.2.3

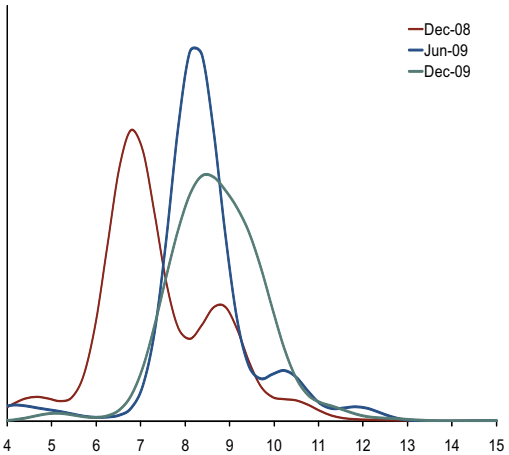
CAPITAL ADEQUACY RATIO
Own funds / (Total requirements * 12.5)
Empirical distribution



Source: Banco de Portugal.
Note: Empirical distribution using a Gaussian kernel that weights institutions by total assets. The ratio was calculated by applying the criteria defined in Basel II by all institutions under analysis. Given the financial situation of the BPN and BPP banks, these institutions were not included in the distributions

Chart 4.2.4

ADEQUACY RATIO OF ORIGINAL FUNDS - TIER I
Own funds / (Total requirements * 12.5)
Empirical distribution

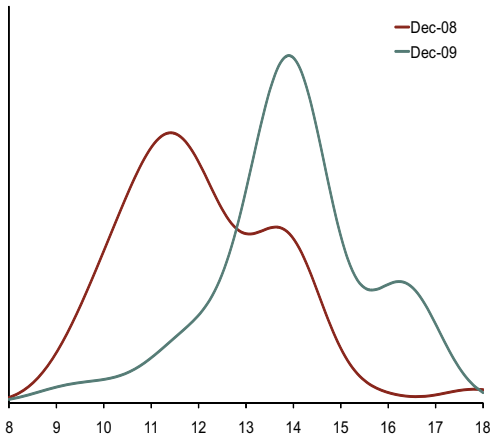


Source: Banco de Portugal.
Note: Empirical distribution using a Gaussian kernel that weights institutions by total assets. The ratio was calculated by applying the criteria defined in Basel II by all institutions under analysis. Given the financial situation of the BPN and BPP banks, these institutions were not included in the distributions.

(9) The main characteristics of the methods used to determine the capital requirements provided for in the New Capital Accord are set out in "Chapter 7 *Regulatory Framework*", Banco de Portugal, *Financial Stability Report* 2004. The application of the more sophisticated methods by the institutions requires the approval of the supervisory authorities.

Chart 4.2.5

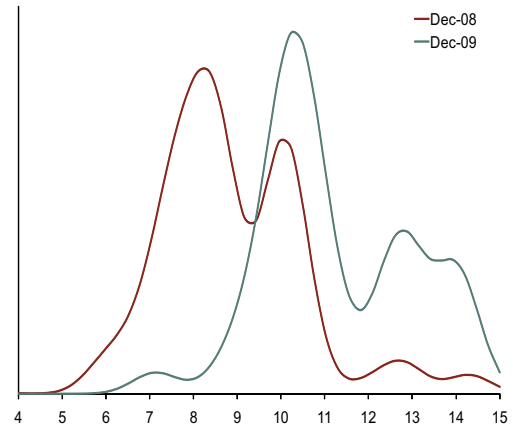
CAPITAL ADEQUACY RATIO FOR A PANEL OF EUROPEAN BANKS
Empirical distribution



Source: Bureau Van Dijk (Bankscope).
Note: Empirical distribution using a Gaussian kernel that weights institutions by total assets. Based on a range of 47 banking institutions from 14 European Union countries, whose accounts for the 2009 fiscal year were available at the above mentioned source at the cut-off date of data for this report.

Chart 4.2.6

ADEQUACY RATIO OF ORIGINAL FUNDS - TIER I - FOR A PANEL OF EUROPEAN BANKS
Empirical distribution

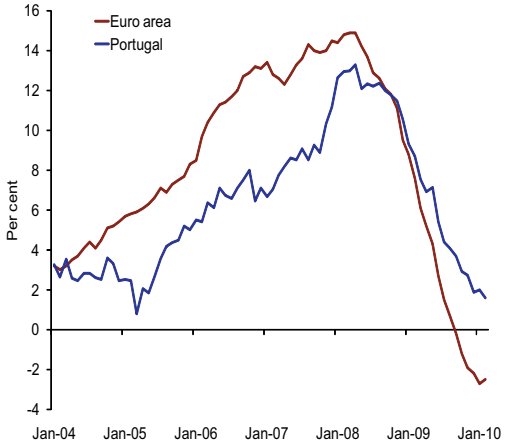


Source: Bureau Van Dijk (Bankscope).
Note: Empirical distribution using a Gaussian kernel that weights institutions by total assets. Based on a range of 47 banking institutions from 14 European Union countries, whose accounts for the 2009 fiscal year were available at the above mentioned source at the cut-off date of data for this report.

gregate balance sheet was noted in 2009, as opposed to what was observed in the euro area. This situation might also have conditioned the evolution of Portuguese banks' capital ratios, as compared to the European banks under analysis, to the extent that the reduction in assets corresponds to lower capital requirements. The need to undertake deleveraging processes felt by several European banks was particularly evident in the nominal reduction of loans granted to non-financial corporations, which account for a comparatively higher proportion than other assets categories in determining own funds requirements. This evolution contrasts to the positive growth, albeit at historically low levels, of loans

Chart 4.2.7

BANK LOANS TO NON-FINANCIAL CORPORATIONS
Rates of change



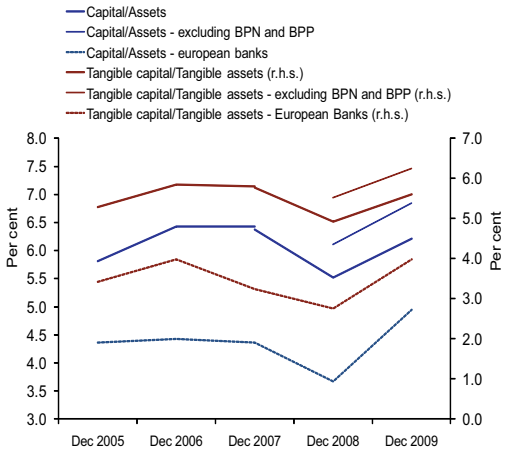
Sources: ECB and Banco de Portugal.

to non-financial corporations in Portugal, in the same period (Chart 4.2.7).[10] On the other hand, the European banks tend to be more sensitive to the evolution of capital markets.

To the extent that the evolution of own funds was highly related with institutions' capital increases, there was also an increase in the ratio between capital and total assets in the balance sheet in 2009, in comparison to 2008 levels, even with the exclusion of intangible components (i.e. namely positive consolidation differences – Goodwill). Note that the evolution of Portuguese banks ratio between capital and total assets in the balance sheet was globally in line with that observed for the European banks under consideration, although at a higher level (Chart 4.2.8).

Chart 4.2.8

CAPITAL TO ASSETS RATIO



Source: *Bureau Van Dijk* (Bankscope) and Banco de Portugal.
Note: The break in the series in 2007 corresponds to an increase in the number of institutions under analysis. The ratios of European banks correspond to a weighted average of data based on a range of 65 institutions from 14 European Union countries, whose accounts for 2009 fiscal year were available at the above mentioned source at the cut-off date of data for this report.

The considerable increase in sovereign risk premium and associated tensions in international financial markets may condition the additional reinforcement of the Portuguese banking system's capital in 2010

In 2009 the reinforcement of capital ratios enabled the Portuguese banking system to withstand unexpected adverse shocks, without entailing significant constraints on the development of its activity. However, the globally positive evolution of financial markets in 2009 was arrested at the end of the year. The increase observed in risk aversion reflected, in part, the prevailing uncertainty over prospects for economic activity and the reversal of support measures for the financial system and the economy. It should be remembered that these measures were an essential factor in the normalisation of financial markets in 2009. The most determining factor in the reappearance of volatility in financial markets was associated with investors' heightened perceptions of sovereign risk in several countries in the euro area, including Portugal. Tensions in public debt markets started to appear at the end of 2009 and, in 2010, spread to other financial market segments, particularly to banks. These tensions reflected uncertainty over the sustainability of public finances in several countries. Notwithstanding higher volatility in the financial markets in this period, in March 2010 and in accordance

(10) For further details on the evolution of loans and advance to customers, see "Section 4.5 *Credit Risk*", of this Report.

with information available for the six biggest banking groups in the Portuguese banking system, own funds adequacy ratios remained globally in line with those noted at the end of the preceding year. In year-on-year terms, capital ratios were significantly higher, particularly reflecting the capital increases made by institutions during the course of 2009.[11] Starting mid April there was an increase in tension in public debt markets, with the persistence of significant sovereign risk premium differentiation between countries in the euro area. In such an environment, the growth of the Portuguese economy will be negatively conditioned, over the short term, by the necessary budget consolidation process and, in more general terms, by economic adjustments. These facts will condition the banking system's activity and profitability and, consequently institutions' solvency.[12] Over the medium term, requirements for the reinforcement of the quality of banks' own funds, prospected in the proposal for the change of the Capital Adequacy Directive, will comprise an additional challenge for the banks' activity.[13]

(11) The main developments in the first quarter of 2010 are presented in "Box 4.1 - *Financial situation of the main banking groups in the Portuguese banking system, in the first quarter of 2010*", of this Report.

(12) See "Chapter 2. *Macroeconomic and Financial Risks*", of this Report.

(13) For more detail see "Box 2.1 Recent developments in international financial regulation and architecture", of this Report.

4.3. Market risk

The progressive decrease in the level of investors' risk aversion during the course of 2009 was an element behind the recovery of international financial markets, which represented a positive development for the financial situation of the Portuguese banking system. In addition to easier access to wholesale financing markets, these developments had a favourable effect on the market value of institutions' assets and, accordingly, on profitability and capital. The banks' securities and financial investments portfolio posted expressive growth, not only related with the (net) acquisition of securities, but also with positive changes in the value of their components. In turn, the recovery of income associated with financial operations largely reflected positive changes in market value and gains on the disposal of several instruments. There was also an increase in the bank employees' pension funds portfolio and the recognition of actuarial gains. However, in 2010, the path of the international financial markets has been globally unfavourable, reflecting investors' growing concerns over sovereign credit risk. The evolution of these markets, in the near future, will be relevant to the Portuguese banking system, given their impact on institutions' profitability and solvency, in a context in which economic activity in Portugal is expected to be contained.

Significant growth of the securities and financial investments portfolio, in line with developments in the financial markets and deriving from the acquisition of debt securities

The Portuguese banking system's securities and financial investments portfolio posted highly expressive growth of around 57 per cent in 2009, in comparison to the preceding year's reduction (Chart 4.3.1).[1] Therefore, the portfolio's relevance to total banking system assets rose to approximately 12 per cent, and comprised the main element underlying the expansion of assets. The increase in the portfolio not only derived from the (net) acquisition of high volumes of debt securities but also reflected positive value changes in several financial instruments, deriving from progressive improvements in international financial markets. Since March 2009, reflecting the adoption of additional policy measures to mitigate the crisis by governments and central banks, and higher than expected corporate profits, stock prices increased, risk premia demanded in debt markets narrowed, and implicit volatilities decreased.

In 2009, there was a significant growth in the available for sale financial assets component which was, to a large extent, related with the (net) acquisition of debt securities, particularly in the second half of the year (Chart 4.3.2). This behaviour was common to several of the main banking groups, albeit differentiated. Most of the securities acquired were sovereign debt securities, including Portuguese public debt. To a lesser extent, they comprised acquisitions of non-subordinated debt securities and securities related with securitisation operations. The path of available for sale financial assets also reflected improvements in the international financial markets, enabling a part of the latent capital losses made in 2008 to be reversed. This effect particularly benefited equity securities classified in these assets categories, as several equity investments were disposed of in 2009. In turn, the increase in investments held to maturity was also related with the acquisition of securities and the recognition in this component of several instruments previously classified in other asset components.[2]

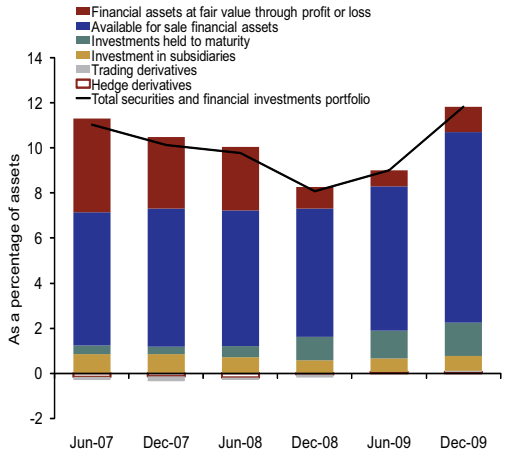
(1) The securities and financial investments portfolio includes financial assets at fair value through profit or loss including trading derivatives (net of financial liabilities held for trading), available for sale financial assets, investments held to maturity, investments in subsidiaries and the net value of hedge derivatives.

(2) It was possible to reclassify securities starting from the second half of 2008, following the changes introduced by the International Accounting Standard Board (IASB), in a context of major turmoil in financial markets. Accordingly, institutions, in highly unusual circumstances, were able to reclassify several securities recognised at fair value in other portfolios. The principal characteristics of the new regulations were presented in "Section 4.4 *Market risk*", Banco de Portugal, *Financial Stability Report* 2008.

Chart 4.3.1

SECURITIES AND FINANCIAL INVESTMENTS PORTFOLIO

In accordance with the IAS classification

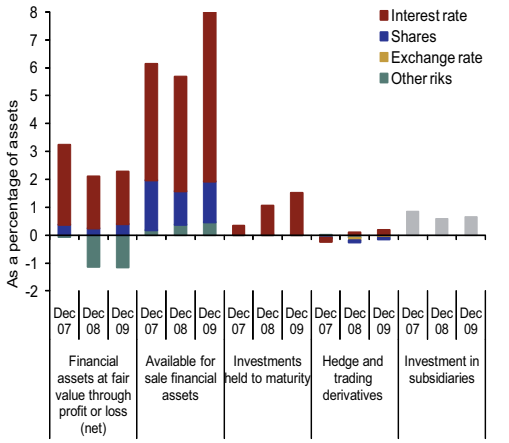


Source: Banco de Portugal.

Chart 4.3.2

BREAKDOEWN OF SECURITIES AND FINANCIAL INVESTMENTS PORTFOLIO

In accordance with the IAS classification and source of risk



Source: Banco de Portugal.

As a consequence of these developments, there was an increase in the proportion of debt securities to the total financial investments portfolio, which currently comprises 10 per cent of assets in December 2009. Given the increased relevance of sovereign debt securities, mainly issued at fixed rates, such developments represent a greater exposure of the Portuguese banking system to interest rate risk (Chart 4.3.3). However, reference should be made to the fact that several institutions took measures designed to cover this risk, by taking out hedge positions. In the case of interest rate risk, it should also be pointed out that, if, on the one hand, the increase in the interest rate implies a decrease in the value of the debt securities, on the other, it has positive effects on net interest income. Accordingly, the total impact on institutions' financial situations is not easy to measure and is highly dependent on the assets structure and business segment of each institution.

Also as regards the securities portfolio, the significant increase in sovereign debt securities also enabled institutions to take advantage of the higher slope of the yield curve recorded in 2009, with its positive impact on net interest income, as referred to in the banking system's profitability analysis.[3] Given the decrease in the cost of market financing, with interest rates in the money market falling to minimum levels, and given the possibility of ECB financing of operations at fixed rates and with a maturity up to one year, institutions took advantage of these financing conditions to acquire debt securities.

The improvement of international financial markets fuelled the recovery of results associated with the securities and financial investments portfolio and was favourably reflected in institutions' capital

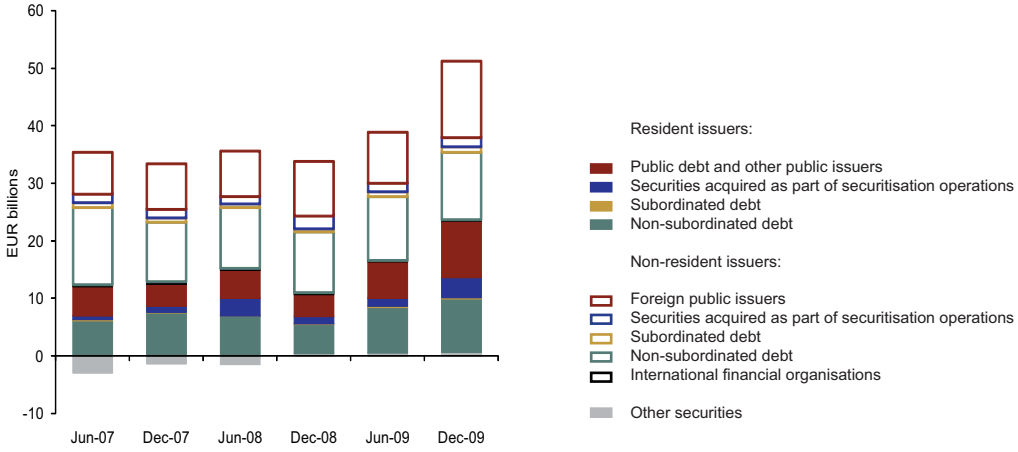
There was a considerable increase in income from the securities and financial investments portfolio in 2009, reflecting the high growth of income from financial operations and significant reduction of the respective impairment losses (Chart 4.3.4).[4] It should be remembered that, in 2008, deriving from

(3) See analysis of net interest income in "Section 4.1 *Activity and profitability*", of this Report.

(4) Income from financial operations comprises the sum of income from financial assets and financial liabilities at fair value through profit or loss, income from available for sale financial assets, income from foreign exchange revaluations and income from the sale of other financial assets.

Chart 4.3.3

BREAKDOWN OF DEBT SECURITIES PORTFOLIO



Source: Banco de Portugal.

the turmoil in the international financial markets observed at the time, the joint income from these components was a crucial factor in the reduction of returns recorded in the referred to year.

The increase in income from financial operations mainly derived from the recovery of income associated with financial assets at fair value through profit or loss, in line with developments in international financial markets. The favourable evolution of markets, particularly higher prices in stock markets, was reflected in positive changes in the value of these assets.[5] In turn, the historically low levels of interest rates also benefited income from financial operations through the financial derivatives component, namely derivatives on interest rates. At the same time, income received on the sale of financial investments and several bonds, mostly classified in the available for sale financial assets and investments in subsidiary categories, was also a positive factor in the recovery of results.

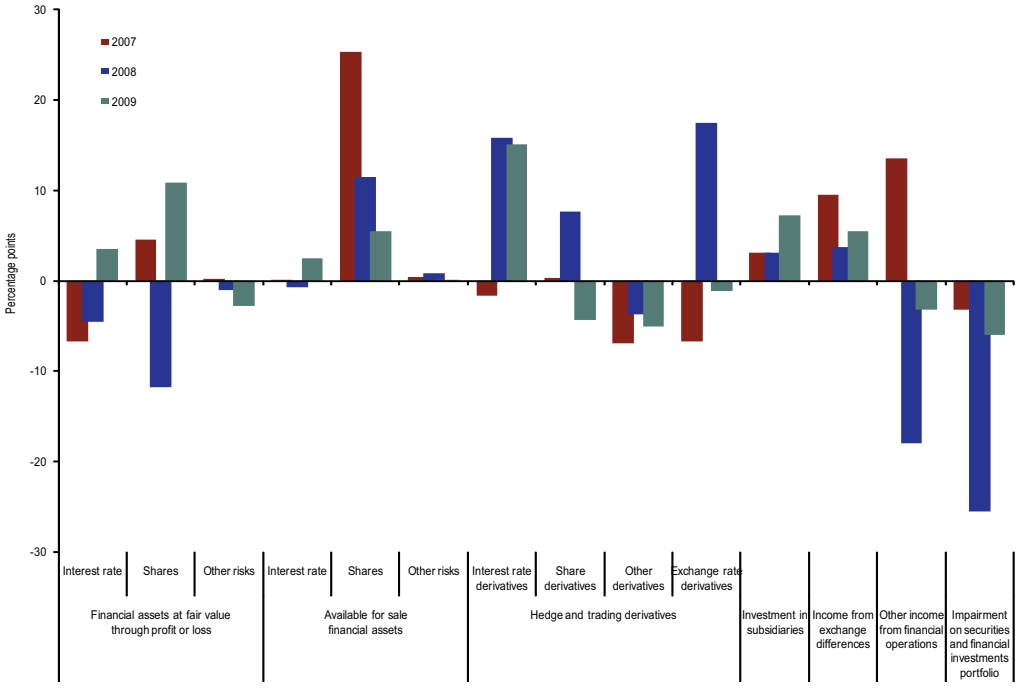
In turn, the significant reduction in the recognition of impairment losses associated with the securities and financial investments portfolio was also related with the more favourable developments in financial markets. The changes in market value, particularly in available for sale financial assets, enabled a reversal of some losses recognised in the value of these assets, with impairment recognition ceasing to exist. The reduction in impairment also derived from balance sheet adjustments made by several institutions in 2008. On the one hand, several securities which recorded significant depreciation in their market value were sold. Reference should, herein, be made to the disposal of some cross-holdings, given the marked downturn in prices in the financial sector in 2008, comprised a highly significant part of the impairment recorded in the year. On the other hand, several institutions recognised unrealised losses on some securities classified in the available for sale financial assets portfolio in their balance sheet, thus limiting the impact of unfavourable changes in the market value of these securities in results.

Also, in terms of income directly related with operations in financial markets, net commissions associated with financial operations were down, once again, in 2009, notwithstanding the favourable market developments. This reduction essentially derived from the evolution of commissions related

(5) The changes of financial assets at fair value through profit or loss and available for sale financial assets portfolios, both recorded at their market value, are posted differently in the institutions' financial statements. Whereas change in the first type of assets always has a counterpart in results, available for sale financial assets only affect institutions' results when they are sold or when their change in value implies impairment. If the change in value does not imply this recognition, these assets' latent capital gains or losses are recognised in the reserves account, which is a component of institutions' equity.

Chart 4.3.4

CONTRIBUTION OF INCOME FROM FINANCIAL OPERATIONS AND RESPECTIVE IMPAIRMENT TO RETURN ON ASSETS
In accordance with the IAS classification and source of risk



Source: Banco de Portugal.

with asset management, in which investment funds are included, and commissions earned on stock market securities operations.

Lastly, it should also be pointed out that the evolution of the securities and financial investments portfolio also had a favourable effect on the change in capital in the banking system. In particular, the positive change in the value of the available for sale financial assets portfolio allowed the significant losses recorded in 2008 to be partly reversed in the reserves component, as an element of institutions' shareholders' equity. The same type of effect occurred in own funds, although to a lesser extent, given the application of prudential regulation.[6] Whereas unrealised capital losses on equity shares are fully registered as a negative element in own funds, only 45 per cent of the latent capital gains are recorded. In turn, the changes in the value of debt securities (provided that they do not imply impairment losses) do not have an impact on the assessment of institutions' own funds.

Positive evolution of pension funds, reflecting their high sensitivity to the situation in financial markets

In 2009, the bank employees' pension funds posted grow of around 8 per cent, reflecting improvements in the international financial markets (Table 4.3.1). After the negative net income recorded in 2008, partially offset by contributions paid into the fund by the institutions, the progressive recovery of financial markets during the course of 2009 translated into highly positive returns (above the actuarial estimates), enabling the institutions' direct contributions to be substantially reduced (to around 25 per cent of contributions in 2008). There was, in turn, a slight decrease in fund liabilities, benefiting from

(6) See "Section 4.2 *Own funds adequacy*", of this Report.

the actuarial gains deriving from changes in several actuarial assumptions. It should be noted that these gains occurred notwithstanding the reduction of the actuarial discount rate applied by several institutions. Reflecting the increase in value of the funds portfolio and the slight decrease in their liabilities, there was a significant increase in bank employees' pension funds coverage in 2009.

The favourable developments of pension funds, on the one hand, contributed to a decrease in accumulated actuarial losses, which had increased substantially in 2008, and, on the other, implied an increase in the regulatory "corridor" used to determine the amounts to be recorded as costs and to be deducted from institutions' own funds.[7] This fact was particularly relevant for institutions which, prior to the financial crisis, had accumulated negative actuarial deviations of more than the regulatory "corridor" as, in 2009, the actuarial losses relating to 2008 (net of expected yields on pension funds for the said year) ceased to have a neutral effect in prudential terms, as defined in Banco de Portugal's Official Notice no.11/2008.[8] Therefore, the evolution of pension funds contributed towards a situation in which the said institutions' deductions from own funds were not so high.

Developments in 2009 showed that the bank employees' pension funds portfolio remains highly exposed to fluctuations in the financial markets, although the decrease of the share component by several institutions, in the context of the financial crisis. It should be remembered that the pension fund portfolio's sensitivity to price fluctuations in stock markets had been identified as one of main vulnerabilities of the Portuguese banking system, under the scope of stress test exercises performed

Table 4.3.1

PENSION FUNDS - BANKING SYSTEM
EUR millions

	2007	2008	2009
Annual increase in liabilities	**489**	**693**	**(191)**
of which:			
Actuarial losses (gains)	242	413	(515)
of which:			
Actuarial losses (gains) on differences between assumptions and realised values	190	1 334	(103)
Actuarial losses (gains) on changes in assumptions and, when applicable, plans' conditions	52	(921)	(412)
Liabilities			
Total liabilities	14 183	14 004	13 877
Minimum liabilities level to be covered	13 451	13 360	13 302
Pension fund			
Value of pension fund at the beginning of the year	**13 553**	**14 544**	**13 160**
Net income of fund	1 063	(2 346)	185
Contribution made to fund	393	1 806	452
Contributions paid by beneficiaries	49	53	52
Retirement pensions paid by fund	596	618	633
Survivors' pensions paid by fund	31	34	36
Changes in the value of fund owing to cuts or redemptions	(2)	(39)	-
Other net changes	3	(41)	60
Value of pension fund at the end of the year	**14 431**	**13 325**	**14 239**
Coverage of fund: Value of pension fund at the end of year (including other forms of coverage) - Minimum liabilities level to be covered	**1 391**	**362**	**1 318**

Source: Banco de Portugal.

(7) The regulatory "corridor" comprises 10 per cent of the value of the pension funds' liabilities or the value of the fund portfolio, whichever the higher. In accounting terms, the amount of the actuarial losses exceeding the corridor is amortised (over a long period) in operating income. In prudential terms, the full amount of the excess comprises a negative own funds element.

(8) Given the exceptional characteristics recorded in financial markets in 2008, Banco de Portugal, via the referred to Official Notice, has permitted the actuarial losses calculated in 2008, less income expected from pension fund assets in the year, to be recognised on a staged basis over a 4 year period. This measure comprised a widening of the prudential "corridor" for a transitory period, but will be progressively decreased up to 2012.

prior to the financial crisis, as discussed in past issues of Financial Stability Reports. More recent exercises continue to identify pension funds as one of the Portuguese banking system's main sources of vulnerability, in a context of unfavourable evolutions in financial markets, given the negative impact on institutions' regulatory capital.

The unfavourable evolution of international financial markets in 2010 constitutes a relevant risk for the Portuguese banking system

Notwithstanding the globally favourable developments noted in the international financial markets in 2009, growing concerns over sovereign credit risk originated an increase in investors' risk aversion since the end of the year. This situation has had a negative effect on the risk premium required for such countries and the functioning of financial markets other than sovereign debt markets, notably greater difficulties in access to the wholesale debt markets by such countries' financial institutions and lower prices in stock markets. The measures announced on a European level contributed to contain the escalation of tensions in the financial markets. However, uncertainty over the evolution of the international financial markets remains high.

In such a context, international investors' assessment of Portugal will be important for the evolution of the Portuguese banking system's financial situation. Less favourable developments in the financial markets have an adverse effect on the market value of the financial assets portfolio and consequently affect institutions' income and capital. Such developments will also tend to have a negative impact on institutions' regulatory capital, mainly via the changes in bank employees' pension funds. As already mentioned, the pension fund portfolio is highly sensitive to fluctuations in the financial markets, in a context in which diverse institutions already use the full amount permitted to accommodate actuarial deviations without an impact in own funds. Accordingly, the less favourable developments of markets may generate additional pressures on several institutions' regulatory capital. Finally, it should also be noted that tensions in the financial markets affect the financing conditions of institutions in such markets, both in terms of cost and quantity, and could limit the expansion of institutions' activity and profitability.

4.4. Liquidity risk

The Portuguese banking system recorded an improvement in its liquidity position in 2009. This development reflected not only a more favourable international wholesale debt market context, benefiting from the authorities' actions on an international and domestic level, but also reinforcements of institutions' capital and the qualitatively different expansion of activity from that observed in preceding years, not so based on an expansion of loans and advances to customers.[1] However, since the end of the year and particularly so starting in the second quarter of 2010, there was a marked deterioration in the external financing conditions of Portuguese banks, as a result of the sharp increase in sovereign risk in several countries.[2]

The normalisation of sovereign debt markets is fundamental to the stabilisation of conditions in international wholesale debt markets. In such an environment, reference should be made to the fundamental importance of ensuring the sustainability of the public finances. The transition to more stringent prudential standards, under the new Community Directive on liquidity requirements is also an important conditioning element in terms of banks' liquidity management over the medium term, the implementation of which shall be contingent on the normalisation of the situation in the international financial markets, and on the adequate calibration of requirements and transition periods.

Improved access conditions to international wholesale financing markets in 2009, both on a level of prices and in other aspects of access to finance.

During the course of 2009, Portuguese banks' financing conditions in the international wholesale debt markets took a gradual turn for the better, particularly in comparison to those in force in the last quarter of 2008. This improvement was, to a large extent, associated with the actions taken by diverse authorities on an international and domestic level, aimed at ensuring the regular financing of the economy, promoting conditions required to allow the banks to obtain the financing to enable them to ensure the necessary liquidity and solvency.

On a euro area level, the support measures firstly translated into a reduction of official interest rates (Chart 4.4.1). In articulation with other financial system support measures, this reduction helped to normalise several markets in which the banks obtain financing, during the course of 2009, with favourable effects on risk premiums. Interest rates on the money market were, therefore, significantly reduced. At the end of 2009, the three months Euribor rate was, at 0.7 per cent, down 2.6 pp over the end of 2008 level. On the other hand, yields on ten year Portuguese Treasury bonds were down 0.1 p.p. in 2009, to 3.91 per cent. This benefited the downward evolution of the yields on Portuguese banks' bonds which, in the same period and reflecting a gradual compression of risk premiums on financial institutions, were even more sharply down.[3]

Additionally, the Council of the ECB has been making significant changes to its monetary policy operating framework since the summer of 2007, to guarantee across-the-board access to liquidi-

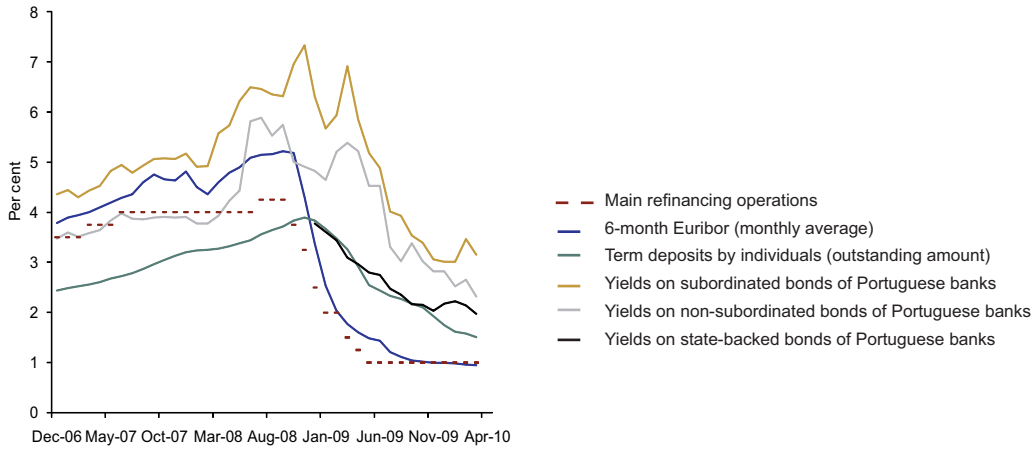
(1) As described in "Section 4.1 *Activity and Profitability*", of this Report, the expansion of activity was essentially sustained by the increase in the financial instruments portfolio, partly resulting from positive value changes, associated with favourable financial market developments, particularly the rise in stock market prices. In turn, there was a significant slowdown in lending and there is certain evidence to the effect that this essentially resulted from lower demand, in addition to restrictions on supply (see Castro, G., Santos, C. (2010) "Interest rates and bank credit determinants", Banco de Portugal, Economic Bulletin - *Spring*.

(2) See "Chapter 2 *Macroeconomic and Financial risks*", of this Report.

(3) In line with this evolution, the evolution of credit default swaps for the main Portuguese banks was also favourable, in 2009.

Chart 4.4.1

COST OF FINANCING FOR PORTUGUESE BANKS



Sources: Bloomberg and Banco de Portugal.
Notes: The series with yields on bonds issued by Portuguese banks refer to a weighted average of bonds from the BCP, BES and CGD banks. The lack of depth in the market has a strongly restrictive effect on bonds with comparable characteristics within each segment and the rates should therefore be considered merely indicative. Bonds issued with a state guarantee are subject to a commission to be paid to the government of 50 basis points, to which a risk premium for the credit default swap of the bank itself (or similar banks, if there are no CDSs for this issuer) if the maturity is longer than one year is added.

ty.[4] These changes involved a progressive extending of the maturity of liquidity injection operations (the maturity had already been extended to up to a year in 2009, for a pre-announced collection of operations), the realisation of foreign currency operations, the widening of assets eligible as guarantees in liquidity injection operations, in addition to eligible counterparts for occasional operations, the adopting of a fixed rate for liquidity injection operations, the full allotment at such a rate and, in 2009, the introduction of a programme for the acquisition of covered bonds. Of this collection of measures, which contributed towards a certain normalisation of conditions in the money market, those more directly relevant for Portuguese banks were the full allotment in the case of liquidity injection operations and the realisation of operations with a maturity of one year. These measures enabled the Portuguese banks to improve their global financing conditions, notably by reducing uncertainty over prices and quantities involved in the ECB's liquidity injection operations. The measures adopted protected Portuguese banks from negative externalities deriving from the existence of institutions with pressing liquidity problems in other banking systems in the euro area. At the same time, the covered bonds acquisition programme which has been gradually implemented, was particularly relevant for the normalisation of market conditions, both in the primary as in secondary markets, in terms of quantities and interest rate spreads. Issues of this instrument by the principal Portuguese banking groups were relatively insignificant in the first half of 2009 (around 5 per cent of total bond issues during the period), being significantly resumed in the second half of 2009 and first quarter of 2010.[5]

Finally, reference should also be made to the role played directly by governments on an international level, involving not only the control of institutions in a more precarious situation (via capital injections) but also the issue of public guarantees on banks' debt issues. In Portugal, banks' direct use of the

(4) For a systemised presentation of the financial system support measures defined on a national and international level, see "Box 2.1 *Measures relating to the financial system taken by the Portuguese authorities in the sphere of the international financial crisis*", Banco de Portugal, *Financial Stability Report* 2008.

(5) In terms of amounts, the issue of covered bonds represented around 50 per cent of Portuguese banks' bond issues in the said periods.

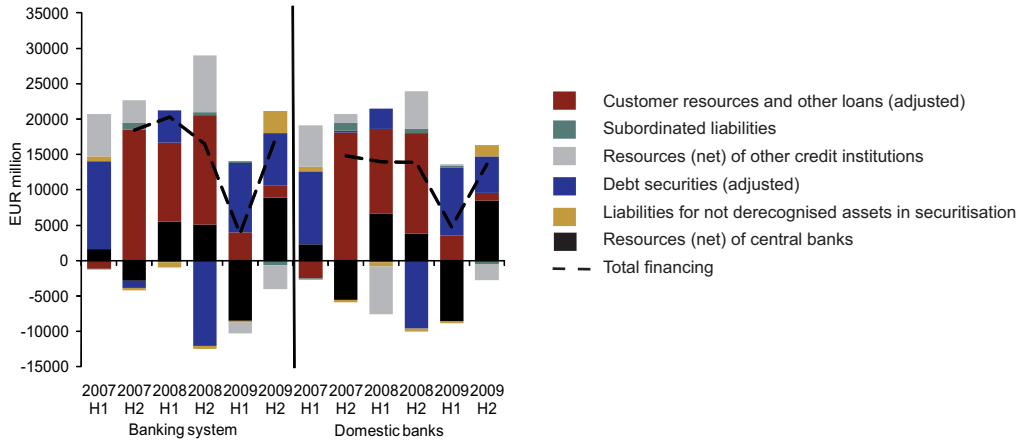
support measures drawn up by the Portuguese government, in line with those defined in international terms, was very limited. On the one hand, no private institution took advantage of the recapitalisation plan for credit institutions headquartered in Portugal. On the other hand, use of the state's guarantees on the issue of securitised debt, denominated in euros, was also contained, both as regards amount, which involved no more than around 25 per cent of the limit of EUR 20 billion provided for the purpose, as in terms of the period for the utilisation thereof, as almost 90 per cent of the amount used comprised guarantees granted up to mid January 2009. Notwithstanding the limited use thereof, the announced measures were relevant for Portuguese banks, to the extent that, in line with international developments, they provided the market with a sign of the government's firm resolution to prevent the onset of a banking crisis, thus avoiding Portuguese institutions from being discriminated against.

Recovery in the issue of securities in the wholesale debt markets and slowdown in customer resources

Given the progressive normalisation of international financial markets, the issue of securities resumed a central role in financing the expansion of activity of the Portuguese banking system in 2009 (Chart 4.4.2). After a decrease in debt securities in 2008, owing to particularly adverse market conditions in the second half of the year, there was significant issuance activity in 2009. There was therefore a fresh increase in the proportion of debt securities to assets, in line with trends on an international level. Unlike events prior to the onset of the financial crisis and more markedly so than in 2008, bond issues were essentially at fixed rates, associated with the reduced level of interest rates, together with a lengthening of average issue maturities (Table 4.4.1 and Chart 4.4.3). It should also be noted that resources taken (net of amortisation) in the form of certificates of deposit and other securities (usually for the shorter maturities, such as commercial paper) totalled an amount comparable to that associated with bond finance in 2009, leading to a recovery of the proportion of such securities in terms of total debt securities from the abnormally reduced values at the end of 2008 (Chart 4.4.4). Additional use of this type of short term instrument tends to translate into added sensitivity to oscilla-

Chart 4.4.2

BANKING SYSTEM FINANCING FLOWS
(Half-year basis)



Source: Banco de Portugal.
Notes: Estimates of securities issued by banks but placed with their customer base are included in the item 'Resources from customers'. There is a series break in mid 2007 which corresponds to an enlargement in the number of institutions analysed.

Table 4.4.1

BONDS ISSUED BY PORTUGUESE BANKING GROUPS
Structure by rate type (percentage of total)

	2004	2005	2006	2007	2008	2009	2010[a]	Postion at end March 2010
Variable-rate	87.8	98.1	82.7	75.9	49.7	31.0	19.1	56.5
Fixed-rate and others	12.2	1.9	17.3	24.1	50.3	69.0	80.9	43.5

Sources: Bloomberg, Dealogic Bondware and Thomson Reuters.
Note: (a) Includes observations to end of March.

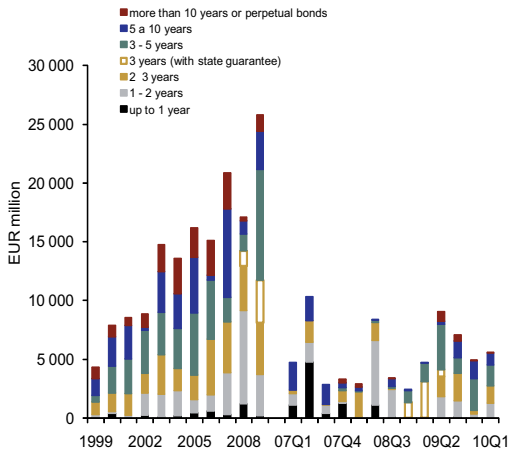
tions in the conditions in financial markets.

Customer resources in the form of deposits continued to be the principal source of financing for banks' assets, representing around 43 per cent of assets on a consolidated basis, at the end of 2009, although slowing significantly during the course of the year (Chart 4.4.5). Customer deposits recorded no more than a marginally positive rate of change at the end of 2009 in comparison to more than 11 per cent in December 2008. Resources taken from customers in the form of debt securities, however, were up 25 per cent.

The recent evolution of customer resources should be analysed in light of the developments of the global financial investments portfolio of private individual customers, which recorded significant movements in terms of portfolio recomposition in 2008 and 2009.[6] Therefore, the marked growth of bank deposits in 2008 benefited, to a large extent, from the channelling of funds originating from the significant net redemptions of investment units in investment funds and savings certificates issued by the state in this sector's portfolio (Chart 4.4.6). In a context of greater risk aversion following the onset of the financial crisis, these redemptions were motivated by a relatively lower interest rate on this type of assets in comparison to interest on bank deposits, in parallel with a risk reassessment.

Chart 4.4.3

GROSS ISSUES OF BONDS BY PORTUGUESE BANKS BY ORIGINAL MATURITY
In Portugal and abroad

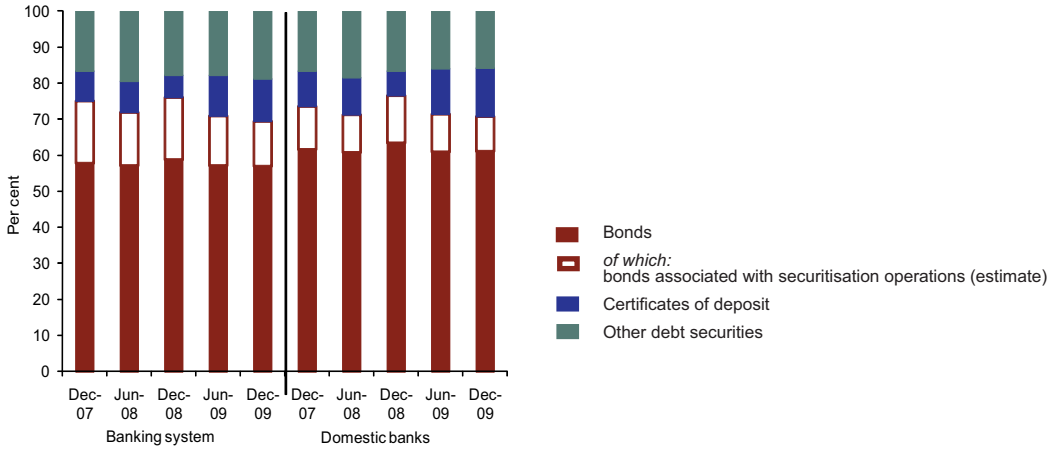


Sources: Bloomberg, Dealogic Bondware and Thomson Reuters.
Note: Includes issues of branches and the subsidiaries of Portuguese banks abroad.

(6) For a more detailed analysis of the factors conditioning the evolution of private individuals' bank deposits see Box 2.1: "The effects of the crisis in international financial markets on the private individuals' financial assets portfolios in Portugal", Banco de Portugal, *Annual Report* 2009.

Chart 4.4.4

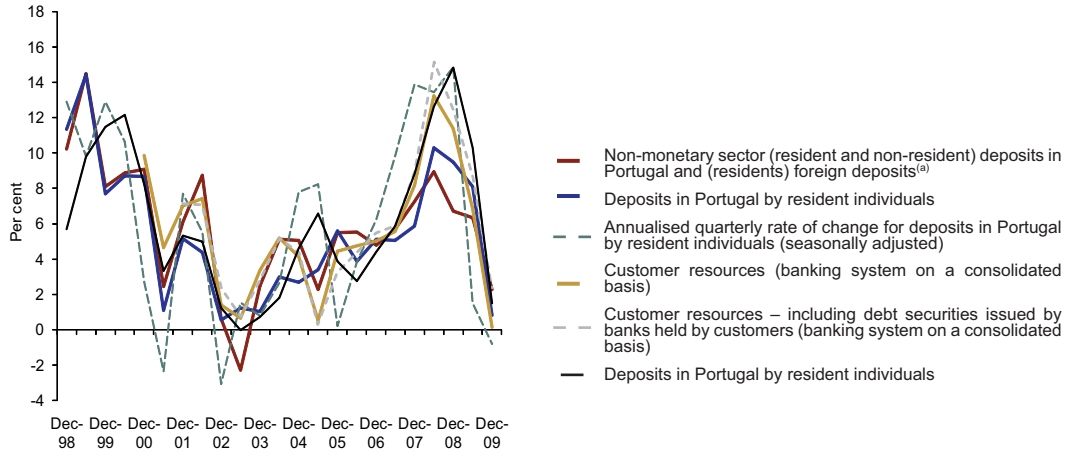
STRUCTURE OF LIABILITIES REPRESENTED BY SECURITIES
On a consolidated basis



Source: Banco de Portugal.

Chart 4.4.5

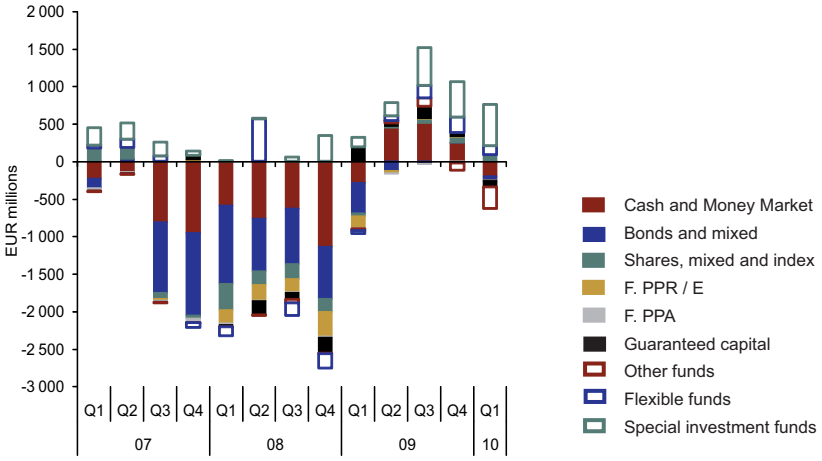
YEAR-ON-YEAR DEPOSIT GROWTH RATES



Source: Banco de Portugal (Monetary and Financial Statistics; International Investment Position; Banking system on a consolidated basis).
Note: (a) Excluding liabilities recorded as a counterpart for non-derecognised securitisation operations, recorded as deposit (and deposit-like instruments) of other financial intermediaries and auxiliaries.

Chart 4.4.6

NET SUBSCRIPTIONS OF MUTUAL AND MONEY MARKET FUNDS



Source: APFIPP.
Note: Excluding groupings of funds and funds of funds, but including investment in other national funds.

This last factor was particularly important in the case of several categories of investment funds, previously assessed by savers as having a similar risk to bank deposits and on which, owing to adverse developments in the financial markets, returns were negative. There was a slowdown in deposits in 2009, in a context of the progressive normalisation of financial markets and gradual reduction of interest rates. There was also, during the course of the year, a certain reduction in risk aversion, with positive net subscriptions to investment units in unit trust investment funds, notably cash and money market funds. It should be noted, however, that the slowdown in total private individual customers' bank deposits coexisted with a significant acceleration in deposits for a maturity of more than 2 years, comprising a favourable development in terms of liquidity, given the greater stability of resources thus obtained from this instrument (Chart 4.4.7). This characteristic is shared with debt securities issued by the banks, a part of which, as already stated, was placed with the customer base. These two facts suggest that the banks have adopted a strategy of stabilising their base of resources taken from customers.

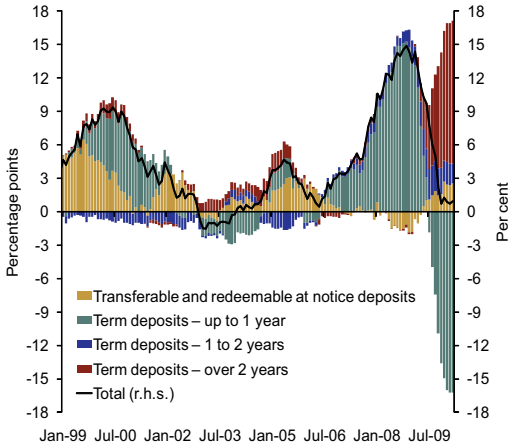
Slight additional improvement in the ratio between credit and customer resources

Notwithstanding the slowdown in customer resources (deposits and securities), the ratios between credit and customer resources were slightly down in December 2009 over the levels recorded at the end of 2008, with a relatively similar occurrence in terms of the domestic institutions aggregate (Charts 4.4.8 and 4.4.9). This is a relatively robust conclusion in terms of the consideration of the different loans and advances to customers and customer resources aggregates. This was a positive development in terms of the liquidity position of the Portuguese banks and was noted in most of the principal domestic banking groups (Chart 4.4.10).

Chart 4.4.7

DEPOSITS BY RESIDENT INDIVIDUALS AND EMIGRANTS IN THE PORTUGUESE BANKING SYSTEM

Year-on-year rate of change and respective contributions



Source: Banco de Portugal.

Chart 4.4.8

RATIO OF CREDIT TO CUSTOMER RESOURCES[(a)]

Banking system

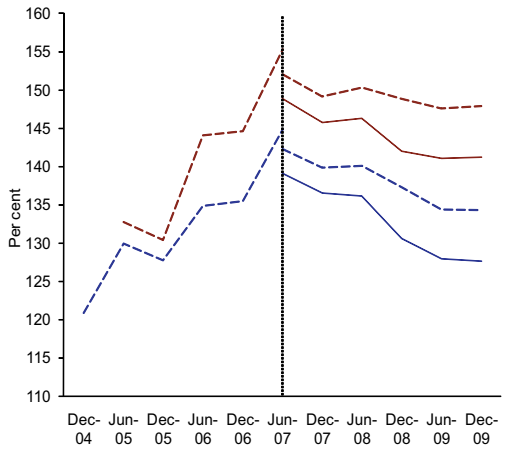
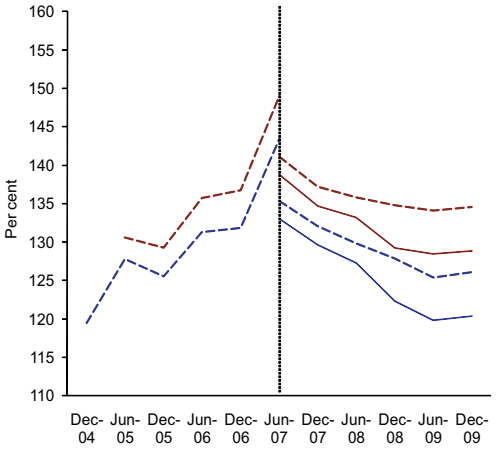


Chart 4.4.9

RATIO OF CREDIT TO CUSTOMER RESOURCES[(a)]

Domestic banks

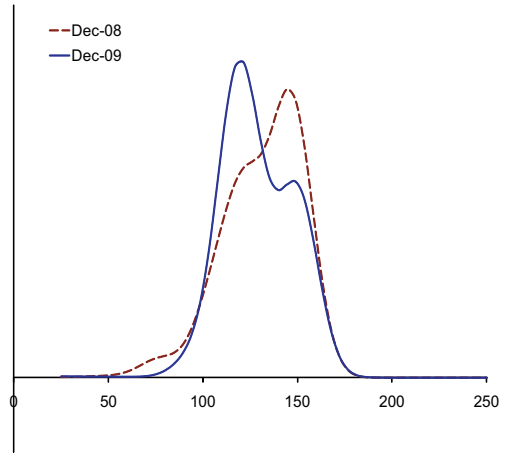


Credit – customer resources ratio
Credit (including securitised and non derecognised credits) – customer resources ratio
Credit excluding securities – customer resources ratio
Credit excluding securities – (including credit but securities securitised and non derecognised) – customer resources ratio

Source: Banco de Portugal.
Notes: (a) The concept of customer resources includes debt securities issued by the banks and placed with their customer base. The break in the series in 2007 comprises an increase in the number of institutions under analysis.

Chart 4.4.10

RATIO OF CREDIT TO CUSTOMER RESOURCES
Domestic institutions



Source: Banco de Portugal.
Note: The concept of customer resources includes debt securities issued by the banks and placed with their customer base. Information obtained under the report set by Instruction no. 13/2009 of Banco de Portugal. Empirical distribution obtained through recourse to non-parametric methods, namely to a Gaussian kernel that weights institutions by their assets.

In an environment of relative stability of resources net of claims and investments obtained from central banks, there was a reduction in net finance obtained from other credit institutions

Together with a slight reduction in the ratio between credit and customer resources and the favourable evolution of international wholesale debt markets, reflected in significant net issues of securities, there was a reduction in the use of finance (net of investments) from other credit institutions (Table 4.4.2). This evolution essentially reflected an increase in claims and investments in other credit institutions abroad by non-domestic institutions. Domestic and non-domestic institutions recorded understandable differences in terms of their relationship with other monetary institutions. Accordingly, whereas domestic institutions concentrated (in a generally similar manner) their assets and liabilities with central banks, notably the ECB, and reduced their interbank exposure to banks abroad, non-domestic institutions increased their liabilities and, principally, their assets in comparison to other institutions domiciled abroad.

Greater stability in resources obtained from central banks

Notwithstanding the fact that at the end of 2009 the net position of banks with the central banks was quantitatively similar to the position in December 2008, reference should be made to a significant change in qualitative terms (Chart 4.4.11). At the end of 2009 around 95 per cent of financing obtained derived from Portuguese participation in the Eurosystem's liquidity injection operations with a maturity of a year, which took place in June, October and December. At the end of 2008, around 50 per cent of financing comprised participation in the main refinancing operations (with a maturity of a week). In such a context, there was a significant increase in the stability of the resources obtained from central banks in 2009, in line with developments, although to a lesser extent, on a euro area level (Chart 4.4.12).

Table 4.4.2

POSITION OF PORTUGUESE BANKS VIS-À-VIS OTHER CREDIT INSTITUTIONS AND CENTRAL BANKS
EUR million

Banking system	Dec-07	Dec-08	Jun-09	Dec-09
(Net) resources from Central banks	**-6931**	**3686**	**-4769**	**4152**
(Net) resources from other credit institutions	**32670**	**40683**	**39163**	**35765**
Cash, claims and investments in Central banks	**12662**	**10722**	**17845**	**15267**
Claims and investment in other credit institutions	**39692**	**33620**	**33841**	**38929**
in the country	8539	11922	10989	13193
abroad	31153	21698	22852	25736
head office and branches of the institution	3216	1033	911	545
Resources from central banks	**5731**	**14407**	**13076**	**19419**
Resources from other credit institutions	**72362**	**74303**	**73004**	**74694**
in the country	7672	10195	7753	8559
abroad	64690	64107	65251	66136
head office and branches of the institution	12586	15630	14644	13034
Domestic banks	**Dez-07**	**Dez-08**	**Jun-09**	**Dez-09**
(Net) resources from Central banks	**-8099**	**2367**	**-6225**	**2240**
(Net) resources from other credit institutions	**9753**	**8395**	**8634**	**6402**
Cash, claims and investments in Central banks	**11601**	**9180**	**16457**	**13440**
Claims and investment in other credit institutions	**26027**	**23446**	**22812**	**23449**
in the country	6112	9282	8658	10850
abroad	19915	14164	14154	12599
head office and branches of the institution	1	0	0	0
Resources from central banks	**3502**	**11547**	**10232**	**15680**
Resources from other credit institutions	**35780**	**31841**	**31447**	**29850**
in the country	5483	7898	5582	6018
abroad	30297	23943	25865	23832
head office and branches of the institution	0	0	0	0

Source: Banco de Portugal.

Increase in coverage of interbank liabilities by high liquidity assets, with a relevant role played by assets eligible for credit operations with the central banks

The conjugation of the evolution of the net position with central banks and other credit institutions with the increase in assets eligible for credit operations with central banks enabled a significant improvement in the coverage of interbank liabilities by high liquidity assets, more significantly so for domestic institutions, which maintain clearly higher ratios than those of non-domestic institutions (Chart 4.4.13). In the specific case of assets in the collateral pool of Eurosystem credit operations, their reinforcement resulted, to a significant extent, from the increase in the ABS (asset backed securities) portfolio which, in line with other banks in the euro area, was associated with the evolution of the securities portfolio resulting from securitisation operations.[7]

Improvement of liquidity gaps, particularly over the shorter time frames

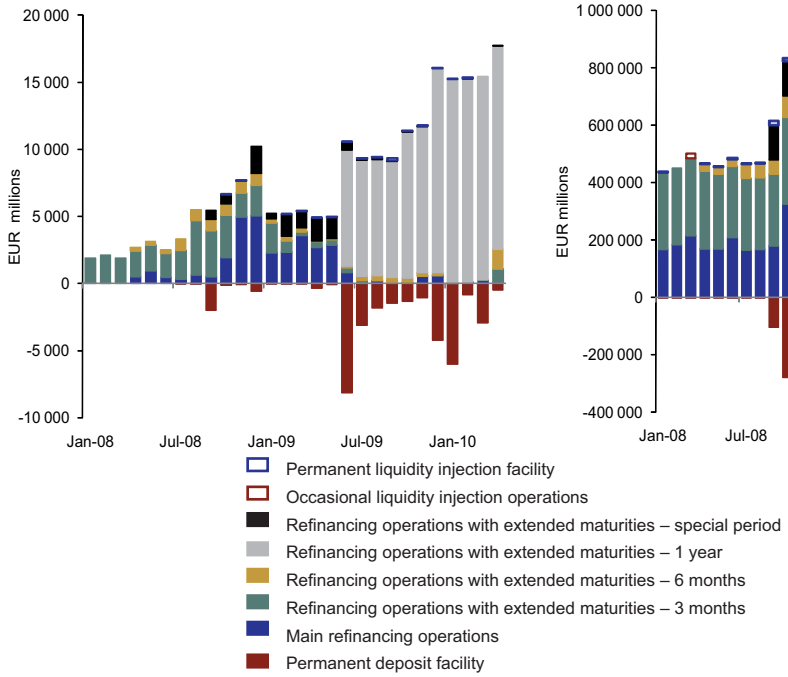
Liquidity gaps also recorded a positive evolution in 2009 (Chart 4.4.14).[8] This indicator, which allows for a more complete and adequate comprehension of institutions' liquidity positions, to the extent that it incorporates information on the period to maturity of a large collection of assets and liabilities, evol-

(7) The marketable assets eligible for the Eurosystem's monetary policy operations are defined in the document "The execution of monetary policy in the euro area: General documentation on the Eurosystem's monetary policy instruments and procedures".

(8) Liquidity gap defined as (liquid Assets – Volatile Liabilities) / (Assets – Liquid Assets) * 100, in each cumulative maturity bracket.

Chart 4.4.11

OUTSTANDING AMOUNTS ON CREDIT AND DEPOSIT OPERATIONS OF PORTUGUESE BANKS



Sources: ECB and Banco de Portugal.

Chart 4.4.12

OUTSTANDING AMOUNTS ON CREDIT AND DEPOSIT OPERATIONS OF THE EUROSYSTEM

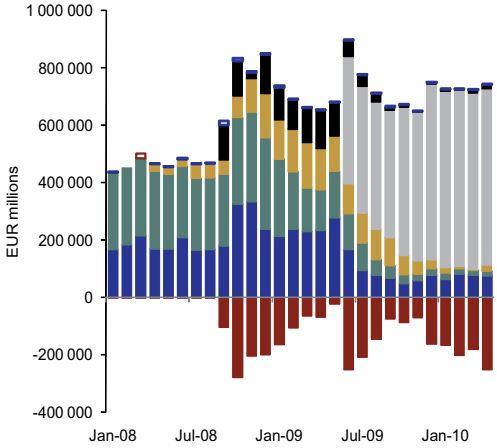
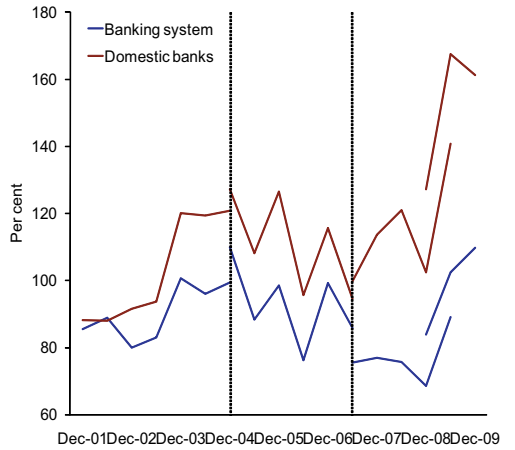


Chart 4.4.13

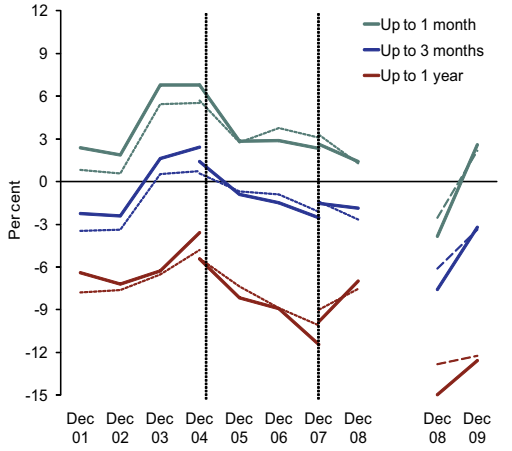
COVERAGE RATIO OF INTERBANK LIABILITIES BY HIGHLY LIQUID ASSETS



Source: Banco de Portugal.
Notes: The 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 2004 break in the series is due to the introduction of new accounting standards, which also implied a redefinition of the banking institutions under analysis. The 2007 break corresponds to an increase in the number of institutions analysed. Data for the period beggining in December 2008 was obtained under the report set by Instruction no. 13/2009 of Banco de Portugal, thus justifying a break in the series, to the extent that some of the concepts previously considered were changed.

Chart 4.4.14

LIQUIDITY GAPS IN CUMULATIVE MATURITY LADDERS



Source: Banco de Portugal.
Notes: The liquidity gap is defined as (Liquid Assets – Volatile Liabilities)/(Assets – Liquid Assets) x 100 for each cumulative ladder of residual maturity. Calculations are based on Banco de Portugal Instruction no. 1/2000. Only financial institutions which take deposits are subject to this norm. The dashed lines show domestic institutions. The 2004 break in the series is due to the introduction of new accounting standards, which also implied a redefinition of the banking institutions under analysis. The 2007 break corresponds to increase in the number of institutions analysed. Data for the period beggining in December 2008 was obtained under the report set by Instruction no. 13/2009 of Banco de Portugal, thus justifying a break in the series, to the extent that some of the concepts previously considered were changed. For further details, please refer to the mentioned Instructions, avaliable in http://www.bportugal.pt/sibap/sibap_e.htm.

Chart 4.4.15

LIQUIDITY GAP - ABOVE ONE WEEK, UP TO ONE MONTH
Domestic institutions

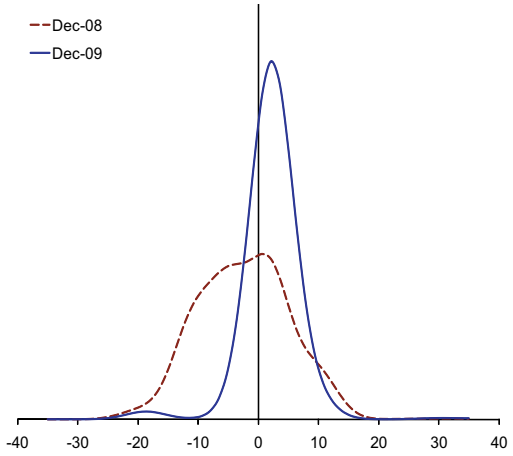
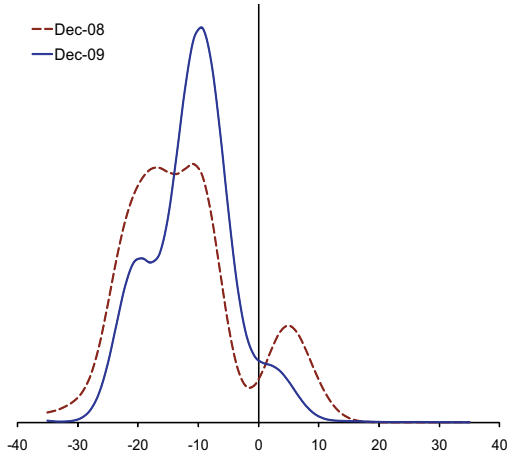


Gráfico 4.4.16

LIQUIDITY GAP - ABOVE SIX MONTHS, UP TO TWELVE MONTHS
Domestic institutions



Source: Banco de Portugal.
Notes: Data obtained under the report set by Instruction no. 13/2009 of Banco de Portugal. Empirical distribution obtained through recourse to non-parametric methods, namely to a Gaussian kernel that weights institutions by their assets.

ved favourably in most of the principal domestic banking groups (Charts 4.4.15 and 4.4.16). This evolution was more marked over the shorter time frames, to a large extent reflecting the lengthening of the maturity of resources obtained from the central banks (particularly the Eurosystem), together with a progressive increase in the amount of assets eligible for credit operations with central banks. For time frames of more than 6 months, the improvement was marginal, to the extent that the increase in such assets was almost totally offset by the increase in the amortisation of securities (Charts 4.4.17).

Global improvement in liquidity position during the course of 2009, but with still significant risks

In global terms, it can be claimed that the liquidity position of the Portuguese banking system evolved positively in 2009. Notwithstanding, it should be remembered that there are still considerable risks on the liquidity of the Portuguese banking system, notably deriving from negative externalities associated with the evolution of sovereign risk. Notwithstanding the fact that the measures recently adopted on a European Union level and by the ECB permitted an immediate containment of the tensions in financial markets, they have not eliminated the high degree of uncertainty in international markets, or the adverse risks (and respective differentiation) prevailing on a global level.[9]

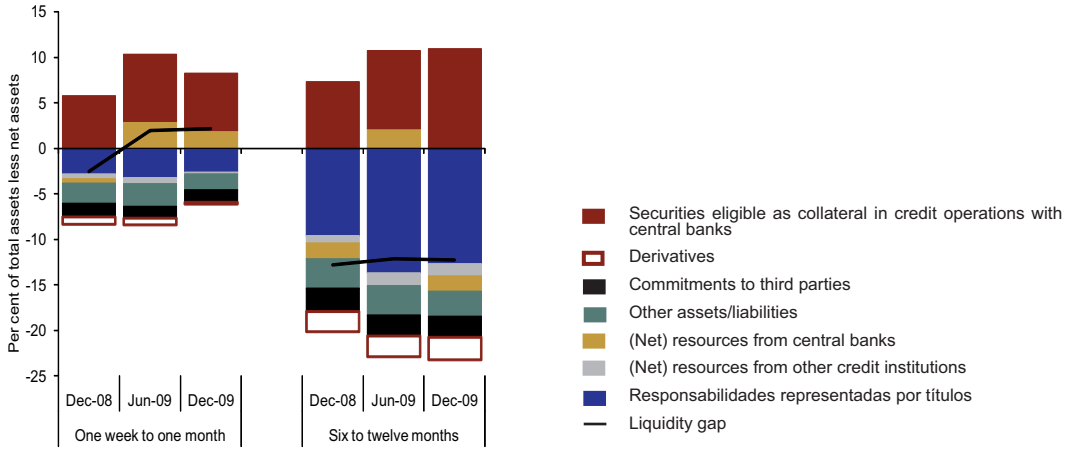
Increase in sovereign risk as the principal risk factor

The onset of financial crisis, in mid 2007, and its potential and effective impact on the economy had negative consequences on the situation of the public finances in several countries, reflecting inter alia the impact of automatic stabilisers and financial system and economy support measures. At the same time, and notwithstanding a certain normalisation of financing conditions in global terms during the course of 2009, risk discrimination has subsisted and even accentuated in 2010. This trend has increasingly affected sovereign risk, notably in the case of countries in respect of which doubts have arisen concerning the sustainability of the public finances by participants in the financial markets. This

(9) Reference to these measures were made in "Chapter 2 *Macroeconomic and Financial risks*", of this Report.

Chart 4.4.17

LIQUIDITY GAP OF DOMESTIC INSTITUTIONS
Main contributions



Source: Banco de Portugal.
Note: Data obtained under the report set by Instruction no. 13/2009 of Banco de Portugal (avaliable in http://www.bportugal.pt/sibap/sibap_e.htm).

environment has been leveraged by the existence of structural vulnerabilities in the said economies.

In such a context, it should also be pointed out that, in comparison to the end of 2009, the risk assessment associated with the Portuguese state has become clearly more negative. This has translated into a situation in which the international rating agencies have downgraded their assessments (and outlooks) and the prices of CDSs on Portuguese public debt and the spreads between yields on Portuguese public debt and those of Germany increased. Although having benefited from the collection of measures adopted on a level of the European Union and, in the case of the Portuguese government, accelerating fiscal consolidation, there still remains an unfavourable assessment of Portuguese sovereign risk in an environment of sovereign risk differentiation on an international level.

The deterioration of the perception of Portuguese sovereign risk, which has been transmitted to the main Portuguese banks, conditions their liquidity. The increase in sovereign risk has a direct impact on the financing conditions of the Portuguese state and Portuguese banks, which will have an effect on the remaining resident economic agents.[10] On the one hand, owing to an increase in the interest rate spreads on securities of Portuguese issuers, thus making credit more expensive, and, on the other hand, owing to quantitative restrictions. In the current market context, the negative externalities associated with the unfavourable evolution of sovereign risk have a predominant effect over the idiosyncratic fundamentals of the other Portuguese issuers, notably the banks.

The importance of budget consolidation for Portuguese banks

Given the context described, there is an absolute need to guarantee a sustainable trajectory of the reduction in the budget deficit to less than 3 per cent by 2013. In this environment, the full implementation of the collection of measures already announced, in addition to eventual additional measures which may be necessary, are crucial factors in limiting Portuguese sovereign risk and, accordingly,

(10) This effect will tend to translate into higher banking interest rates on lending operations, on the one hand, and, for the same budget deficit objective, the need to generate a more positive (less negative) primary budget balance.

safeguarding access to external finance by resident economic agents through the banks.[11]

Transition to a more stringent regulatory framework over the medium term

Another risk factor for the banks on an international level and also for Portuguese banks could derive from the adoption of more stringent liquidity management regulation, under the scope of the new Community Directive on liquidity requirements. Notwithstanding the fact that they have been designed to reduce liquidity risk over the medium and long term, the proposals currently under discussion may require substantial balance sheet adjustments to be made by several institutions during their period of adaptation to the new rules. Accordingly, and in light of the fact that their adoption could coexist with the implementation of new prudential rules in other domains, notably in terms of capital requirements, the implementation schedule of the new standards on liquidity management should be carefully considered and should desirably be implemented at a time when conditions in the financial markets have normalised.

Importance of prudent management and proactive liquidity risk

Taking into account, inter alia, the non-permanent nature of the measures recently adopted on a European level and the foreseeable maintenance of a situation of greater risk differentiation, it is absolutely imperative for resident economic entities (private and public, financial and non-financial) to make structural adjustments to their financial position. In the specific case of Portuguese banks, this adjustment should allow them to increase their resistance to the absorption of liquidity shocks and be consentaneous with the guidelines which will tend to result from the current revision of prudential liquidity regulations.

(11) A more detailed description of the budget adjustment trajectory and the already announced measures is given in "Chapter 2 *Macroeconomic and financial risks*", of this Report.

4.5. Credit risk

The historically unprecedented recessionary period which accentuated at the end of 2008 and beginning of 2009 translated into a deterioration of the financial situation in the non-financial private sector and consequent materialisation of credit risk. However and notwithstanding the fact of their maintenance at historically high levels in several credit segments, in the last few months of 2009 the trend towards an increase in default indicators in the domestic banking system was arrested. The annual flow of new overdue credit and other non-performing loans was down in terms of the materialisation of credit risk at the end of 2009 and beginning of 2010 (Table 4.5.1 and Chart 4.5.1). In a context of economic recovery, although still at its early stages, this evolution was, to a large extent, associated with the decrease and maintenance of interest rates at historically low levels, in the case of non-financial corporations.[1] The exposure of the Portuguese financial sector maintains its concentration profile in sectors and activities related with real estate, with a differentiation in the default profile of the different components. Default levels on mortgage loans, in the recent past, were contained, whereas loans to non-financial corporations in the "construction" and "real estate activities" segments were substantially higher. In fact, companies in these sectors recorded appreciable increases in the default rate since the onset of the financial crisis. However, the increase in defaults was transversal to the different economic sectors, although not synchronised. Loans to companies in the sectors "Trade, hotels and restaurants" and "Manufacturing" recorded in 2009 the highest increase in the default rate, although in 2008 the increase had been relatively contained. Reference should also be made to the fact that the banking system credit portfolio to non-financial corporations remains concentrated in large exposures. The credit risk associated with these exposures was moderate, as exposures of higher amount have lower default levels that fall at the end of 2009, in contrast with the increase in the case of total loans to non-financial corporations recorded in the Central Credit Register. The reduction in default indicators at the end of 2009 and start of 2010 is unlikely to be sustainable. An environment in which the necessary fiscal consolidation process is put into effect, in conjunction with the maintenance of significant sovereign risk differentiation, will tend to imply short term costs for economic activity and a greater materialisation of credit risk. Finally, the prospects relating to the evolution of defaults in the non-financial private sector suggest a need for the reinforcement of the impairment appropriation for losses in the credit portfolio.

Deceleration of loans to households, principally based on a fall in demand…

In line with events recorded since the start of 2008, there was a deceleration in bank loans to households over a significant part of 2009 (Charts 4.5.2 and 4.5.3). The decrease in expenditure aggregates (private consumption of durable goods and investment in housing) was the main underlying factor behind the deceleration of loans, notwithstanding the significant reduction in interest rates. As referred to by Castro e Santos (2010),[2] credit evolution is in line with its long term determinants. Notwithstanding the strong deceleration since the start of 2008, the growth rate of mortgage loans in 2009 continues to be higher than the associated with its long-term determinants (interest rates and investment in housing). During the course of 2009 there was, however, a reduction in the difference between the observed growth rate and the rate resulting from the estimated model. In the case of loans for consumption and other purposes, the growth observed was lower than the one associated with the long-term determinants (interest rates and private consumption of durable goods). Reference should also be made to the differentiation in terms of the profile of the rate of growth exhibited by the different institutions, which could reflect the implementation of different credit growth and market position strategies (Chart 4.5.4). Unlike the case of mortgage loans, there was a significant level of

(1) See "Box 4.2 *Determinants of the default on loans to non-financial corporations*", of this Report.

(2) Castro, G. and Santos, C. (2010), "Bank interest rates and loan determinants", Banco de Portugal, *Economic Bulletin*-Spring.

Table 4.5.1

MAIN INDICATORS
Per cent

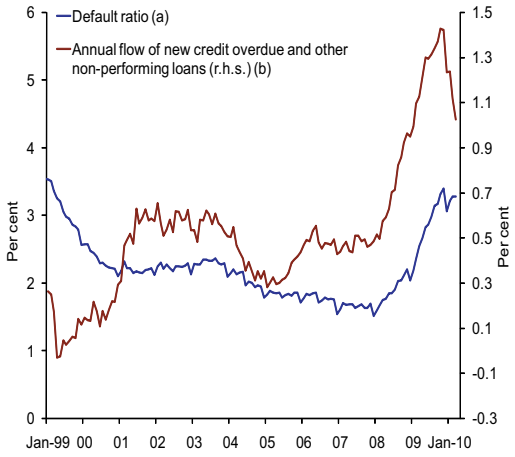
	Dec. 2003	Dec. 2004	Dec. 2005	Dec. 2006	Dec. 2007	Dec. 2008	Jun. 2009	Dec. 2009	Last month: March 2010
Default ratios in credit/loan portfolios[a]									
Credit, reported on a consolidate basis[b],[c]	2.4	1.8	1.7	1.5	1.6	2.0	2.8	3.0	n.a.
Credit, reported on an individual basis (prudential default concept)[d],[e]	-	1.6	1.4	1.2	1.4	1.7	2.5	2.9	n.a.
Loans to the resident non-financial sector (Monetary and Financial Statistics)[f],[g]	2.1	1.8	1.7	1.5	1.5	2.0	2.9	3.1	3.3
Households	2.0	1.8	1.7	1.5	1.6	1.9	2.4	2.4	2.6
Housing	1.4	1.3	1.2	1.1	1.1	1.3	1.5	1.5	1.6
Consumption and other purposes	4.6	4.2	3.7	3.7	3.6	4.7	6.3	6.4	7.1
Non-financial corporations	2.1	1.7	1.7	1.5	1.4	2.2	3.5	3.9	4.2
Annual flow of new credit overdue and other non-performing loans (Monetary and Financial Statistics)[g],[h]									
Resident non-financial private sector	0.5	0.4	0.4	0.4	0.5	0.9	1.3	1.2	1.0
Households	0.5	0.2	0.3	0.4	0.4	0.7	0.8	0.6	0.5
Housing[i]	0.4	0.0	0.0	0.0	0.2	0.3	0.3	0.3	0.2
Consumption and other purposes[i]	0.9	1.0	1.1	1.4	1.3	2.4	2.8	2.0	1.6
Non-financial corporations	0.5	0.5	0.6	0.5	0.6	1.3	2.0	2.1	1.7
Provisions for overdue credit and other non-performing loans (individual basis)[e]									
As a percentage of credit	-	1.1	1.2	1.0	1.1	1.2	2.0	2.4	n.a.
As a percentage of credit in default (prudential default concept)[d]	-	72.0	82.7	82.7	76.9	73.4	80.3	82.9	n.a.
Appropriation for impairment (consolidated basis)[c]									
As a percentage of credit	-	1.6	2.4	2.1	2.1	2.7	3.0	3.3	n.a.
As a percentage of overdue credit	-	94.0	147.8	153.2	134.3	133.6	109.1	110.0	n.a.
Year-on-year rates of change									
Credit, consolidated basis[c]	3.1	3.5	10.7	11.0	14.6	12.1	6.7	1.7	n.a
Loans to the resident non-financial private sector (Monetary and Financial Statistics)[g]	6.4	6.1	7.7	8.7	9.9	7.1	3.6	2.1	2.2
Households	9.6	9.2	9.8	9.9	9.0	4.6	2.2	2.3	2.9
Housing	11.8	10.5	11.1	9.9	8.5	4.3	2.5	2.6	3.0
Consumption and other purposes	2.4	4.4	4.5	10.1	11.3	6.2	1.3	0.9	2.3
Non-financial corporations	2.7	2.5	5.0	7.1	11.2	10.5	5.4	1.9	1.3

Source: Banco de Portugal.
Notes: (a) Defined as being credit in default as a percentage of the credit/loans balance. (b) Credit in default comprises credit and interest overdue for more than 30 days. (c) Credit values reported on a consolidated basis for the aggregate of the Portuguese banking system, including credit to residents and non-residents in addition to credit from the foreign subsidiaries of Portuguese banks. Derecognised securitisations were not considered. Break in series in 2004 and 2007. For additional information please consult the *Financial Stability Report* for 2008. (d) Credit in default defined on the basis of the prudential concept comprising credit and interest overdue for more than 90 days and other non-performing loans, referring to future payments of credit when there are any doubts over its collection, as established in Banco de Portugal's Official Notice 3/95 (available at *www.bportugal.pt/servs/sibap/sibap_p.htm*). (e) Values of credit to residents reported on an individual basis by the other monetary financial institutions (banks, savings banks and mutual agricultural credit banks) and other financial intermediaries. Derecognised securitisations were not considered. (f) Credit in default comprises credit and interest overdue for more than 30 days and other non-performing loans, referring to future payments of credit when there are any doubts over its collection, as established in Banco de Portugal's Official Notice 3/95 (available at *www.bportugal.pt/servs/sibap/sibap_p.htm*). (g) Loans granted by other monetary financial institutions to residents, adjusted by total securitisations. (h) The estimate of the annual flow of new overdue credit and other non-performing loans is presented as a percentage of the loans, adjusted for securitisation, and is calculated by adjusting the change in the oustanding amount of overdue credit and other non-performing loans for asset write-offs/write-downs, reclassifications and, starting December 2005, sales outside the banking system of overdue credit and other non-performing loans not written off from assets, reported on a quarterly basis in accordance with Banco de Portugal Instruction 2/2007. (i) Sales outside the banking system of overdue credit and other non-performing loans not written-off/written-down from assets were not considered.

dispersion in the rate of growth of loans for consumption and other purposes with several of the largest banks having decreased the amount of their loans, while others had a relatively high growth rate.

Chart 4.5.1

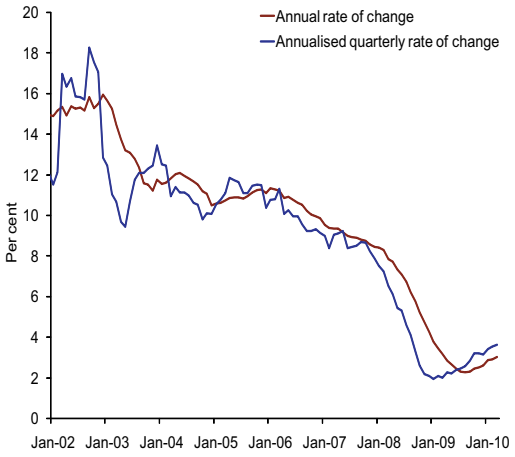
DEFAULTS IN BANK LOANS TO THE PRIVATE NON-FINANCIAL SECTOR



Source: Banco de Portugal.
Notes: (a) Defined as being credit in default (overdue loans and other non-performing loans) as a percentage of the loans balance adjusted for securitisation. (b) The estimate of the annual flow of new overdue credits and other non-performing loans is presented as a percentage of the loans, adjusted for securitisation, and is calculated by adjusting the change in the outstanding amount of overdue credit and other non-performing loans for write-offs/write-downs from assets, reclassifications and, starting December 2005, sales outside the banking system of overdue credit and other non-performing loans not written-off/written-down from assets, reported on a quarterly basis according to Banco de Portugal Instruction 2/2007.

Chart 4.5.2

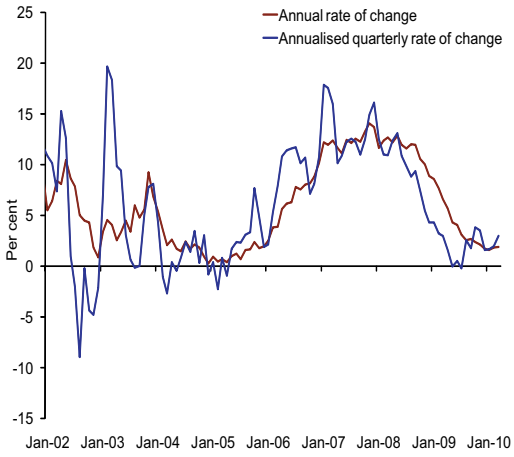
BANK LOANS TO HOUSEHOLDS
For housing purchases



Source: Banco de Portugal.
Notes: The annual and the quarterly rates of change are calculated on the basis of the relationship between outstanding bank loan amounts at the end of the month, adjusted for securitisation operations, and monthly transactions, calculated on the basis of outstanding amounts adjusted for reclassifications, write-offs/write-downs from assets and foreign exchange and price revaluations. The quarterly rate of change is seasonally adjusted.

Chart 4.5.3

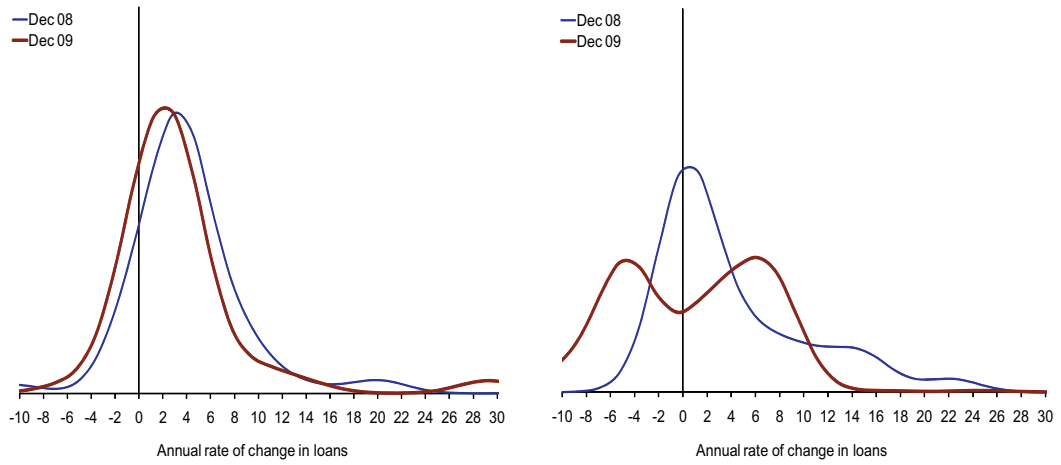
BANK LOANS TO HOUSEHOLDS
For consumption



Source: Banco de Portugal.
Notes: The annual and the quarterly rates of change are calculated on the basis of the relationship between outstanding bank loan amounts at the end of the month, adjusted for securitisation operations, and monthly transactions, calculated on the basis of outstanding amounts adjusted for reclassifications, write-offs/write-downs from assets and foreign exchange and price revaluations. The quarterly rate of change is seasonally adjusted.

Chart 4.5.4

EMPIRICAL DISTRIBUTION OF THE ANNUAL RATE OF CHANGE ON BANK LOANS TO HOUSEHOLDS



Source: Banco de Portugal.
Note: Empirical distribution obtained by the use of a Gaussian Kernel which weights financial institutions by their lending operations.

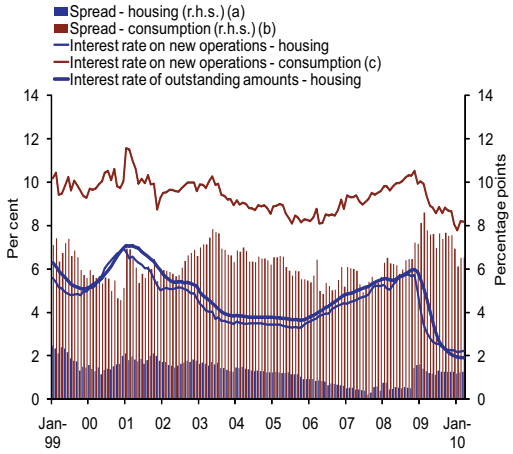
… but also in supply side factors

The growth of credit to households was also conditioned by changes in the supply of loans. According to the Bank Lending Survey,[3] the five interviewed banks reported, during the course of 2009 and in the first quarter of 2010, an increase in the lending criteria requirements, being recorded in the second half of 2009 and in the first quarter of 2010 a less marked increase than in the first half of 2009. This more restrictive lending criteria was associated with the deterioration of prospects in the housing market and expectations regarding the evolution of economic activity in general and, to a lesser extent, the increase in financing costs and restrictions on the banks' balance sheets. As a result, the banks included in the survey reported an increase in the spreads charged, particularly in the case of higher risk loans. In fact, following the increase verified at the end of 2008, which may be associated with the time lag in the transmission of reference interest rates, it was recorded a relative stabilisation of the spread on new mortgage loan operations relating to the 6-month Euribor rate at substantially higher levels than those recorded prior to the recent financial crisis (Chart 4.5.5). It was also noted, starting in the last quarter of 2009, that the interest rate on new mortgage loans operations was higher than the rate on the outstanding amounts, which may be the reflection of a more restrictive approach to lending as a result of a revaluation of the credit risk. The spreads associated with new loans for consumption were also up at the end of 2008. However, as opposed to spreads on mortgage loans, their level fell at the start of 2010 to amounts similar to those recorded in 2007 (Chart 4.5.5). A more restrictive approach to lending criteria in the two segments considered was also visible in greater requirements for guarantees and an increase in commissions or other costs not related with the interest rate, although progressively less pronounced over the course of 2009. The increase in restrictions on lending criteria for mortgage loans was also reflected in a decrease of the amount of the loan to guarantee ratio and, in the first quarter of 2010, also in a reduction of the maturity and increase in the level of guarantees required, as opposed to past quarters.

(3) For more information see the Bank Lending Survey, that was developed by the Eurosystem and published quarterly, in January, April, May and October. The results for Portugal are available at *http://www.bportugal.pt/en-US/EstudosEconomicos/Publicacoes/IBMC/Paginas/InqueritoaosBancossobreoMercadodeCredito.aspx*.

Chart 4.5.5

INTEREST RATES ON BANK LOANS TO HOUSEHOLDS FOR HOUSING PURCHASES AND FOR CONSUMPTION



Source: Banco de Portugal.
Notes: (a) Interest rate spread on new loans to households for house purchases using 6-month Euribor. (b) Interest rate spread on new loans to households for consumption using, respectively, 6-month Euribor, 12-month Euribor and the yield on Portuguese Treasury bonds with a period to maturity of 5 years, in cases in which the initial pricing of the rate is 1 year, between 1 and 5 years and more than 5 years.) (c) Average interest rate calculated on the basis of the rates on new loans per initial price fixing period rate, weighted by the amounts of new operations in each period.

Signs of an increase in the growth rate of credit to households starting from the third quarter of 2009

The slight acceleration in loans to households, at the end of 2009, was associated with the progressive recovery of the economy and the maintenance of interest rates at historically low levels. The annualised quarterly rates of change (calculated on seasonally adjusted data) for loans to households for house purchases and for consumption and other purposes over the course of the last quarter of 2009 and first quarter 2010 were generally higher than the annual rates, which suggests an acceleration of loans to households in the next few months. This effect was particularly marked in the case of mortgage loans and is consistent with the cyclical evolution of loans.[4] In fact, there is a time lag in the maximum correlation between mortgage loans and economic activity, with the evolution of this credit aggregate usually anteceding the evolution of GDP by four quarters. However, it is expected that its growth is going to be maintained within relatively contained levels. The uncertainty associated with economic recovery, households' already high levels of indebtedness and the acceleration of the Portuguese economy's adjustment process will tend to condition demand for credit. On the other hand, in an environment of a maintenance of significant sovereign risk differentiation, financing conditions will tend to be more restrictive.

The reduction of household default indicators starting in the third quarter of 2009 may not be sustainable

Default indicators in 2009 recorded historically high levels, in association with the sudden downturn in economic activity, at the end of 2008. Loans for consumption and other purposes recorded significantly higher default levels than those observed in the recessionary period of 2003, notwithstanding

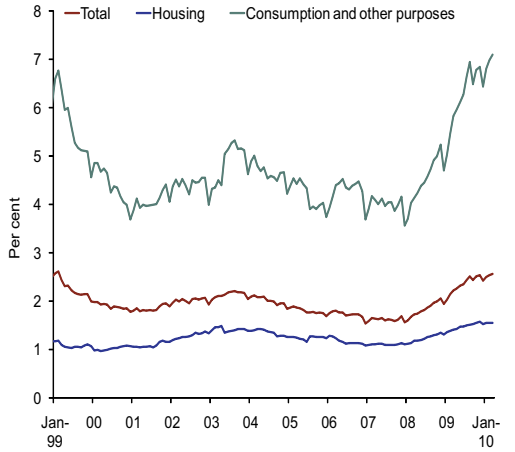
(4) See "Box 2.2 *Cyclical evolution of loans to non-financial corporations and households*", Banco de Portugal, *Annual Report* 2009.

the decrease in bank interest rates. In turn, default levels on mortgage loans were relatively contained and much lower than in the case of loans for consumption and other purposes (Charts 4.5.6 and 4.5.7). The third quarter of 2009 witnessed an interruption of the trend towards an increase in default indicators noted since the start of the preceding year. Default ratios[5] associated with mortgage loans and loans for consumption and other purposes have remained stable since then, whereas the flow of new overdue credit and other non-performing loans[6] decreased. This was particularly evident in the case of loans for consumption and other purposes, which recorded a much lower level in March 2010 than in December 2008, although still remaining at a historically high level. The start of the recovery of the economic activity, in conjugation with a decrease of interest rates to historically very low levels, may have contributed to arresting the trend towards higher default indicators. In fact, more than 80 per cent of loans to households were for mortgage purchases, with the interest rate on most of these loans being indexed to money market rates, with repricing dates of predominantly 3 and 6 months. Credit for consumption and other purposes, to a large extent, comprises agreements entered into at fixed rates. However, owing to the shorter maturity associated with these agreements changes in the market interest rates have a non-negligible impact in the costs associated with debt.[7] The recently noted favourable evolution of default levels is not only associated with cyclical factors but is also a reflection of the characteristics of the different credit to households segments. In the case of mortgage loans, the fact that households in the lower income bracket have a very low level

Chart 4.5.6

DEFAULT RATIOS ON BANK LOANS

Households

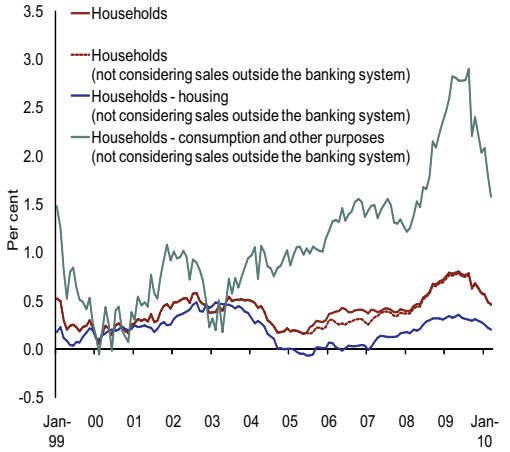


Source: Banco de Portugal.
Note: Defined as credit in default (overdue credit and other non-performing loans) as a percentage of the loans balance adjusted for securitisation.

Chart 4.5.7

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

Households



Source: Banco de Portugal.
Note: The estimate of the annual flow of new overdue credit and other non-performing loans is presented as a percentage of the loans, adjusted for securitisation, and is calculated by adjusting the change in the outstanding amounts of overdue credit and other non-performing loans by asset write-offs/write-downs, reclassifications and, starting December 2005, sales outside the banking system of overdue credit and other non-performing loans not written-off/written-down from assets, reported on a quarterly basis in accordance with Banco de Portugal Instruction 2/2007.

(5) In this section, the default ratio is defined as credit in default as a percentage of the loans balance adjusted for securitisation. Credit in default includes credit and interest overdue for more than 30 days and other non-performing loans, relating to future credit instalments when there are doubts over their collection, as established in Banco de Portugal's Notice 3/95. For more detail see Instruction 16/2004 and Official Notice 3/95 at *www.bportugal.pt/servs/sibap/sibap_p.htm*.

(6) The estimate of the annual flow of new overdue and other non-performing loans is presented as a percentage of the loans, adjusted for securitisation, and is calculated by adjusting the change in oustanding amount of and other non-performing loans by asset write-offs/write-downs, reclassifications and, starting December 2005, sales outside the banking system of overdue credit and other non-performing loans not written-off/written-down from assets, reported on a quarterly basis in accordance with Banco de Portugal's Instruction 2/2007.

(7) See "Box 4.3 *Credit to households and default: a characterisation based on the Central Credit Register*", of this Report.

of participation in this market segment, in addition to the fact that Portuguese households have relatively contained debt servicing ratios (partly due to the long loan maturities), in comparison with households in other countries in the euro area,[8] is an important credit risk mitigating factor. Loans for house purchases to younger households, which are those with the highest average value of loans, are frequently associated with personal guarantees which add to the mortgage on the property and help to decrease vulnerability to the unfavourable macroeconomic environment, reflected in lower default levels.[9] In the case of loans for consumption and other purposes, reference should be made to the intensification of access to this market by households with lower income levels and those whose representative is relatively younger.[10] However, notwithstanding the eventual higher credit risk associated with these exposures, a differentiated profile (in terms of amounts in default as a percentage of credit) by the debtor's age bracket was not recorded in December 2009. In addition, the higher credit risk associated with loans for consumption and other purposes is incorporated by the banks and reflected in higher spreads on interest rates and commissions, in comparison to mortgage loans. Notwithstanding the conditioning factors and the improvement already evidenced in several default indicators, the implementation of the necessary fiscal consolidation process in Portugal and, in more general terms, the need for economic adjustment will tend to imply relatively high default levels in comparison to those in the period preceding the economic and financial crisis.

Deceleration of loans to non-financial corporations over the course of 2009, following the preceding year's strong growth

There was a marked slowdown in loans to non-financial corporations over the course of 2009, in line with developments noted from the beginning of 2008 (Chart 4.5.8). This evolution was transversal to the different financial institutions (Chart 4.5.9). The evolution of loans to non-financial corporations was conditioned by the decrease in corporate investment, as reported in Castro e Santos (2010).[11] However, the growth of loans to non-financial corporations in this period was still higher than the associated with its long term determinants (corporate investment and bank interest rates). Developments relating to the growth of loans to non-financial corporations are in line with the historical regularities for Portugal and the euro area, in which the slowdown initially occurred with loans to households and latterly extended to loans to non-financial corporations.[12] The need to deleverage balance sheets felt by several European banks justified the nominal downturn in loans to non-financial corporations in the euro area, in contrast with the positive growth, although at historically low levels, registered in Portugal. The growth rate of such loans in the first quarter of 2010 was less than 2 per cent. The annualised quarterly rates of change on loans to non-financial corporations (calculated on seasonally adjusted data) registered in the first quarter of 2010 a certain level of volatility. The possibility of a further reduction in this segment's growth rate over the next few months cannot, accordingly, be excluded.

The banking sector is also exposed to credit risk from non-financial corporations in the form of securitised debt positions. Securitised debt issued by non-financial corporations in the possession of the banks totalled around EUR 19 billion, in December 2009, in comparison to lending of EUR 118 billion. It is, accordingly relevant, to analyse the behaviour of a broader credit aggregate including loans and

(8) Information available in Housing Finance in the Euro Area, *Occasional Paper Series* No 101, European Central Bank, 2009.

(9) See "Box 4.3 *Credit to households and default: a characterisation based on the Central Credit Register*", of this Report, "Box 4.2 *The main characteristics of loans to households for house purchase in Portugal*", Banco de Portugal, *Financial Stability Report* 2008 and "Box 4.3 *Aspects of higher risk mortgage loans in the United States and Europe*", Banco de Portugal, *Financial Stability Report* 2008

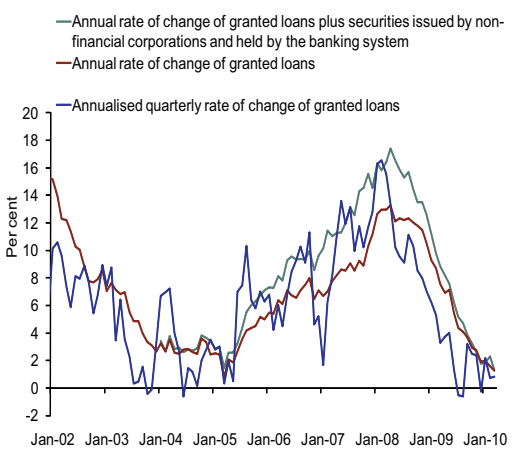
(10) Results from the Household Wealth and Indebtedness Survey (*Inquérito ao Património e Endividamento das Famílias*), taking place in 2000 and in 2006/2007.

(11) Castro, G. and Santos, C. (2010), "Bank interest rates and loan determinants", Banco de Portugal, *Economic Bulletin*-Spring.

(12) See "Box 2.2 *Cyclical evolution of loans to non-financial corporations and households*", Banco de Portugal, *Annual Report* 2009 and "Box 1 *Loans to the non-financial private sector over the business cycle in the euro area*", in the ECB's *Monthly Bulletin* October 2009.

Chart 4.5.8

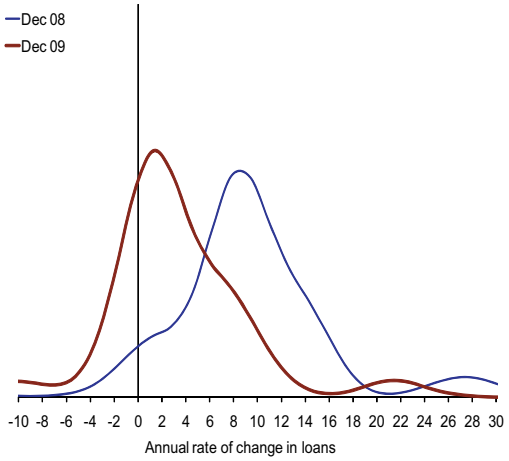
CREDIT TO NON-FINANCIAL CORPORATIONS



Source: Banco de Portugal.
Note: The annual and the quarterly rates of change are calculated on the basis of the relationship between oustanding bank loan amounts (or bank loans and short-term securities held by the banking system) at the end of the month, adjusted for securitisation operations, and monthly transactions, calculated on the basis of outstanding amounts adjusted for reclassifications, write-offs/write-downs from assets and foreign exchange and price revaluations. The quarterly rate of change is seasonally adjusted.

Chart 4.5.9

EMPIRICAL DISTRIBUTION OF THE ANNUAL RATE OF CHANGE ON BANK LOANS TO NON-FINANCIAL CORPORATIONS



Source: Banco de Portugal.
Note: Empirical distribution obtained by the use of a Gaussian Kernel which weights financial institutions by their lending operations.

securitised debt issued by non-financial corporations in the possession of the banks. This credit aggregate decelerated in line with loans to non-financial corporations in the second half of 2009 and first quarter of 2010. Reference should, however, be made to the increase in the proportion of securities with a maturity of more than one year which, in February 2010, represented around 25 per cent of the value of the securities issued by non-financial corporations held by the banks.

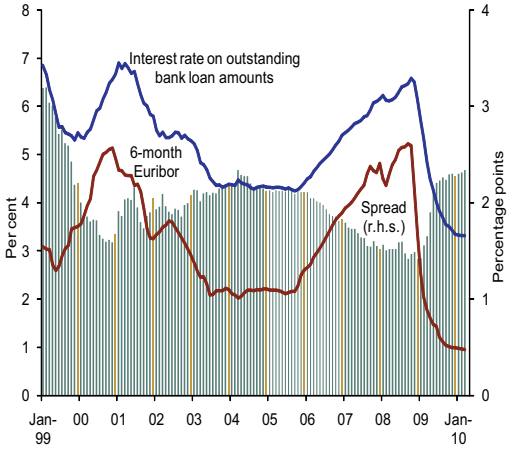
Slowdown in loans to non-financial corporations dominated by factors on the demand side but also owing to a contribution on the supply side, with the larger loans having recorded higher growth rates

In addition to the factors associated with the demand for credit in the evolution of loans to non-financial companies, reference should also be made to the importance of factors related with credit supply conditions. According to the Bank Lending Survey, there was an increase, albeit progressively less marked, in restrictions on lending criteria to non-financial corporations, during the course of 2009. There was a slight reversal of this trend, in the first quarter of 2010, in a context of an increase in sovereign risk, with a more marked increase in restrictions than in the preceding half year. A more restrictive approach was reflected in higher spreads, particularly in the case of higher risk loans. Loan maturities were also shortened, with requirements for additional guarantees, higher commissions and other charges not related with the interest rate plus more stringent contractual conditions.

In line with the results of the Bank Lending Survey, spreads on end of period balances were substantially up in the first half of 2009, since when they have tended to increase slightly (Chart 4.5.10). The current levels are slightly higher than those recorded in the 2003 recessionary period. As regards loans' contractual maturity periods the marked deceleration of loans with a maturity of more than five years should be noted. This segment which, at the end of 2008 and start of 2009, posted growth rates of more than 20 per cent, has more recently evidenced a growth rate of less than 10 per cent, with rates of this magnitude only having been recorded in 2003 (Chart 4.5.11). Loans with a maturity

Chart 4.5.10

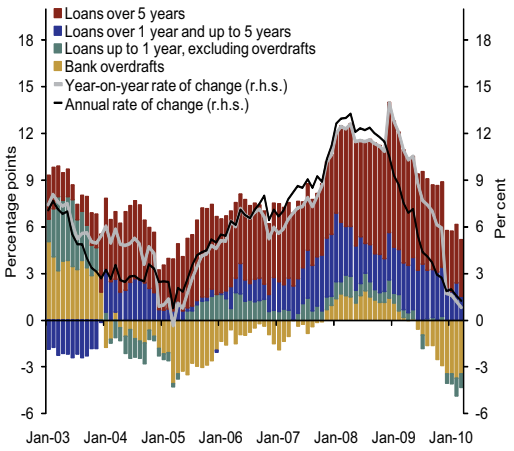
MONEY MARKET INTEREST RATE, INTEREST RATE ON BANK LOANS TO NON-FINANCIAL CORPORATIONS AND RESPECTIVE SPREAD



Source: Banco de Portugal.
Notes: Rates and spread refer to end of period oustanding amounts. End of years are underlined. Up to December 2002, the rates on the balances are estimated. The spread is calculated as the difference between the rate on the outstanding amounts and the six month moving average of the 6-month Euribor.

Chart 4.5.11

CONTRIBUTIONS OF CONTRACTUAL MATURITY SEGMENTS TO THE RATE OF CHANGE ON THE OUTSTANDING BANK LOANS TO NON-FINANCIAL CORPORATIONS



Source: Banco de Portugal.
Notes: The contributions refer to the unadjusted outstanding bank loan amounts, for which the year-on-year rate of change is presented. The annual rate of change is obtained from the relation between outsatnding bank loan amounts, adjusted for securitisation, and monthly transactions, which are calculated using the outstanding amounts corrected of reclassifications, write-offs/write-downs and exchange rate changes and price revaluations. Bank overdrafts were classified as having a maturity of less than a year.

of less than a year contributed negatively to the growth in loans to non-financial corporations, in currently recording a negative rate of change of around 5 per cent. This behaviour is in line with the euro area, although less markedly so, in which only loans with a maturity of more than five years have positive growth rates and loans with a maturity of less than a year posting a downturn of around 10 per cent, in March 2010.

As regards the dimension of exposures, loans to the non-financial corporations are concentrated in the higher value loan brackets and have the highest growth rates (Table 4.5.2). By way of contrast, the rate of growth in exposures of less than EUR 563 thousand, originated by 90 per cent of the counterparts and representing only around 13 per cent of the loans to non-financial corporations, were close to nil in December 2009.

The deceleration of credit to non-financial corporations was transversal to all sectors of activity, although not synchronised

The deceleration profile of loans to non-financial corporations was differentiated by sector of activity, which reflects a time lag in the transmission of shocks to the diverse sectors. Loans to real estate-related sectors and activities evidenced a marked slowdown at the very beginning of the financial and economic crisis, having in 2008 recorded a much stronger level of deceleration than total loans to non-financial corporations. This effect is particularly visible in loans to real estate companies (Table 4.5.3). More recently, loans to the "construction" and "real estate" sectors posted negative rates of change. In turn, loans to companies in the "trade, hotels and restaurants" sector which, in 2008, evidenced a slight degree of acceleration, recorded a marked slowdown in 2009, having posted negative growth rates in December 2009. Loans to this sector recovered, however, in the first quarter of 2010. In turn, loans to companies in the "manufacturing" sector are those in which the level of deceleration during the course of 2008 and 2009 is less marked, notwithstanding signs of a slowdown in the first quarter of 2010.

Table 4.5.2

LENDING TO NON-FINANCIAL CORPORATIONS – BY DIMENSION OF EXPOSURES[a]
Annual rates of change at end of period, per cent

					Memo (December 2009):		
	Jun-08	Dec-08	Jun-09	Dec-09	Lower limit[d] (10^3€)	Average outstanding amounts (10^3€)	Proportion of the outsatnding amounts in the total (%)
Total	11.7	10.6	6.1	1.4			100
Exposures for more than the 90th quantile[b]	12.3	11.5	6.6	1.5	563	4 478	87
of which: exposures for more than the 99th quantile[b]	12.7	13.2	8.1	2.7	7 436	28 600	56
of which: exposures for more than the 99.5th quantile[b]	12.3	12.7	8.4	3.0	14 200	47 000	46
of which: exposures for more than the 99.9th quantile[b]	9.8	11.3	7.0	2.4	54 600	130 000	25
Smaller exposures[c]	8.5	5.2	2.6	0.2	0.05	73	13

Source: Banco de Portugal.
Notes: (a) Indicators based on information supplied by the Central Credit Register (CRC), with each exposure being characterised by the total value of loans in the financial system of a specific non-financial corporation. Elements of the financial system were taken to be all banks, savings banks, mutualist credit agricultural institutions, financial credit institutions, factoring companies, leasing companies, credit card issuing or management companies, finance houses for credit purposes and other resident financial intermediaries. Only exposures to a specific financial institution of more than EUR 50 were considered. (b) For the calculation of year-on-year rates of change, the lower limits of each exposure bracket coincide with the quantile which, at any time, are defined on the basis of the number of companies ranked by the amount of total exposure. (c) Compreises 90 per cent of companies with debts to the institutions registered with the CRC. (d) Lowest amount of exposure in the whole quantile.

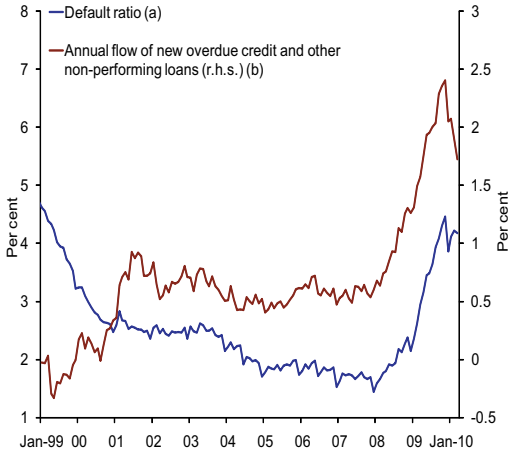
Arrest of the increase and a certain reversal of default levels in loans to non-financial corporations although remaining at historically high levels

The increase in the materialisation of credit risk was reflected in the substantial increase in default indicators on loans to non-financial corporations in the first three quarters of 2009, which trend was arrested at the end of the said year (Chart 4.5.12). This evolution was observed in the default ratio and particularly in the flow of new overdue credit and other non-performing loans. The percentage of companies with overdue credit and interest in December 2009 was up over December 2008, but remained very close to the June 2009 percentage, according to information supplied by the Central Credit Register (Table 4.5.4). The risk associated with exposures to higher amounts was moderate as such exposures, in December 2009, posted the lowest default levels and the smallest increases. Exposures for amounts higher than the 99th percentile, comprising more than 50 per cent of credit, showed improvements in their default indicators over June 2009, notwithstanding a deterioration over December 2008. Companies in the "construction", "trade, hotels and restaurants" and "manufacturing" sectors and, to a lesser extent, companies in the "real estate activities" had higher default ratios at the end of 2009 than those recorded by the non-financial corporations aggregate (Chart 4.5.13). The time lag in the transmission of shocks to different sectors of activity led to a differentiated evolution of default by sector of activity. After a marked increase in defaults by companies in the "real estate activities" and, in particular, "construction" sectors in 2008, exposures to these sectors were not among those recording the highest increases in the default ratio last year. On the contrary, loans to companies in the "trade, hotels and restaurants" and "manufacturing" sectors posted a higher increase in default ratios in 2009, in contrast with the relatively contained increase in 2008. In a context of economic recovery, although at its early stages and significantly improved confidence indicators in the second half of 2009, the maintenance of interest rates at very low levels was associated with lower debt costs, contributing towards the recent improvement in default ratios.[13] However, taking into account companies' indebtedness, the acceleration of the fiscal consolidation and of the adjustment of the economy at large, is a short term risk factor for the corporate activity and, consequently, their default levels.

(13) See "Box 4.2 *Determinants of the default on loans to non-financial corporations*", of this Report.

Chart 4.5.12

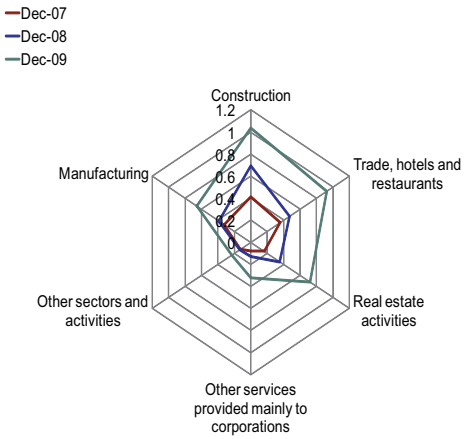
DEFAULTS ON LOANS TO NON-FINANCIAL CORPORATION



Source: Banco de Portugal.
Notes: (a) Defined as being credit in default (overdue loans and other non-performing loans) as a percentage of the outstanding bank loan amounts adjusted for securitisation. (b) The estimate of the annual flow of new overdue credit and other non-performing loans is presented as a percentage of the loans, adjusted for securitisation, and is calculated by adjusting the change in the outstanding amount of overdue credit and other non-performing loans for write-offs/write-downs from assets, reclassifications and, starting December 2005, sales outside the banking system of overdue credit and other non-performing loans not written off from assets, reported on a quarterly basis according to Banco de Portugal's Instruction 2/2007.

Chart 4.5.13

DEFAULT RATIO OF NON-FINANCIAL CORPORATIONS
Sectoral contribution



Source: Banco de Portugal.
Note: Considering loans from other monetary financial institutions, with the allocation of loans branch of activity estimated on the basis of the structure of the Central Credit Register.

Table 4.5.3

LOANS TO NON-FINANCIAL CORPORATIONS – BY SECTOR[a]
Annual rates of change at end of period, per cent[b]

	2004	2005	2006	2007	2008	2009		2010	Proportion in total loans
						Jun.	Dec.	Mar.	Dec. 2009
Total	2.5	5.0	7.1	11.2	10.5	5.4	1.9	1.3	100.0
By branch of activity:									
Agriculture, fishing and mining	1.8	3.6	6.4	13.6	20.3	11.7	4.0	3.0	2.2
Manufacturing	-3.8	-3.0	0.7	7.9	7.7	7.2	3.2	1.2	12.9
Electricity, gas and water	-2.0	37.9	-11.3	13.7	47.8	32.2	10.7	11.0	3.1
Construction	6.0	10.7	5.4	10.7	8.6	4.4	2.5	-0.5	19.3
Trade, restaurants and hotels	2.0	3.0	7.1	6.3	7.5	1.1	-0.4	0.2	16.9
Transport, post and telecommunications	-4.5	-10.6	0.7	11.0	18.3	14.8	3.9	9.0	6.0
Real estate activities	14.0	12.0	12.9	14.4	8.5	3.4	1.3	-1.5	19.7
Services provided mainly to corporations	-1.7	6.6	13.8	16.6	14.1	3.0	-2.0	0.3	14.3
Other services activities	2.9	-3.6	9.6	10.0	6.2	8.9	9.1	9.6	5.6

Source: Banco de Portugal.
Notes: (a) Considering loans from other monetary financial institutions, with the allocation of loans by sector of activity being estimated on the basis of the structure of Central Credit Register. (b) Rates of change are calculated on the basis of the ratio between outstanding bank loan amounts at the end of the period and transactions calculated on the bases of balances adjusted for reclassifications. They are also adjusted for securitisation operations and write-offs/write-downs from assets and foreign exchange and price revaluations.

Table 4.5.4

CREDIT DEFAULT INDICATORS FOR NON-FINANCIAL CORPORATIONS, BY SIZE OF EXPOSURE[a]
Per cent

	Dec-07	Jun-08	**Dec-08**	Jun-09	**Dec-09**	Feb-10
Total exposure						
Number of debtors in default[b]	14.4	15.8	16.3	18.5	18.7	19.4
Overdue credit and interest[c]	1.8	2.1	2.3	3.9	4.1	4.4
Exposures for more than the 90th quantile[d]						
Number of debtors in default[e]	8.0	10.0	11.5	15.6	14.3	16.0
Overdue credit and interest[f]	1.2	1.5	1.8	3.4	3.5	3.9
of which: exposures for more than the amount of the 99th quantile[d]						
Number of debtors in default[e]	4.5	6.7	9.1	13.8	11.4	13.0
Overdue credit and interest[f]	0.4	0.6	0.8	2.6	2.3	2.5
of which: exposures for more than the amount of the 99.5th quantile[d]						
Number of debtors in default[e]	4.0	5.5	7.5	12.9	9.3	11.3
Overdue credit and interest[f]	0.3	0.4	0.6	2.3	1.9	2.0
of which: exposures for more than the amount of the 90.9th quantile[d]						
Number of debtors in default[e]	2.1	2.9	6.3	11.3	7.1	8.7
Overdue credit and interest[f]	0.0	0.1	0.2	1.9	1.3	1.2
Smaller exposures[g]						
Number of debtors in default[e]	15.2	16.4	16.9	18.8	19.2	19.8
Overdue credit and interest[f]	5.1	5.5	5.8	7.4	7.9	8.2

Source: Banco de Portugal.
Notes: (a) Indicators based on information from the Central Credit Register (CRC). Comprising credit from banks, savings banks, mutual agricultural credit banks, credit financial institutions, factoring companies, leasing companies, credit card issuing or management companies, credit-purchase financing companies and other resident financial intermediaries. Only exposures to a specific financial institution of more than EUR 50 were considered with unused lines of credit having been excluded. A non-financial corporation is in default if the amount of overdue credit is more than 0.5% of its exposure to the financial system. (b) As a percentage of the number of non-financial corporations with debts to financial institutions participating in the CRC. (c) As a percentage of the total credit from financial institutions participating in the CRC to resident non-financial corporations. (d) Percentiles defined on the basis of the number of companies ranked by their total amount of exposure. (e) As a percentage of the number of debtors in this portfolio. (f) As a percentage of the total credit in this portfolio. (g) Exposures whose amounts are less than the 90th percentile, comprising 90 per cent of the companies with debt to institutions participating in the CRC.

Box 4.1. Financial situation of the major banking groups in the Portuguese banking system in the first quarter of 2010

The financial context in which the Portuguese banking system operates changed considerably in the first few months of 2010, as a consequence of growing concerns over the sustainability of the public finances of several countries in the euro area. As regards the activity of the Portuguese economy, the information relating to first quarter 2010 evidenced signs of a certain recovery, but whose magnitude is unlikely to be sustainable. The measures recently adopted by the Portuguese government and, more generally, the need for the financial deleverage of the economy will tend to be adversely reflected in growth of economic activity over the short term.

Taking into account the data of the six major banking groups in the Portuguese banking system[1] for the first quarter of 2010, the expansion of activity, based on total assets, continued to record a high growth rate (Table 1). As in 2009, growth in assets was sustained by the increase in the securities and financial instruments portfolio, particularly debt securities, with credit to customers, adjusted for securitisation operations, continuing to move downward albeit clearly less pronounced. In the first few months of 2010, debt securities were, once again, the main source of financing of activity, notwithstanding the unfavourable changes of conditions prevailing in the wholesale financing markets, followed by resources obtained from central banks and other credit institutions. In turn, customer resources in the form of deposits, which represent banks' main resource, remained relatively stable, with a highly reduced growth rate. It should be noted that the growth and financing profile of banking activity in the period under analysis is, as mentioned, similar to that of 2009 as a whole, but differs substantially from the first quarter of the referred to year, when relations with customers were the main factor underlying the increase in both assets and liabilities.

Table 1

BALANCE SHEET OF THE SIX MAJOR BANKING GROUPS
On a consolidated basis

	Structure (as percentage of assets)		Year-on-year rates of change (per cent)				
	2008	2009	2009				2010
	Dec.	Dec.	Mar.	Jun.	Sep.	Dec.	Mar.
Cash and claims on central banks	2.3	3.3	4.4	142.1	-6.8	50.5	80.1
Claims and investments in other credit institutions	5.2	5.6	-0.9	-23.1	-6.9	15.6	0.3
Securities, derivatives and investments	12.9	15.9	13.6	13.5	22.8	31.8	39.8
Net credit to customers	67.5	63.5	5.6	3.3	1.8	0.9	2.1
Securitised non-derecognised assets	6.9	6.6	55.5	44.6	34.8	3.4	-6.2
Tangible and intangible assets	1.1	1.0	3.0	0.4	29.9	-3.8	-0.8
Other assets	4.1	4.1	23.2	16.4	14.7	7.6	18.0
Total assets	**100.0**	**100.0**	**9.6**	**8.0**	**6.5**	**7.2**	**8.4**
Resources from central banks	3.2	3.8	63.9	82.4	28.2	25.1	147.1
Resources from other credit institutions	7.6	7.4	-0.1	0.3	-1.8	5.3	-3.1
Resources from customers and other loans	48.1	45.0	13.5	9.3	3.2	0.2	0.8
Liabilities represented by securities	24.2	27.4	0.3	0.8	11.5	21.4	19.0
Subordinated liabilities	2.7	2.5	-0.7	9.9	-1.8	-2.3	-2.4
Other liabilities	8.2	7.1	27.8	11.8	2.0	-7.5	-7.0
Capital	6.0	6.9	9.2	16.4	22.3	23.2	26.6
Total liabilities and capital	**100.0**	**100.0**	**9.6**	**8.0**	**6.5**	**7.2**	**8.4**
Memo:							
Credit to customers including non-derecognised securitisation operations	75.8	71.9	9.4	6.8	4.7	1.6	1.5

Source: Banco de Portugal.

(1) *The total assets of the six banking groups analysed in this box (Caixa Geral de Depósitos, Espírito Santo Financial Group, Millennium BCP, Banco Português de Investimento, Banco Santander Totta and Caixa Económica Montepio Geral) represented around 78 per cent of total assets in the Portuguese banking system in December 2009.*

In the first quarter of 2010, the income before tax and minority interests heading in the institutions under analysis was down in comparison to income for the same period 2009, implying a reduction in profitability indicators (Table 2 and Chart 1). The containment of operating costs and the reduction of provisions and impairment, over the same period of the preceding year, were not enough to offset the decrease in gross income which essentially reflected the evolution of net interest income. Net interest income, notably income from operations with customers, was significantly down over the first quarter of 2009, owing to the fall in interest rates to historically low levels during the course of 2009 (Chart 2). In such a context, it should be remembered that a highly significant proportion of loans in Portugal was taken out at a variable rate, mainly indexed to Euribor, with a repricing period of less than a year. Therefore the impact of changes in interest rates on margin from the credit operations occurs relatively quickly. However, reference should be made to the fact that a comparison between the flow of net interest income assessed in the first quarter of 2010 and the quarterly flows during the course of 2009 shows that the more recent flow is in line with the path noted in the second half of 2009.

Table 2

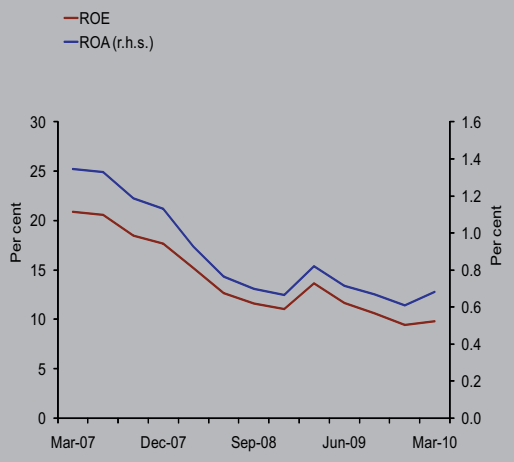
PROFIT AND LOSS ACCOUNT OF THE SIX MAJOR BANKING GROUPS
On a consolidated basis

	Structure (as a percentage of average assets)[a]					Year-on-year rates of change (per cent)				
	2009				2010	2009				2010
	Mar.	Jun.	Sep.	Dec.	Mar.	Mar.	Jun.	Sep.	Dec.	Mar.
Net interest income	1.80	1.68	1.57	1.49	1.30	4.3	-0.9	-7.0	-12.6	-22.1
Income (net) from services and commissions	0.66	0.67	0.67	0.68	0.70	3.0	2.2	2.9	4.4	13.8
Income from financial operations	0.40	0.33	0.36	0.37	0.36	149.7	149.9	114.2	34.7	-2.7
Other income	0.14	0.16	0.13	0.12	0.08	-4.3	-22.9	-34.5	-20.1	-35.2
Gross income	3.01	2.84	2.73	2.67	2.45	12.3	5.6	0.9	-4.3	-12.3
Operating costs	1.49	1.47	1.46	1.46	1.35	4.7	0.2	0.5	-0.6	-2.6
Provisions and impairment	0.66	0.66	0.63	0.65	0.46	33.6	19.3	-0.9	-7.2	-24.0
Consolidation differences and appropriation of income	0.04	0.00	-0.03	-0.04	-0.04	-	-108.2	3.1	-	-
Income before tax and minority interests	0.82	0.71	0.67	0.61	0.68	-3.8	1.4	3.6	-1.1	-10.5

Source: Banco de Portugal.
Note: (a) Quarterly data have been annualised.

Chart 1

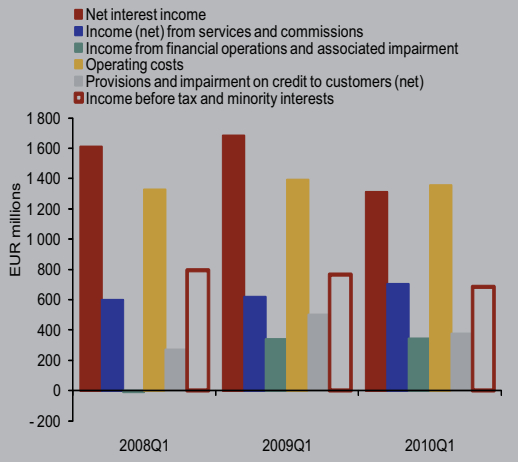
RETURN ON ASSETS (ROA) AND RETURN ON EQUITY (ROE) OF THE SIX MAJOR BANKING GROUPS



Source: Banco de Portugal.
Note: Quarterly data have been annualised.

Chart 2

PROFIT AND LOSS ACCOUNT – QUARTERLY FLOWS



Source: Banco de Portugal.

As regards capital adequacy, the own funds adequacy ratios of the institutions under analysis, in March 2010, remained globally in line with those observed at the end of the previous year (Table 3). In year-on-year terms, the capital ratio levels were significantly higher, particularly reflecting capital increases by institutions during the course of 2009.

Table 3

OWN FUNDS ADEQUACY OF THE SIX MAJOR BANKING GROUPS
On a consolidated basis

EUR millions	2009		2010
	Mar.	Dec.	Mar.
1. Own funds	25 823	30 735	30 968
1.1. Original own funds	18 911	23 060	23 648
1.2. Additional own funds	8 254	7 995	7 704
1.3. Deductions from total own funds	-1 351	- 320	- 384
2. Capital requirements	20 698	21 377	21 514
3. Ratios (per cent)			
3.1. Overall own funds adequacy ratio	10.0	11.5	11.5
3.2. Original own funds adequacy ratio	7.3	8.6	8.8

Source: Banco de Portugal.

Box 4.2. Determinants of the default on loans to non-financial corporations

The international financial and economic crisis was associated with a very sharp fall in the economic activity in most of the developed economies in 2009. In particular, in the case of Portugal, the reduction of activity was the most marked of the last thirty years. In such a context, there has been a significant increase of defaults in banks' credit portfolio which, in the case of non-financial corporations, has attained historically high levels. The materialisation of credit risk is strongly cyclical and is broadly documented in the literature, including applications to the Portuguese corporate sector (e.g. Bonfim (2009), Antunes, Ribeiro e Antão (2006)). The analysis of the relationship between credit risk and the economic cycle is particularly relevant for the analysis of the financial stability of the Portuguese economy, given the potential transmission of losses associated with credit risk on the profitability and solvency of the banking system. In addition, in the light of significant losses of their credit portfolio banks are expected to adopt more stringent lending policies which, in turn, will condition economic activity.

The objective of this box is to study the evolution of default levels on loans to non-financial corporations over the last decade. The analysis uses linear Autoregressive Distributed Lag (ADL) models as well as non-linear ADL models, which allows for the identification of the behaviour of the default in different regimes. The latter are referred to in the literature as threshold models (e.g. Tong and Lim (1980)). These models are adequate for the analysis of variables with asymmetric behaviour, as different dynamics for the dependent variable in each regime are considered. The regime in which the variable is to be found at any moment is determined by the threshold variable. When the threshold variable exceeds a certain threshold, the dynamics of the dependent variable is determined by a different regime.

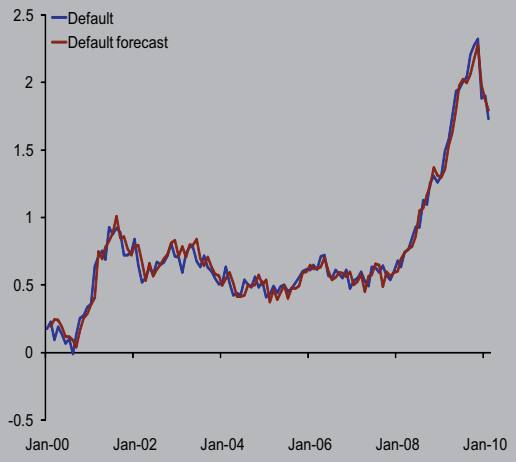
Using as a proxy for the default the annual flow of new overdue credit and other non-performing loans, the relationship between the default and the evolution of economic activity (measured by the coincident indicator of activity) is explored. The level of bank interest rates, for which a positive relationship with credit risk is, in principle, expected, is used as a control variable in the analysis. The data used in this analysis is monthly and covers the period between January 1999 and February 2010, with the model being estimated in first differences. The empirical results based on the linear ADL model corroborate the existence of a negative relationship between economic growth and the default. A threshold model was also estimated on the same data using as an exogenous threshold variable the evolution of the Portuguese PSI20 stock market, for regime differentiation purposes. This model reveals a good adjustment to the data (see Chart 1), with the estimated threshold corresponding to a negative monthly change of the PSI20. The results obtained are in line with the linear model. Defaults on loans to non-financial corporations are more sensitive to the evolution of economic activity in the regime in which the stock market is falling.[1] In the alternative regime, the default is not sensitive to this variable. The interest rates on non-financial corporations' loans have a positive relationship with the default levels and this effect is more evident in the unfavourable regime. Therefore, given the relatively more favourable evolution recorded by the PSI20 between the second quarter of 2009 up to the beginning of 2010, the lower default levels observed may be associated with the reduced bank interest rates currently in force.

(1) *This result is comparable to the one obtained by Marcucci and Quagliariello (2009) in an analysis of credit risk in Italy.*

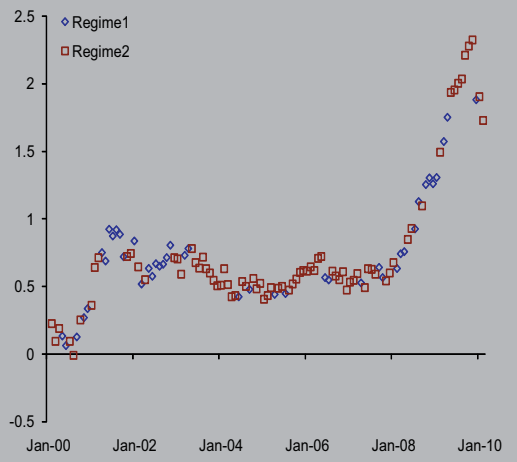
Chart 1

DEFAULTS ON LOANS TO NON-FINANCIAL CORPORATIONS

Adjustment of model



Classification of regimes



Sources: Banco de Portugal and authors' calculations.
Note: The threshold variable is given by the monthly change (lagged one month) of the PSI20, where the PSI20 is measured by its monthly average. Regime 1 comprises the situation in which the variable is smaller than the threshold, whereas regime 2 is the opposite.

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Box 4.3. Credit to households and default: a characterisation based on the Central Credit Register

Over the course of more than a decade, Portuguese households' indebtedness has significantly increased, the ratio between households' debt and disposable income increasing from 22 per cent in 1990 to 134 per cent in 2009, which is relatively high by international standards. According to the data from the Households Wealth and Indebtedness Survey (IPEF) carried out at the end of 2006, in the case of indebted households the median value of the ratio between debt and income totalled 144 per cent.[1] The dynamics of the increase in the households' indebtedness reflected, in part, the transition to a new equilibrium resulting from a greater facility in the access to credit, largely fuelled by the deregulation process, the existence of lower transaction costs (to a large extent information costs) following the rapid technological development of the last few years, the supply of new products, in addition to the changeover to a new regime characterised by lower, less volatile interest rates.[2] Notwithstanding the evolution of indebtedness, the historically low level of interest rates has permitted the proportion of interest paid out of disposable income to evolve much more moderately. According to Banco de Portugal estimates, this indicator increased from around 4 per cent, in 1990, to around 6 per cent in 2009. Additionally, as loan maturities have been increasing, the ratio between debt service payments and disposable income has remained at supportable levels, mitigating the effect of the increase in indebtedness in households' finances.

The information available on loans in default has been used as a measure of credit quality and risk associated with credit to households. In 2009, in the context of a marked downturn in economic activity following the onset of the financial crisis, the values of this sector's aggregate default indicators were comparable to those recorded in the recession of 2003. Both the level and dynamics of defaults on mortgages differed significantly from those observed in the consumption and other purposes segment. In particular, the default rates on mortgages was significantly lower, with loans in default occurring at a much more moderate rate than in other household credit segments. The fact that the main purpose of this type of credit is the acquisition of first homes, in addition to the requirement of personal guarantees from third parties in loans to younger individuals with lower income levels, contributed to explain those differences.[3] Furthermore, in accordance with the data from the last IPEF, the participation in the other credit segments was extended to younger debtors with a relatively lower level of income.

An analysis of households' indebtedness and associated default based on aggregate data is insufficient, as percentiles and other characteristics of the distributions may provide more relevant information than average values. The data available in the Central Credit Register (CRC) is particularly useful for the characterisation of credit from the financial sector and, in particular, credit in default, in accordance with several characteristics of the loans (type of product and maturity) and debtors (age, number of banking relationships and amount of exposure).[4] In this box, the CRC data are used to describe the recent situation of indebted households in Portugal, paying special attention to the characteristics of the debtors in default. The analysis refers to outstanding credit extended by the reporting institutions to resident households in Portugal, at the end of December 2009. It includes credit to this sector under the scope of their activities as self employed or sole proprietorship businesses.[5] The total amount of credit to households registered in the CRC was around EUR 150 billion euros in December 2009, relating to 3.7 million debtors. The total amount of credit differs from the amount recorded in the monetary and financial statistics (EMF) essentially on account of the fact that institutions with the obligation to report directly for EMF purposes (banks, savings banks and mutualist agricultural savings institutions) are a sub group of the entities participating in the CRC. The data refer to effective and not potential credit. Credit can be performing or overdue. This analysis

(1) *IPEF 2006, carried out by Banco de Portugal and INE, obtained results from around 8,000 households. For more details on the characteristics of the sample see Farinha, L. (2008), "The indebtedness of Portuguese households: recent evidence based on IPEF 2006-2007", Banco de Portugal, Financial Stability Report 2007.*

(2) *See "The Portuguese economy in the context of economic, financial and monetary integration", Banco de Portugal, Economics and Research Department, 2009.*

(3) *See "Box 4.2 The main characteristics of loans to households for house purchase in Portugal", Banco de Portugal, Financial Stability Report 2008.*

(4) *The current CRC format makes it possible to separately identify and characterise mortgage loans and other types of credit. In comparison with survey data, this database has the advantage of covering the whole of the population with debts to financial institutions but has the disadvantage of not having such a comprehensive set of information on debtors' demographic and socioeconomic characteristics.*

(5) *Outstanding amounts of credit to non-profit institutions serving households, included in the sectors are accordingly, not included.*

considers the usual division into mortgage loans, credit for consumption and credit for other purposes. Additionally, credit for consumption is split up into credit for vehicles, use of credit cards and other loans for consumption.

The distribution of the number of debtors by type of product shows that more than 80 per cent of the debtors have taken out credit for consumption, around 41 per cent of debtors have mortgage loans and almost 17 per cent have credit for other purposes (Table 1). In terms of amounts, the largest proportion comprises mortgage loans with 78 per cent of the total, confirming the importance of this type of credit in terms of households' financial liabilities. Microeconomic data permits the calculation of other measures in addition to average values. The quantiles may be particularly informative in the case of asymmetrical distributions, as in the case of credit distribution. The median value of mortgage loans is EUR 65 thousand. It is also the case that 5 per cent of mortgage loans are for more than EUR 189 thousand. The median values of the balances for other types of credit are relatively lower although it should be noted that around 1 per cent of loans for other purposes accounts for more than EUR 230 thousand. This type of credit records the highest percentage of debtors in default (22 per cent), although the default ratio in this segment (8 per cent) is not the highest.[6] In turn, the segment with the lowest percentage of debtors in default (5 per cent) and the lowest default ratio (1.7 per cent) is mortgage loans. It should be noted that the proportion of these segments in terms of total credit differs significantly and is around 8 per cent for credit for other purposes and around 80 per cent for mortgage loans.

The distribution of credit by maturity at origination is consistent with the distribution by type of credit (Chart 1). In the case of mortgage loans, more than 50 per cent of the credit has been taken out for maturities of more than 30 years. In turn, vehicle credit is highly concentrated in the 5 to 10 years maturity brackets. The proportion of consumer credit which does not have a defined maturity comprises the use of credit cards. By analogy, the proportion of credit for other purposes with an indeterminate maturity comprises lines of credit, particularly used to finance households' business activities. Concerning default, credit with longer maturities tends to have lower default ratios. This is in line with the fact that the longer maturity loans are largely for house purchases, which is the credit segment that presents the lowest default ratio, while the loans with the smallest maturities are mainly for consumption and other purposes that have higher default levels.

Borrowers tend, over a more or less long period, to use a single credit institution for their financing requirements. The relationship established allows the credit institution to accumulate information on the debtor that facilitates the access to credit. The data used in this analysis indicate that around 58 per cent of debtors have taken out credit

Table 1

DISTRIBUTION OF CREDIT BY PRODUCT

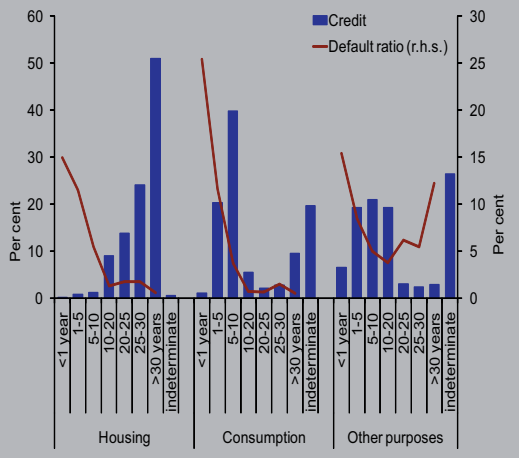
	EUR thousands								Per cent			
Segment \ Percentiles[a]	p1	p5	p25	p50	p75	p95	p99	Média	No. debtors[b]	Credit	No. debtors in default[c]	Default ratio[d]
Housing	1.1	6.2	35.6	65.3	100.4	189.0	316.2	77.6	40.9	77.9	5.3	1.7
Consumption	0.1	0.1	0.6	2.2	7.9	25.9	58.3	6.8	82.0	13.7	13.6	6.9
vehicle	0.3	1.0	3.6	6.9	11.5	20.6	31.5	8.4	16.9	3.5	15.0	8.7
credit cards	0.1	0.1	0.3	0.7	1.7	6.0	12.9	1.6	51.9	2.0	10.2	10.6
other	0.1	0.1	0.6	2.1	7.4	28.0	66.8	7.2	46.7	8.3	13.4	5.3
Other purposes	0.1	0.2	1.0	4.6	12.5	62.0	229.1	20.4	16.7	8.3	22.0	8.1

Source: Banco de Portugal (Central Credit Register).
Notes: (a) Percentiles of the variable exposure of each borrower towards the financial institutions reporting to the Central Credit Register. (b) Number of debtors in a specific segment as a percentage of the total number of debtors. (c) Number of debtors in default in a specific segment as a percentage of the number of debtors in that segment. (d) Overdue credit as a percentage of the amount of credit in the segment.

(6) *A specific segment's default ratio is defined as overdue credit as a percentage of the amount of credit in that segment.*

Chart 1

DISTRIBUTION OF CREDIT AND DEFAULT RATIO BY MATURITY AT ORIGINATION



Source: Banco de Portugal (Central Credit Register).
Note: Credit is expressed as a percentage of credit to the segment under analysis (housing, consumption and other purposes).

from only one institution and that their debt comprises around 42 per cent of total credit (see Table 2). The number of debtors with more than six banking relationships is less than 1 per cent and their debt comprises around 2 per cent of the credit. The literature, in the case of companies, also shows that exclusive relationships tend to last longer in the case of debtors with a more solid financial situation.[7] Difficulty in obtaining credit from the usual bank is the main reason why a debtor will use another institution. This is, to a certain extent, corroborated by the results presented above. The default ratio clearly increases in line with the number of debtors' banking relationships.

It should be expected, all things being equal, that younger indebted borrowers beginning their working lives should be more vulnerable in the event of an economic crisis. The distribution of credit by debtors' age indicates that credit to very young people (under 30) accounts for a relatively reduced proportion in the various segments, except for vehicle credit (Chart 2). It has also been noted that the credit peaks in an intermediate age bracket which differs according to the type of credit. The age bracket of 30 to 40 years is responsible for the largest proportion of

Table 2

DISTRIBUTION OF CREDIT AND DEFAULT RATIO PER NUMBER OF BANKING RELATIONSHIPS

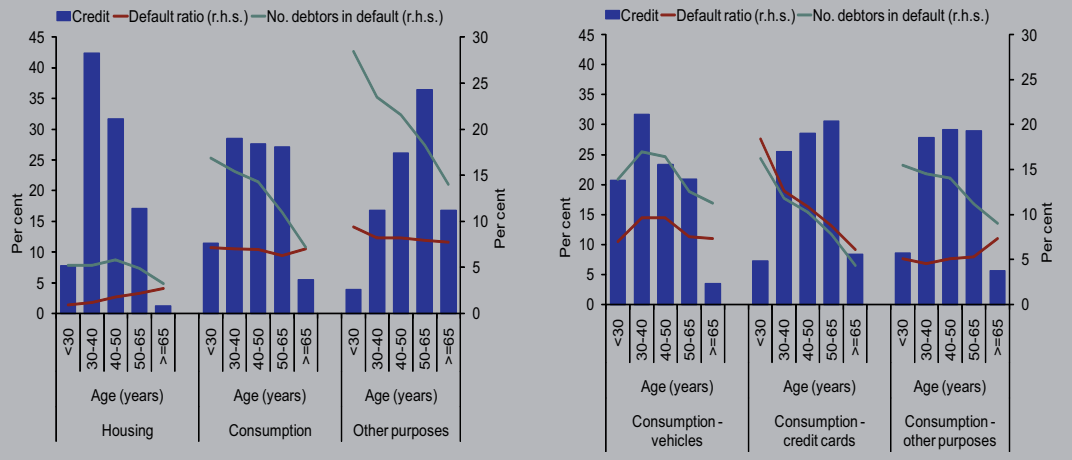
	Per cent		
Number of banking relationships	No. debtors[(a)]	Credit[(b)]	Default ratio[(c)]
1	58.3	42.3	2.2
2	24.0	27.7	2.6
3	9.9	14.5	3.3
4	4.2	7.5	4.1
5	1.9	3.7	4.8
6	0.9	2.0	5.9
more than 6	0.8	2.3	8.6
Total	100.0	100.0	2.9

Source: Banco de Portugal (Central Credit Register).
Notes: (a) Number of debtors with a specific number of banking relationships as a percentage of the total number of debtors. (b) Credit of debtors with a specific number of banking relationships as a percentage of total credit. (c) Overdue credit as a percentage of the amount of credit, for each specific number of banking relationships.

(7) *See Farinha and Santos (2002), "Switching from single to multiple bank lending relationships: determinants and implications", Journal of Financial Intermediation, 11,124-151.*

Chart 2

DISTRIBUTION OF CREDIT AND DEFAULT BY AGE OF DEBTOR



Source: Banco de Portugal (Central Credit Register).
Note: Only credit with information available on the age of the debtor was considered, comprising around 88 per cent of the credit considered in the rest of the analysis of this box.

mortgage loans (around 42 per cent) and vehicle credit (around 32 per cent) and the 50 to 65 year old bracket for the credit for other purposes (around 36 per cent) and the use of credit cards (around 31 per cent). The percentage of debtors in default monotonically decreases with the age of debtors, except in the case of vehicle credit. However, the effect of age in default ratios is not so clear. The default ratio clearly grows with age in the case of mortgage loans. This result may, in part, derive from the fact that in the case of credit to younger people, a significant part of such credit has at least one additional guarantee (Table 3). Only in the case of the use of credit cards the default ratio clearly decreases with age.

Loans to individual households evidence a certain level of concentration in larger exposures, although to a much lesser extent than loans to non-financial corporations. Of the segments considered in this analysis, mortgage loans are among the less concentrated ones, with 10 per cent of the debtors holding the largest exposures (of more than around EUR 150 thousand) representing around 30 per cent of the amount of credit (Chart 3). The default ratio of this segment does not appear to be very sensitive to the dimension of the exposure, although the largest exposures present a higher percentage of debtors in default. As regards credit for consumption, the largest concentration is registered in the other credit for consumption segment, although reference should be made to the fact that the default ratios do not show significant differences when exposures for different amounts are considered. Vehicle credit has a similar profile. Credit associated with credit cards has the highest concentration in terms of the largest exposures, with 10 per cent of debtors being responsible for around 50 per cent of the amount of credit. These exposures have the highest default levels, with default clearly growing in line with the dimension of the exposure. Credit for other purposes has the largest concentration of credit in the larger exposures, although such exposures have the lowest default levels.

In conclusion, CRC data confirm the importance of mortgage loans in terms of total credit to households and that this is the segment which has recorded the lowest default ratio. Even though, 82 per cent of debtors have taken out credit for consumption, approximately twice the number with mortgage loans, in line with the results of the IPEF which indicate an increase in the number of debtors with credit for purposes other than housing. This analysis also shows that loans with the longest maturities (more than 30 years) account for a very high proportion of mortgage loans, corroborating the hypothesis that the increase in indebtedness was accompanied by a trend towards the lengthening of loan maturities. CRC data show, in the case of mortgage loans to younger people, that guarantees other than the mortgage on the property is more frequent. This evidence is consistent with the fact

Table 3

DISTRIBUTION OF CREDIT AND DEFAULT RATIO BY NUMBER OF BANK GUARANTEES, IN THE MORTGAGE LOANS SEGMENT

Credit (per cent)[a]

Age (years) \ No. guarantees	0	1	>1	Total
<30	7.5	67.3	25.2	100.0
30-40	8.4	74.7	16.9	100.0
40-50	9.0	82.1	8.8	100.0
50-65	10.2	84.8	5.0	100.0
>=65	12.8	82.4	4.8	100.0
Total	8.4	79.2	12.4	100.0

Default ratio (per cent)[b]

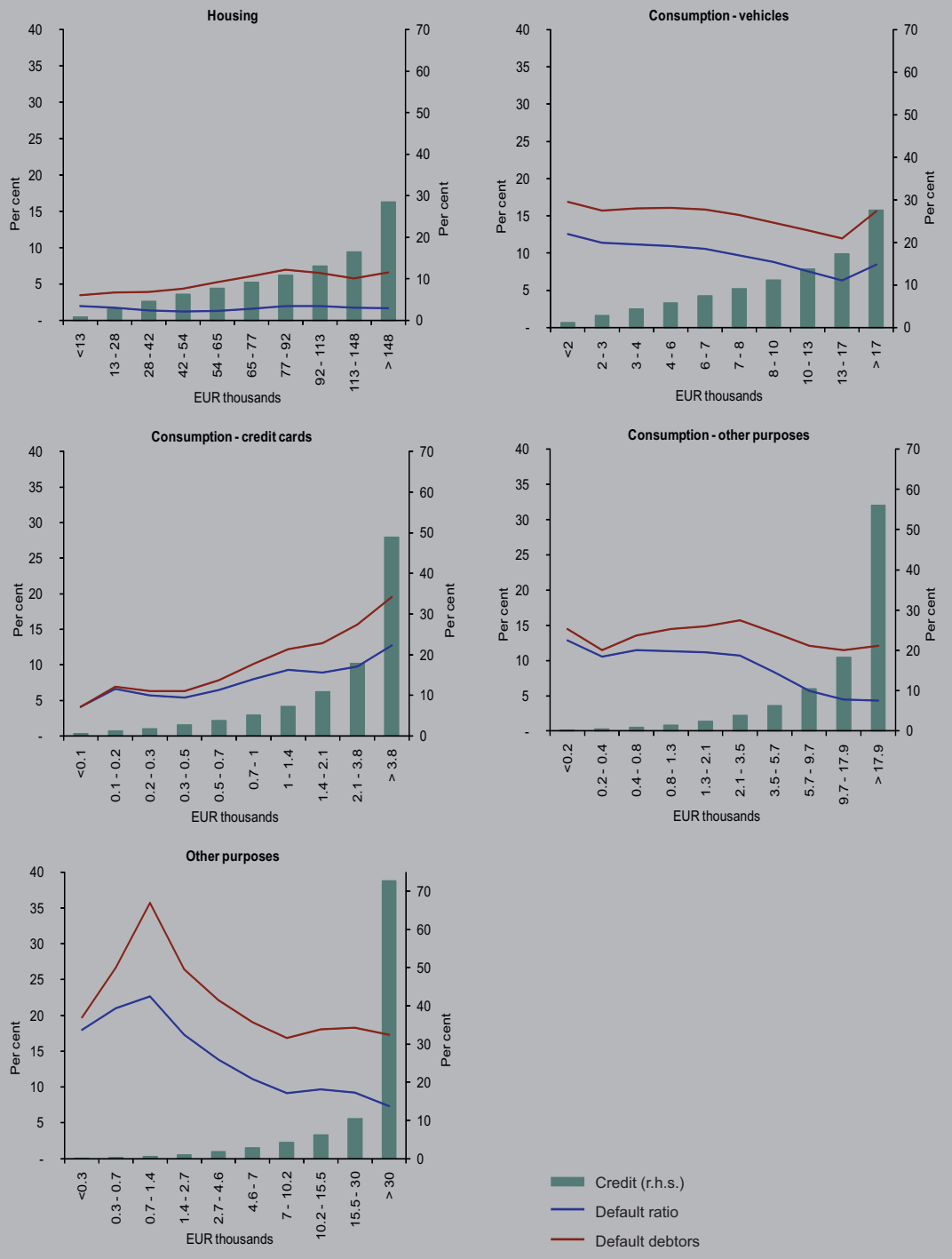
Age (years) \ No. guarantees	0	1	>1	Total
<30	1.8	1.0	0.3	0.9
30-40	3.0	1.2	0.5	1.2
40-50	4.4	1.6	0.7	1.8
50-65	5.4	1.9	1.0	2.2
>=65	6.4	2.3	0.7	2.7
Total	4.7	1.5	0.6	1.7

Source: Banco de Portugal (Central Credit Register).
Notes: (a) Credit associated with loans with a specific number of guarantees in each age bracket as a percentage of the credit in that category. (b) In each age bracket, overdue credit associated with loans with a specific number of guarantees as a percentage of the amount of those loans.

that the default ratios are relatively lower for younger debtors, which is noted in most of the segments, except for credit cards. Regarding the distribution of default by dimension of exposure, a slightly downward trend of the ratio in line with the dimension of the exposures has been noted, except for credit cards, suggesting that in the case of the higher exposures, there is a smaller risk of incurring default situations.

Chart 3

CHARACTERISATION OF CREDIT AND DEFAULT BY DIMENSION OF EXPOSURE



Source: Banco de Portugal (Central Credit Register).
Note: Only credit with information available on the age of the debtor was considered, comprising around 88 per cent of the credit considered in the rest of the analysis of this box.

PART II – ARTICLES

AN ASSESSMENT OF PORTUGUESE BANKS' COSTS AND EFFICIENCY*

*Miguel Boucinha***

*Nuno Ribeiro***

*Thomas Weyman-Jones****

1. INTRODUCTION

Banks play a central role in the financial system and also in the real economy as the 2008 financial crisis has vividly illustrated. Their smooth functioning allows for the intermediation of funds in the economy and provides for a wide range of financial services. In order to ensure this banks need not only to adequately monitor their risks but also to efficiently allocate their resources. Hence, the measurement of bank performance is a critical issue that has deserved considerable attention in the banking literature.

In this paper, we propose to analyse developments in the performance of the Portuguese banking system between 1992 and 2004, a period in which significant changes were observed, including the process of liberalization, consolidation and financial innovation.[1] These changes had a profound impact on the market's structure and on banks' technology and, through the analysis of a cost function, we assess how they affected banks' marginal costs and total productivity, which we decompose into the effect of scale efficiency change, cost efficiency change and technological progress.[2] In this way, we can not only quantify total factor productivity growth, but also identify if changes in productivity were driven by moving to a different point in the cost function, by moving closer to the cost frontier or by shifts in the frontier itself.

Previous empirical results on the efficiency of Portuguese banks include the work by Mendes and Rebelo (1999), Mendes and Rebelo (2000), Pinho (2001), Canhoto and Dermine (2003), Lima (2008) and Lima and Pinho (2008). The majority of these studies estimated translog cost functions using Stochastic frontier Analysis (SFA), while in the one by Canhoto and Dermine (2003) a non-parametric frontier was estimated using Data Envelopment Analysis (DEA) and Mendes and Rebelo (2000) employ both methodologies.

Even though the above mentioned studies use different empirical and theoretical approaches to the modelling of banks' activity and cover different time periods (starting in 1987 and ending in 2004),

* The opinions expressed in the article are those of the authors and do not necessarily coincide with those of Banco de Portugal or the Eurosystem. Any errors and omissions are the sole responsibility of the authors.

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(1) For a brief overview of the liberalization process see Ribeiro (2007) and Banco de Portugal (2009).

(2) Cost efficiency is commonly referred to in the literature as X-efficiency.

all but the one by Mendes and Rebelo (1999) found that the productivity of Portuguese banks has increased through time. However, as expected given the differences in the approaches, they do not agree on the levels of X-inefficiency. The identification of shifts in best practices and changes in the distance at which banks operate from the efficient frontier also varies across studies according to the methodology employed. In fact, some studies do not allow for the distinction of the two effects, since the frontier is assumed to be constant over time, so that all productivity changes are attributed to changes in cost efficiency. Further, Pinho (2001) and Mendes and Rebelo (2000) found that state-owned banks tend to perform worse on average whereas Canhoto and Dermine (2003) found that banks which were created after 1984 and foreign banks perform better than older banks which operated under the previously prevalent tightly regulated market conditions, including state-owned banks. Further, Mendes and Rebelo (2000) and Lima (2008) found that mergers contributed to increase banks' performance.

The remainder of the article proceeds as follows. Section 2 presents the methodology and the data used to estimate banks' cost function and productivity. Section 3 presents the empirical results of this article and is divided into 6 subsections, comprising the discussion of the estimates for Portuguese banks' marginal costs, the shadow cost of equity, scale efficiency, cost efficiency, technological progress and total factor productivity growth. Section 4 presents some concluding remarks.

2. METHODOLOGY AND DATA

The modelling of banks' production has been the subject of considerable debate in the literature, essentially due to the controversy regarding the classification of customer deposits as inputs or as outputs. On the one hand, the *production approach* to bank modelling regards banks as firms producing services which are related to loans and deposit accounts, thus identifying as outputs the number of deposit accounts serviced and the number of loans originated and as inputs labour and physical capital. On the other hand, according to the *intermediation approach* (Sealey and Lindley (1977)), banks' main activity is granting loans and investing in securities and other assets using funds obtained through deposits, purchased funds and equity.[3] There are sensible theoretical arguments supporting both approaches, and there is not a clear preference for either of them in empirical applications.[4] However, as remarked in Hughes, Mester and Moon (2001) the inclusion of deposits both as inputs and as outputs would yield misleading results. In this case, the cost function would include both the level of deposits (since deposits are an output) and the price of deposits, whereas the definition of costs would include deposit related interest expenses (since deposits are an input). The argument is that the optimal choice of one input – deposits – would not be influenced by the price of this input, since its quantity is held fixed.

There are two main reasons why holding deposits is an attractive activity for banks. On the one hand, as suggested by the production approach, deposits generate commission income and are a product

(3) See Freixas and Rochet (1998), p.p. 77-79, on the production and intermediation approach.

(4) The fact that the production approach identifies as outputs the number of loans originated and deposit accounts constitutes an additional complication since this data is often unavailable. Studies which follow the production approach usually circumvent this issue by proxying the number of loans and deposit accounts by their value.

which adds value in itself, as the general public does not have access to the same investment opportunities as banks. On the other hand, they are a relatively low cost and stable source of funding. Either way, a considerable part of banks' resources is dedicated to the origination and management of deposits. However, even though on a smaller scale, the acquisition and management of any input carries costs.

Based on the test proposed in Hughes and Mester (1993) we chose to model deposits as an input since the elasticity of total costs deducted of interest paid on deposits with respect to the level of deposits is negative.[5] This specification has the additional advantage of allowing for a more comprehensive definition of banks' costs, since otherwise the specification would totally ignore funding costs, and so the measurement of efficiency would be limited to operational costs. Such an analysis could yield misleading results as some banks may be willing to bear higher operational costs (with employees and equipment) in order to optimize their funding structure, thus attaining lower funding costs. A similar argument motivates the inclusion of equity as a fixed input since, as remarked in Hughes, Mester and Moon (2001), otherwise banks which find relatively more funding in equity and less in debt would spuriously appear to be more efficient. The fact that equity is treated as a fixed rather than a variable input is justified by regulatory and rating/reputation constraints to the choice of the optimal level of equity. Further, the costs associated to common equity issues lead banks to raise capital in relatively large tranches. As a consequence, current levels of capital need not only suffice to cover risks currently incurred, but should also accommodate the future growth of assets. As such, banks may have a higher level of equity than that yielded by the individual static maximization problem.

Hence, banks are assumed to minimize labour, funding and capital related costs $\left(w_L L + w_F F + w_K K\right)$ subject to the production of a predetermined amount of loans $\left(\overline{y_1}\right)$ and other earning assets $\left(\overline{y_2}\right)$ and to the maintenance of a given level of equity $\left(e_0\right)$:

$$C\left(y_1, y_2, w_L, w_F, w_k, e\right) = \min_{L,F,K}\left(w_L L + w_F F + w_K K\right) \tag{1}$$

$$\begin{aligned} & s.t. \\ F\left(x, e\right) &\geq \overline{y} \\ e &\geq e_0 \end{aligned}$$

where the variables are defined as:

$$C \equiv \sum_k w_k x_k \tag{2}$$

(5) The reasoning behind this test is that increasing the use of an input should decrease costs incurred with other inputs, whereas an increase in the production of an output should be associated with an increase in costs.

$$
\begin{aligned}
y_1 &: Total\ Loans \\
y_2 &: Other\ Earning\ Assets \\
w_L &: Price\ of\ Labour \\
w_F &: Price\ of\ Funding \\
w_K &: Price\ of\ Capital \\
L &: Labour \\
F &: Funding \\
K &: Capital \\
e &: Equity
\end{aligned}
$$

The price of funding is computed as the ratio between the flow of interest paid and the stock of interest bearing liabilities and the price of labour is defined as the ratio between labour costs and the number of employees, whereas the price of capital was proxied by the ratio between the sum of depreciation and general administrative costs (excluding labour) and the stock of tangible and intangible assets.

It is well known that banks, as is true with other firms, either due to agency problems or due to differences in managerial ability, do not strictly behave as profit maximizers, and some banks are closer to optimal behaviour than others. Furthermore, as usual in empirical applications, the performance of each bank is also affected by random factors, and the variables used in the estimations may be subject to measurement error. Hence, in order to analyse the cost efficiency of Portuguese banks since the early nineties, the cost function stemming from Equation (1) is estimated using Stochastic Frontier Analysis models. The main equation to be estimated in the model may be expressed as:

$$lnC_{i,t} = lnC\left(t_t, y_{r,i,t}, w_{k,i,t}, e_{i,t}\right) + \left(v_{i,t} + u_{i,t}\right) \tag{3}$$

where $C\left(t_t, y_{r,i,t}, w_{k,i,t}, e_{i,t}\right)$ represents the estimated cost frontier and $C_{i,t}$ are banks' actual costs, so that a banks' observed costs are bounded below by the sum of the estimated cost frontier and a random error $\left(v_{i,t}\right)$ which is assumed to follow an i.i.d. $N\left(0, \sigma_v^2\right)$ distribution and accounts for measurement error of the level of costs, as well as for the effect of other random uncontrollable shocks. The sum of $lnC\left(t_t, y_{r,i,t}, w_{k,i,t}, e_{i,t}\right)$ and $v_{i,t}$ constitutes the stochastic frontier, and $u_{i,t}$ is a non-negative random variable which measures cost inefficiency as the difference between realized cost and the stochastic cost frontier. There are several models established in the literature which make different assumptions about the distribution of $u_{i,t}$. Battese and Coelli (1995) assume that the $u_{i,t}$ are independently distributed as truncations at zero of the $N\left(m_{i,t}, \sigma_u^2\right)$ distribution, where $m_{i,t} = z_{i,t}\delta$ and, in turn, $z_{i,t}$ is a vector of firm specific and time varying variables and δ is a vector of unknown coefficients to be estimated. This specification has the advantage of allowing for an interpretation of how some selected variables (those included in $z_{i,t}$) are related with estimated cost efficiency. The variables included in $z_{i,t}$ were the ratio of non-performing loans outstanding for less than one year to granted loans $\left(NPL\right)$ as a measure of credit risk, banks' credit market share $\left(Msc\right)$ as a measure of relative size, ROE an ROA as profitability measures, the equity to assets ratio $\left(Cap.\ Ratio\right)$ and a measure of liquidity defined as the ratio of volatile assets to volatile liabilities $\left(Liq.\ Ratio\right)$.

An alternative model, proposed in Battese and Coelli (1992) defines $u_{i,t}$ as follows:

$$u_{i,t} = u_i \exp\left(-\eta\left(t - T\right)\right) \tag{4}$$

Where u_i are assumed to be independently distributed as truncations at zero of the $N\left(\mu, \sigma_u^2\right)$ distribution and μ and η are parameters to be estimated. In this specification, inefficiency is firm specific and is allowed to vary through time even though, unlike in the model proposed in Battese and Coelli (1995), the ranking of firms remains constant through time. If η is not found to be statistically significant, it can be constrained to zero, so as to maximize the degrees of freedom by estimating no more parameters than needed. The cost efficiency of firm i at time t is:

$$CE_{i,t} = {C\left(t_t, y_{r,i,t}, w_{k,i,t}, e_{i,t}\right)} \Big/ {C_{i,t}} \in (0,1] \tag{5}$$

A fully efficient bank's actual cost is on the cost frontier, so that its efficiency is 100%, whereas an X% efficient bank's actual cost is above the frontier, so that it could theoretically produce the same output with only X% of its actual cost.

In order to provide a good approximation to the true cost function while preserving the available degrees of freedom and avoiding multicollinearity problems, the choice of the functional form in which the cost function is specified should obtain a balance between flexibility and parsimony. While the Cobb-Douglas specification is acknowledged to be too restrictive, the translog functional form provides a flexible local approximation and the Fourier functional form provides a global approximation. Berger and Mester (1997) found the difference between the two latter functional forms to be statistically but not economically relevant. Hence, and given the relatively small number of observations in our sample, the cost function is estimated using a translog functional form, which can be written as:

$$\begin{aligned} lnC_{i,t} = {} & \gamma_0 + \gamma_t t_t + \frac{1}{2}\gamma_{tt} t_t^2 + \sum_r \gamma_{t,r} t_t lny_{r,i,t} + \sum_k \gamma_{t,k} t_t lnw_{k,i,t} + \sum_r \gamma_r lny_{r,i,t} + \\ & + \sum_k \gamma_k lnw_{k,i,t} + \frac{1}{2}\left(\sum_r \sum_s \gamma_{r,s} lny_{r,i,t} lny_{s,i,t} + \sum_k \sum_l \gamma_{k,l} lnw_{k,i,t} lnw_{l,i,t}\right) + \\ & + \sum_k \sum_r \gamma_{k,r} lnw_{k,i,t} lny_{r,i,t} + \gamma_e e_{i,t} + \frac{1}{2}\gamma_{ee} e_{i,t}^2 + \\ & + \sum_k \gamma_{e,k} e_{i,t} lnw_{k,i,t} + \sum_r \gamma_{e,r} lne_{i,t} lny_{r,i,t} + v_{i,t} + u_{i,t} \end{aligned} \tag{6}$$

where the usual theoretical restrictions stemming from duality theory (*i.e*. symmetry and linear homogeneity in prices) were imposed. The associated cost share equations implied by Shephard's lemma were not imposed since they hold only under the assumption that no allocative inefficiency exists. Hence, our measure of X-inefficiency comprises both technical and allocative inefficiency.

The dataset used in this study was obtained from banks' financial statements reported to Banco de Portugal. The database comprises an unbalanced panel of yearly data for all banks operating in Por-

tugal from 1991 to 2004.[6] Total loans were adjusted for securitization, essentially since the originating bank is generally still responsible for servicing securitized loans. Hence, if this correction were not to be undertaken, the cost efficiency of banks involved in securitization operations would be underestimated.[7] Non-performing loans are not included in the definition of output since they are essentially a non-income producing item in banks' balance sheet. Hence, this procedure accounts for different levels of credit risk in banks' loan portfolios and implicitly corrects for the differences in the level and in the quality of banks' screening and monitoring activities of their borrowers' creditworthiness. Note, however, that this argument implicitly assumes that banks' loan portfolios are homogeneous. In practice, each bank may target different loan segments which have different levels of credit risk associated. Even though some effort was made in the selection of a sample of banks with a relatively similar activity in order to mitigate this problem, a full solution would involve defining a separate output for different categories of loans. In our case, this was not viable since it would imply a large increase in the number of parameters to be estimated, which could not be accommodated within the size of our sample.

All banks operating in Portugal are required to report financial statements to Banco de Portugal. However, in order to ensure that the analysis focuses on banks which operate with a similar technology, so that it is legitimate to include them in the same cost function, only universal banks with a retail branch network were included in the sample. Further, newly created banks were included only from their third year of operation, in order to avoid biases associated with short-term misalignments between setup costs and output.

After applying these filters, a sample of 25 banks, comprising a total of 254 bank-year pairs was obtained. For each year, the sample covers at least 77% of total loans, 80% of total assets and 87% of total deposits in the Portuguese banking system. Further, the market share of the five largest banks, when measured in terms of total assets in the sample, increased from around 57% in 1992 to near 70% in 2004, in similar fashion to what was observed in the whole banking system.

3. EMPIRICAL ANALYSIS

This section presents the main results of the analysis. All results are based on the estimation of Equation (6) and are summarized in Table 1. Since the data are expressed as deviations from the overall sample mean, one can easily assess relevant cost function elasticities evaluated at the mean by directly analysing single parameters.[8] Hence, in order to clarify the exposition, most cross terms are not shown in Table 1.[9] A preliminary analysis of estimation results shows that the elasticity of cost with respect to each of the input prices is positive. Furthermore, the input price to which costs react most is the price of funding, which is not surprising considering that funding costs constitute the highest

(6) The reason why more recent data was not used is that in 2005 there were changes in accounting standards, so that data until 2004 is not comparable with the more recent data.

(7) Securitization in Portugal began in 1997 and grew rapidly in recent years, accounting for around 6% of aggregate loans outstanding in 2004. Nonetheless, some heterogeneity was present among banks, with a particular bank presenting a share of securitized loans as high as 34% on a non-consolidated basis in 2004.

(8) For a discussion of why this holds, see Boucinha, Ribeiro and Weyman-Jones (2009).

(9) The full estimation results are available from the authors upon request.

Table 1

COST FRONTIER ESTIMATION RESULTS

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
$ln(W_L)$	0.1260	0.1253	0.1266	0.1278	0.1519	0.1148	0.1147
	0.02	*0.02*	*0.02*	*0.02*	*0.02*	*0.02*	*0.02*
$ln(W_F)$	0.6233	0.6243	0.6226	0.6213	0.6019	0.6364	0.6367
	0.01	*0.01*	*0.01*	*0.01*	*0.01*	*0.01*	*0.01*
$ln(y_1)$	0.5800	0.5798	0.5798	0.6040	0.5872	0.5562	0.5566
	0.01	*0.01*	*0.01*	*0.01*	*0.01*	*0.01*	*0.01*
$ln(y_2)$	0.4472	0.4468	0.4475	0.4679	0.4409	0.4589	0.4591
	0.01	*0.01*	*0.01*	*0.01*	*0.01*	*0.01*	*0.01*
$ln(y_1)*ln(y_2)$	-0.2201	-0.2208	-0.2194	-0.2417	-0.2079	-0.2496	-0.2499
	0.02	*0.02*	*0.02*	*0.01*	*0.02*	*0.02*	*0.01*
t	-0.0192	-0.0191	-0.0194	-0.0195	-0.0236	-0.0142	-0.0143
	0.00	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*
$ln(e)$	-0.0061	-0.0053	-0.0067	-0.0539	-0.0002	-0.0486	-0.0492
	0.02	*0.02*	*0.02*	*0.01*	*0.02*	*0.01*	*0.01*
NPL	0.8847	0.8842	0.8845	0.8978	0.6681		
	0.12	*0.12*	*0.12*	*0.12*	*0.12*		
Msc	-1.0852	-1.0759	-1.0835	-0.9847	-1.1822		
	0.30	*0.29*	*0.30*	*0.31*	*0.40*		
$Cap.\ Ratio$	-0.7913	-0.7739	-0.7865		-0.7525		
	0.27	*0.27*	*0.27*		*0.32*		
ROE	-0.0103						
	0.03						
ROA		-0.40477					
		0.61					
$Liq.\ Ratio$					0.01		
					0.00		
μ						0.0682	0.0713
						0.06	*0.04*
η						0.0021	
						0.03	
γ	0.7126	0.7169	0.7130	0.7033	0.5442	0.77	0.77
	0.16	*0.16*	*0.16*	*0.18*	*0.31*	*0.1295*	*0.1258*

Source: Authors' calculations.
Notes: Standard errors are reported in italics. In the cost function specification, the constant and most cross terms were omitted as they have no direct interpretation. The complete estimation results are available from the authors upon request.

share of total costs. The sum of the parameters on the two outputs is close to one, indicating close to constant returns to scale at the sample mean. The fact that the parameter on the interaction term between the two outputs is negative indicates that there are scope economies in the joint production of loans and other earning assets. There is statistically significant cost reducing technological progress at the sample mean and banks with higher levels of equity tend to have lower costs with other inputs. The estimate for γ indicates the percentage of the total error's variance which is accounted for by cost inefficiency rather than by the classical random error and the fact that it is statistically significant in every specification provides evidence that the estimation of the cost function as a frontier is appropriate. Further, the estimate for γ is lower in the models which include explanatory

variables in the definition of inefficiency, which should be expected as the z-variables capture some of the variance of $u_{i,t}$.

The first five columns of the table provide the results for models where estimated inefficiency is defined as a function of a series of bank characteristics. Banks with a higher ratio between the flow of non-performing loans and total loans granted show up to be more cost inefficient. This result suggests that loan delinquency works as a proxy for manager skill, *i.e*. managers who are poor at monitoring and screening loans are also poor at controlling costs. Banks with a larger market share in loans show up to be more cost efficient, which could indicate that larger banks are able to attract more competent managers. This hypothesis could in turn reflect larger salaries and perks than smaller banks able to pay to their top management as well as the prestige that comes from leading the largest banks. More capitalized banks show up to be more cost efficient, which could reflect lower agency costs. Profitability does not show up to be a relevant determinant of cost efficiency. Banks' liquidity ratio is positively related with cost inefficiency, indicating that banks with less aggressive liquidity management also tend to be less cost efficient. One should nonetheless note that banks that choose to hold lower liquidity buffers will be subject to higher funding liquidity risk, which may not be properly priced in wholesale markets in times of smooth market functioning, such as the one that prevailed during the sample period.

In the seventh column of Table 1, the estimate for bank specific cost inefficiency is defined as a function of time, as shown in Equation (4). However, since the estimate for η was not found to be statistically significant, the next column of the table presents estimation results in which it is restricted to zero in order to avoid the loss of degrees of freedom due to the estimation of redundant parameters. This is the specification used for the analysis whose results are presented in detail in the following subsections, the first of which presents results concerning estimated marginal costs for each bank as well as their behaviour over time. The next subsection discusses the estimates for banks' shadow cost of equity capital. The third subsection discusses results concerning scale efficiency. The following subsections present results concerning cost efficiency and technological progress. In the last subsection changes in total factor productivity are quantified and decomposed in order to assess whether they were driven mainly by changes in the optimum technology, by the technology of each bank approaching the best practices, or simply by banks moving to a different point in the same cost function.

3.1. Marginal costs

Using the estimated parameters for the cost function, marginal cost estimates for the production of each output may be obtained by:

$$mc_{r,i,t} \equiv \frac{\partial C_{i,t}}{\partial y_{r,y,t}} = \frac{C_{i,t}}{y_{r,i,t}} \frac{\partial lnC_{i,t}}{\partial lny_{r,i,t}} \tag{7}$$

Note that Equation (7) yields bank specific marginal cost estimates for both the production of bank loans and of other earning assets. Hence, the time-series presented in Table 2 were constructed by aggregating the individual estimates, using each bank's market share in loans as weights. Since

Table 2

MARGINAL COST ESTIMATES AT THE WEIGHTED SAMPLE MEAN

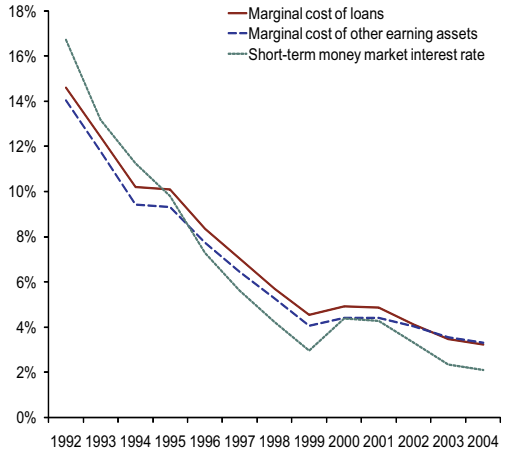
Year	Marginal cost of loans	Marginal cost of other earning assets	Short-term money market interest rate	Implicit price of funding	Real resource marginal cost of loans	Real resource marginal cost of other earning assets	Implicit interest rate on loans	Margin on loans
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
1992	14.59%	14.03%	16.72%	10.74%	3.85%	3.29%	17.15%	2.56%
1993	12.43%	11.79%	13.17%	8.94%	3.48%	2.84%	15.45%	3.02%
1994	10.21%	9.41%	11.23%	7.01%	3.20%	2.40%	13.08%	2.86%
1995	10.10%	9.31%	9.79%	7.09%	3.01%	2.21%	12.26%	2.15%
1996	8.35%	7.73%	7.27%	5.71%	2.64%	2.02%	10.72%	2.37%
1997	7.04%	6.45%	5.61%	4.65%	2.39%	1.80%	9.24%	2.20%
1998	5.69%	5.26%	4.23%	3.59%	2.10%	1.66%	7.44%	1.75%
1999	4.53%	4.05%	2.96%	2.65%	1.89%	1.41%	5.78%	1.25%
2000	4.93%	4.40%	4.39%	3.28%	1.64%	1.11%	6.13%	1.20%
2001	4.85%	4.41%	4.26%	3.46%	1.40%	0.95%	6.30%	1.45%
2002	4.12%	4.03%	3.32%	2.76%	1.35%	1.26%	5.36%	1.24%
2003	3.46%	3.54%	2.33%	2.28%	1.17%	1.26%	4.56%	1.10%
2004	3.21%	3.30%	2.11%	2.00%	1.21%	1.29%	4.21%	1.00%

Sources: Banco de Portugal and authors' calculations.
Note: Total loans adjusted for securitization are used as weights in the computation of means.

funding costs constitute a major share of banks' variable costs and interest rates have decreased markedly during the period under analysis, the fact that the marginal cost estimates have decreased sharply over time is not surprising (Chart 1). Nonetheless, an interesting question is whether real resource marginal costs also decreased through time. A proxy for banks' non-financial marginal cost is obtained by deducing the estimated marginal cost for each bank of the corresponding price of funding. As shown in columns 5 and 6 of Table 2 and in Chart 2, this measure also presents a decreasing trend, indicating that, despite contributing to the profile observed in marginal costs through time, the behaviour of interest rates alone is not enough to explain it. It should be mentioned that during the period under analysis there was a change in the structure of banks' loan portfolio, with an increase in

Chart 1

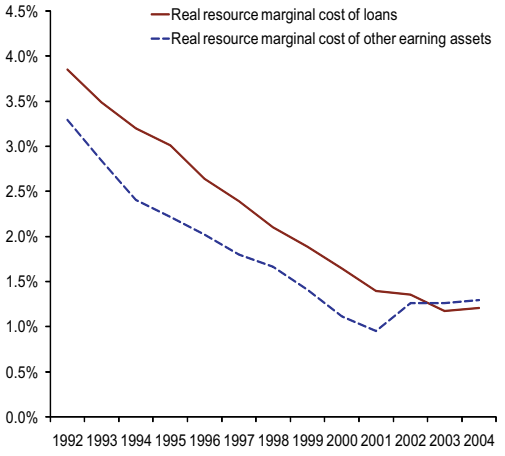
MARGINAL COSTS



Sources: Banco de Portugal and authors' calculations.

Chart 2

REAL RESOURCE MARGINAL COSTS



Source: Authors' calculations.

the share of loans to households as opposed to a decrease in the weight of loans to the public sector. This structural change should have contributed to an increase in the marginal cost of total loans. As such, the significant reduction in the estimated operational marginal cost of loans was not driven by changes in the composition of the loan portfolio.

As illustrated in Chart 2 and documented in Table 2, the marginal cost of loans has generally been higher than that of other earning assets, indicating that it is more resource consuming to provide an additional loan than it is to invest in securities, which should be related with the screening and monitoring costs involved in granting loans. However, this difference has become less relevant through time. In order to understand this development, one should keep in mind that the output which is defined as other earning assets includes quite heterogeneous products. Furthermore, during the sample period there have been changes to the composition of this output. In fact, whereas during the early 1990's banks had significant resources invested in government bonds and deposits with the central bank, with the liberalization of the banking system and financial innovation, banks started to invest in more sophisticated assets which, due to their greater complexity, require the use of more resources.

Furthermore, using data on banks' loan related interest income and stock of outstanding loans, one may compute an implicit interest rate on loans, as shown in column 7 of Table 2. Deducing the marginal cost from this interest rate, a measure of banks' price cost margin is obtained. According to the results shown in the last column of Table 2 and in Chart 3, this measure has decreased through time, which is consistent with the result found in Boucinha and Ribeiro (2009), according to which competition in the banking system has increased during the period under scrutiny.[10]

3.2. Shadow cost of equity

Since the estimated cost function includes the level of equity as a fixed input, it allows for the computation of a measure of the shadow cost of equity capital as:

$$w_k^* = -\frac{\partial C_{i,t}}{\partial e_{i,t}} = -\frac{C_{i,t}}{e_{i,t}} \frac{\partial lnC_{i,t}}{\partial lne_{i,t}} \tag{8}$$

The rationale underlying the computation of the shadow cost of equity is to provide a measure of how much banks are willing to pay for equity, since it indicates the amount that they would save in other costs as a result of an increase in the level of equity.[11]

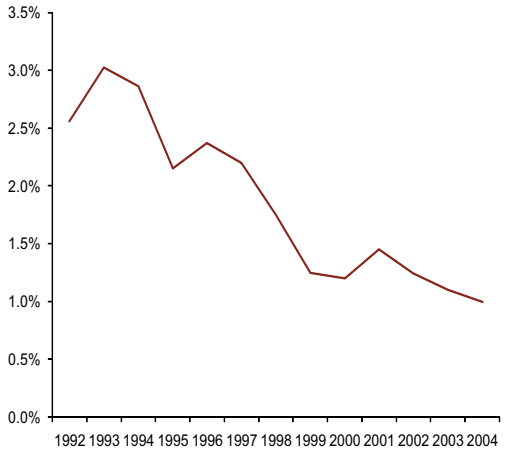
As shown in Chart 4 the time series obtained by aggregating the estimates for the shadow cost of equity is strongly correlated with market interest rates and with banks' weighted average cost of deposit

(10) The measure of implicit interest rate used is computed based on interest income and loan stocks which do not include non-performing loans. Hence, it is a proxy for the interest rate that banks charge their customers, which should be higher than the average interest rate that they actually receive due to loan delinquency. Hence, the decrease in non-performing loans observed throughout the sample period should also have contributed to the decrease observed in banks' price-cost margin. Nonetheless, constructing a measure of interest rate which is a lower bound for the one that banks actually receive, since it includes non-performing loans but not the interest on these loans, the decreasing pattern found for the margin on loans is still present. Hence, this behaviour was not solely driven by the decrease in loan delinquency observed throughout the sample period.

(11) One must bear in mind the limitations of the model employed, by operating under the framework of a static optimization model estimated using non-consolidated accounting data.

Chart 3

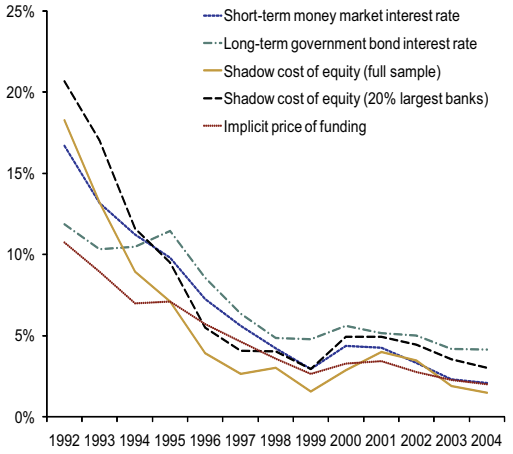
MARGIN ON LOANS



Source: Authors' calculations.

Chart 4

THE SHADOW COST OF EQUITY



Sources: Banco de Portugal and authors' calculations.

and market debt funding. This result is consistent with shareholder capital being a source of funding in itself, so that funding costs are the ones which are most affected by the level of equity.

The obtained measure of the shadow cost of equity, presented in Table 3, is lower than (what is generally acknowledged to be a reasonable value for) the actual price of equity. This result is not surprising and supports our choice of modelling equity capital as a fixed rather than a variable input, since it suggests that the regulatory and reputation constraints to the level of equity are in fact relevant, so that banks hold a higher level of equity capital than the one which would solve their static unconstrained optimization problem.

Table 3

THE SHADOW COST OF EQUITY

Year	Shadow cost of equity (full sample)	Shadow cost of equity (20% largest banks)	Short-term money market interest rate	Long-term government bond interest rate	Equity/Assets ratio	Implicit price of funding
	(1)	(2)	(3)	(4)	(5)	(6)
1993	13.20%	17.02%	13.17%	10.33%	7.41%	8.94%
1994	8.94%	11.60%	11.23%	10.48%	6.97%	7.01%
1995	7.13%	9.52%	9.79%	11.47%	6.54%	7.09%
1996	3.93%	5.51%	7.27%	8.56%	6.29%	5.71%
1997	2.67%	4.09%	5.61%	6.36%	6.07%	4.65%
1998	3.04%	4.04%	4.23%	4.88%	6.39%	3.59%
1999	1.55%	2.96%	2.96%	4.78%	6.50%	2.65%
2000	2.87%	4.92%	4.39%	5.60%	6.04%	3.28%
2001	4.01%	4.94%	4.26%	5.16%	5.85%	3.46%
2002	3.46%	4.46%	3.32%	5.01%	6.13%	2.76%
2003	1.90%	3.56%	2.33%	4.18%	6.36%	2.28%
2004	1.51%	3.04%	2.11%	4.14%	6.33%	2.00%

Sources: Banco de Portugal and authors' calculations.
Note: Total loans adjusted for securitization are used as weights in the computation of means.

With the purpose of investigating what drives differences in banks' shadow cost of equity, this variable was regressed upon a set of bank specific variables, including each bank's capital ratio and return on equity and dummy variables which identify public banks, branches of credit institutions whose head office is in foreign countries and large banks (the 20% larger banks in each year).[12]

In order to avoid simultaneity issues concerning the shadow cost of equity and banks' capital ratio and return on equity, the lag rather than the contemporary value of these variables is used. Since the dummy variable which identifies branches of credit institutions whose head office is in foreign countries is time invariant, identification of the coefficient on this variable is not possible in a regression which includes bank specific fixed-effects. Hence, both fixed-effects and random-effects regressions are shown.

The results of these regressions, shown in Table 4, suggest that more capitalized banks tend to have a higher shadow cost of equity. A positive effect of profitability is also found, which may reflect higher risk incurred by the bank. Possibly reflecting lower credit risk perceived by debt markets, state owned banks tend to have a lower shadow cost of equity. Branches of credit institutions whose head office is in foreign countries generally represent a relatively small portion of their banking group's assets, so that their activity hardly influences the group's credit rating and they often resort directly to the head office in order to obtain funding. Hence, it is not surprising to find that these banks tend to have a lower shadow cost of equity on average. Conversely, larger banks, which tend to be more transparent and whose equity is more likely to be traded in public markets, tend to have a higher shadow cost of equity.

Table 4

DETERMINANTS OF THE SHADOW COST OF EQUITY

	Random-Effects model	Fixed-Effects model
	(1)	(2)
$(Equity/Assets)_{t-1}$	0.84	0.71
	0.14	*0.14*
ROE_{t-1}	0.14	0.13
	0.03	*0.03*
State-owned bank (dummy variable)	-0.05	-0.04
	0.02	*0.02*
Branch of credit institution whose head office is in foreign countries (dummy variable)	-0.08	
	0.04	
20% largest banks (dummy variable)	0.02	0.04
	0.01	*0.02*
Hausman test (p-value)	*0.995*	

Source: Authors' calculations.
Notes: Standard errors are reported in italics. Time dummies and a constant were included in the regressions.

(12) The fact that the dependent variable of this regression is itself an estimate means that the standard errors of this regression are not valid, since they do not account for the variance of the dependent variable.

3.3. Scale efficiency

The assessment of scale economies has been the subject of extensive discussion in the literature. Even though there are many theoretical arguments supporting their existence and they are typically invoked by bank managers as a motivation for mergers and acquisitions, empirical studies often fail to find them in the data. The identification of scale economies has relevant implications since it allows for inference on the adequacy of the market structure from a technological point of view.

This section assesses the presence of scale economies since the liberalization of the Portuguese banking system. A measure of scale economies is typically obtained as:

$$SE_{i,t} \equiv \sum_{r} \frac{\partial ln C_{i,t}}{\partial ln y_{r,y,t}} \tag{9}$$

An elasticity of cost with respect to total loans smaller (larger) than one is obtained in the presence of scale economies (diseconomies). As shown in Table 5, statistically significant scale diseconomies (as defined above) were found during the early 1990's so that, all else equal, an increase in banks' size implied a more than proportional increase in costs. In the more recent period, the estimate for the scale parameter is slightly below one, albeit not statistically different from one, indicating virtually constant returns to scale. One should, nonetheless, keep in mind that the elasticity computed according to Equation (9) is a measure of short-run or constrained scale economies, since the level of equity is held fixed. Furthermore, since the definition of cost employed does not include the cost of equity, the measure of scale economies presented above is actually a measure of cash flow cost economies. This measure is likely to overestimate the true scale parameter, since the fact that the level of equity is held fixed implies that any increase in output must be totally financed by interest bearing debt, so that the cost of debt is forced to increase more than what would be realistic.

Table 5

SCALE ECONOMIES

Year	Scale Economies *(SE)*	*p-value (H0: SE=1)*	Economic Scale Economies *(ESE)*	*p-value (H0: ESE=1)*
1992	1.0919	*0.00*	0.9698	*0.01*
1993	1.0747	*0.00*	0.9678	*0.01*
1994	1.0505	*0.02*	0.9664	*0.00*
1995	1.0349	*0.08*	0.9687	*0.01*
1996	1.0156	*0.41*	0.9665	*0.00*
1997	0.9995	*0.98*	0.9628	*0.00*
1998	1.0010	*0.96*	0.9533	*0.00*
1999	0.9882	*0.57*	0.9457	*0.00*
2000	0.9906	*0.66*	0.9431	*0.00*
2001	0.9933	*0.79*	0.9409	*0.00*
2002	0.9909	*0.71*	0.9363	*0.00*
2003	0.9770	*0.35*	0.9347	*0.00*
2004	0.9658	*0.20*	0.9297	*0.00*
1992-2004	0.9964	*0.86*	0.9447	*0.00*

Source: Authors' calculations.
Notes: Total loans adjusted for securitization are used as weights in the computation of means. SE denotes scale economies as defined in Equation (9) and ESE refers to economic scale economies as defined in Equation (14).

A measure of scale economies which allows for the level of capital to change in response to changes in output could be obtained by estimating a cost function where equity is treated similarly to the other inputs. However, as mentioned above, we do not think that this would be an optimal solution, as there are important constraints to the choice of banks' level of equity capital. Furthermore, even in the more recent period, only a small number of Portuguese banks are listed in the stock exchange market, so that it is not straightforward to obtain estimates for the cost of equity.

Alternatively, as outlined in Hughes, Mester and Moon (2001), citing an original proposal by Hughes (1999), one can compute a measure of economic scale economies assuming that the observed level of equity capital minimizes economic cost at the shadow price of equity, since it then holds that:

$$C\left(t, y_r, w_k, w_{e^*}\right) = C\left(t, y_r, w_k, e\right) + w_e^* e \tag{10}$$

From the expression above, one can compute a measure of economic scale economies as:

$$ESE_{i,t} \equiv \sum_r \frac{\partial C\left(t, y_r, w_k, w_e^*\right)}{\partial y_r} \frac{y_r}{C\left(t, y_r, w_k, w_e^*\right)} \tag{11}$$

Since the level of equity capital e minimizes economic cost, the constrained marginal cost equals the long run marginal cost:

$$\frac{\partial C\left(t, y_r, w_k, w_e^*\right)}{\partial y_r} = \frac{\partial C\left(t, y_r, w_k, e\right)}{\partial y_r} \tag{12}$$

From this result and the definition of the shadow cost of equity in Equation (8), expression (11) may be written as:

$$ESE_{i,t} \equiv \sum_r \frac{\partial C\left(t, y_r, w_k, e\right)}{\partial y_r} \frac{y_r}{C\left(t, y_r, w_k, e\right) - \frac{\partial C}{\partial e} e} \tag{13}$$

or

$$ESE_{i,t} \equiv \frac{\sum_r \frac{\partial lnC_{i,t}}{\partial y_{r,i,t}}}{1 - \frac{\partial lnC_{i,t}}{\partial lne_{i,t}}} \tag{14}$$

An aggregate time-series of the estimates for scale economies obtained through the aggregation of the individual estimates yielded by the computation of Equation (14) is presented in Table 5. While this measure presents the same decreasing profile as the constrained measure, its level is considerably lower at each year. Hence, accounting for the fact that banks' level of capital is allowed to vary

according to changes in banks' output, one finds statistically significant scale economies for the full period under scrutiny, which suggests that the concentration process observed in the Portuguese banking system was at least partly driven by the opportunity to increase productive efficiency.

Estimated scale economies show up to be stronger at the end of the sample when compared to the early 1990's. This result is likely to be linked with the changes to banks' technology brought about by technological progress. In fact, the increasing automation of services should have allowed for a decrease in banks' variable costs at the expense of a more significant initial investment in technology, such as storage and processing of information and communication facilities. These technological developments in turn allowed for the setup of a dense ATM network and of other remote-delivery outlets such as websites, with the corresponding savings in costs associated with the need for less employees and branches. Another factor possibly contributing to the higher scale economies found in the more recent period was the increasing internationalization of banking activity brought about by technological progress, financial innovation and increasing economic integration among EU members. In fact, the expansion of the relevant market for banks' activity beyond national borders brought about new growth opportunities while, to some extent, exposed them to increased competition from non-resident banks. Moreover, even the largest banks in the Portuguese financial system are relatively small when compared to their international counterparts.

3.4. Cost efficiency

Table 6 presents the obtained estimates for the cost efficiency of Portuguese banks between 1992 and 2004. As indicated above, results are based on a specification which does not include determinants of inefficiency. Further, η – the parameter for the change in cost efficiency through time – was not found to be statistically significant, and so was constrained to zero. Hence, the distance at which

Table 6

COST EFFICIENCY ESTIMATES

Year	X-Efficiency
1992	90.89%
1993	91.11%
1994	91.14%
1995	91.08%
1996	91.02%
1997	91.03%
1998	90.50%
1999	90.53%
2000	90.63%
2001	90.66%
2002	90.67%
2003	90.71%
2004	90.82%
1992-2004	90.76%

Source: Authors' calculations.
Note: Total loans adjusted for securitization are used as weights in the computation of means.

each bank stands from the cost frontier representing best practices does not seem to have changed during the period under scrutiny.[13]

The aggregate estimate for inefficiency lies just below 91%, suggesting that Portuguese banks could theoretically have produced the same output while incurring only 91% of their actual costs. Some heterogeneity across banks was found, with estimated efficiency scores ranging from a minimum of 84% to a maximum of 99%.

3.5. Technological progress

The estimated cost function also includes a time trend as a translog term, which allows for the computation of both Hicksian neutral and non neutral technological progress. Total cost reducing technological progress, *i.e.*, shifts to the frontier brought about by the adoption of more efficient production techniques, is obtained by $\frac{\partial lnC}{\partial t}$.[14]

As shown in Table 7, technological progress was very low (and not statistically significant) during the first half of the 1990's. More recently, as banks adjusted to the sector's liberalization and the process of consolidation and financial innovation progressed, technological progress has intensified. These developments should be regarded in the context of global financial integration, which catalysed the swift adoption of more efficient technology. The estimate for technological progress found for 2004 should be interpreted as indicating that, in this year, Portuguese banks operating according to the industry's best practices could produce the same output as in the previous year incurring 3.2% lower total costs.

Table 7

TECHNOLOGICAL PROGRESS

Year	Technological progress *(eti)*	*p-value (H0: eti=0)*
	(1)	(2)
1992	0.19%	0.62
1993	-0.08%	0.42
1994	-0.33%	0.22
1995	-0.67%	0.11
1996	-0.96%	0.02
1997	-1.29%	0.00
1998	-1.44%	0.01
1999	-1.76%	0.03
2000	-2.23%	0.00
2001	-2.54%	0.00
2002	-2.78%	0.00
2003	-3.04%	0.00
2004	-3.19%	0.01

Source: Authors' calculations.
Note: Total loans adjusted for securitization are used as weights in the computation of means.

(13) The fact that the aggregate value of the cost efficiency estimate shown in Table 6 is not constant, even though (as inferred from the lack of statistical significance of η) each bank's efficiency estimate is time invariant, is motivated by a composition effect. In fact, due to changes in banks' market shares, the weights used in aggregation (the value of granted loans) are not constant and, due to mergers/acquisitions and to the emergence of new banks, estimation relies on an unbalanced panel of data.

(14) This effect is particularly clear in 2000, when significant mergers occurred.

3.6. Total factor productivity growth

In this section the parameters of the estimated cost function are used to compute a measure of total factor productivity change $\left(TFPC\right)$ which may be decomposed into the effect of cost efficiency change $\left(EC\right)$, technological progress $\left(TP\right)$ and returns to scale $\left(RTS\right)$ (see Bauer (1990) for details):

$$TFPC = EC + TC + RTS \tag{14}$$

or

$$ln\left(\frac{TFP_{i,t}}{TFP_{i,t-1}}\right) = ln\left(\frac{CE_{i,t}}{CE_{i,t-1}}\right) + \frac{1}{2}\left(-\frac{\partial lnC_{i,t}}{dt} - \frac{\partial lnC_{i,t-1}}{dt}\right) + \\ + \frac{1}{2}\sum_{r}\left[\left(\varepsilon_{r,i,t}\frac{1-ESE_{i,t}}{ESE_{i,t}} + \varepsilon_{r,i,t-1}\frac{1-ESE_{i,t-1}}{ESE_{i,t-1}}\right)ln\left(\frac{y_{r,y,t}}{y_{r,y,t-1}}\right)\right] \tag{15}$$

Where ε_r is the elasticity of cost with respect to output r and each term of the decomposition has an interesting interpretation. In fact, according to the expression above, total factor productivity change comprises catching-up to the cost frontier (cost efficiency change), shifts in the frontier itself over time (technical progress) and shifts along the frontier (returns to scale component). The effect of returns to scale represents the pure impact on total costs stemming from changes in output after allowing for input requirements and it is positive if a bank with increasing (decreasing) returns to scale increases (decreases) its production.

It should be taken into account that Equation (15) is presented as proposed in Bauer (1990), with the necessary changes to account for the inclusion of equity in the estimated cost function. As such, the concept of economic scale economies (ESE) is used instead of the classical measure of scale economies presented in Equation (9).

The results for total factor productivity change in the Portuguese banking sector during the period under consideration are summarized in Table 8 and in Chart 5. The most striking result is that total factor productivity change has been mainly driven by technological progress, which became stronger throughout the sample period. Scale efficiency change also made a positive contribution towards total factor productivity growth, especially during the more recent years, since output increased whereas increasing returns to scale were observed.[15]

Cost efficiency remained virtually constant throughout the period. Combining the three effects one finds that the slow total factor productivity growth observed during the early 1990's increased significantly throughout the decade, reaching a value above 4% in 2004.

(15) This effect is particularly clear in 2000, when significant mergers occurred.

Table 8

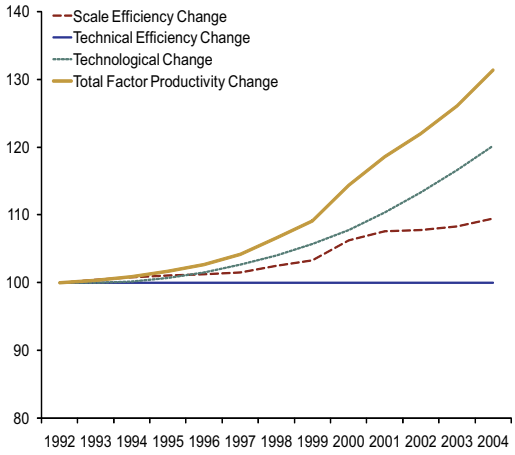
TOTAL FACTOR PRODUCTIVITY GROWTH

Year	Scale Efficiency Change	Technical Efficiency Change	Technological Change	Total Factor Productivity Change
	(1)	(2)	(3)	(4)
1993	0.39%	0.00%	-0.05%	0.34%
1994	0.36%	0.00%	0.21%	0.57%
1995	0.28%	0.00%	0.50%	0.78%
1996	0.17%	0.00%	0.82%	0.99%
1997	0.28%	0.00%	1.12%	1.41%
1998	1.00%	-0.01%	1.37%	2.37%
1999	0.73%	0.00%	1.60%	2.33%
2000	2.83%	0.00%	2.00%	4.83%
2001	1.33%	0.00%	2.38%	3.71%
2002	0.18%	0.00%	2.66%	2.83%
2003	0.44%	0.00%	2.91%	3.35%
2004	1.11%	0.00%	3.12%	4.23%

Source: Authors' calculations.
Note: Total loans adjusted for securitization are used as weights in the computation of means.

Chart 5

TOTAL FACTOR PRODUCTIVITY GROWTH



Source: Authors' calculations.

4. CONCLUDING REMARKS

This paper analyses the production technology of Portuguese banks during the 1992-2004 period through the estimation of a translog cost frontier. Banks are modelled as firms which produce loans and other earning assets, choosing the cost minimizing combination of labour, capital and interest bearing debt, subject to holding a given level of equity.

Several different specifications were tested for the distribution of estimated inefficiency. Banks with higher credit risk and with more idle liquidity were found to be more cost inefficient, possibly reflecting the fact that these variables are in a way proxies for manager quality/sophistication. On the other hand, relatively larger and more capitalised banks were found to be more cost efficient, which could

indicate, respectively, that larger banks are able to attract more competent managers and that strong capitalisation is an effective way of reducing agency problems. The more detailed analysis whose results are briefly summarised below was carried out based on the estimation results of a simpler model where no determinants of inefficiency were included.

Portuguese banks' marginal costs in the production of loans and other earning assets were found to follow to a large extent the decline in nominal interest rates observed throughout the period under consideration. Still, a significant part of the decrease in total marginal costs is explained by a reduction in the real resource marginal cost. In 2004, the last year included in this exercise, the estimate for this measure amounted to 1.2% in the production of loans (the corresponding figure for other earning assets is 1.3%).

Banks' capital structure was accounted for in the analysis by including equity as a fixed input in the cost function. This procedure allowed for the computation of estimates for banks' shadow cost of equity, which should be interpreted as a lower bound to banks' true willingness to pay for equity capital. Hence, it is not surprising to find that they are lower than levels compatible with usually accepted equity risk premia. Furthermore, the estimated shadow cost of equity follows quite closely the developments in market interest rates.

On average, Portuguese banks were found to operate with a cost inefficiency level around 9%, indicating that they could theoretically produce the same output incurring only 91% of their actual cost. The magnitude of cost reducing technological progress was found to increase through time, standing at 2.2% at the (weighted) sample mean and at 3.2% in 2004. Accounting for banks' capital structure, significant scale economies were found, especially in the more recent period. Further, the results point to the existence of economies of scope in the joint production of loans and other earning assets.

Against the background of the liberalization and privatization of the banking system and of increasing financial innovation, the cost frontier representing best practices has shifted downwards over time. The distance between banks' actual costs and the cost frontier, on the other hand, has not changed significantly. Since banks with increasing returns to scale increased their production, there was a move along the cost function which also contributed to an increase in productivity.

Combining these results, estimates for total factor productivity change were computed, amounting to 2.8% each year on average, which results in a total productivity increase of 31.4% between 1992 and 2004. The increase in productivity was more marked in the more recent period, recording a value of 4.2% in 2004.

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AN APPLICATION OF CONTINGENT CLAIM ANALYSIS TO THE PORTUGUESE BANKING SYSTEM*

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1. INTRODUCTION

Following the current financial crisis, economic agents as well as their regulators, have been alerted for the need of models able to quantify the risks taken both at individual level and as a whole. In this context, more than ever, analyzing credit risk has become critical. This article presents contingent claim analysis as one of the models that has been most prominent in assessing this type of risk. This approach is based on an extensive literature that began in the 70s (Merton, 1974, Black and Scholes, 1973, Vasicek, 1977) and has been expanded since then. Recently, the ideas of these seminal papers have been applied on assessing the risk of firms and economic sectors. Gray and Malone (2008) have a reasonably complete picture of the latest applications of this approach.

Following the presentation of the model, the methodology is applied to a set of three Portuguese banks listed in Lisbon's stock exchange. This exercise shows that contingent claim analysis is able of synthesizing the perception of the markets about the solvency state of financial institutions by providing measures for time series and cross section analysis. Although affected by the global financial crisis, our results show that the three banks under analysis have been able to overcome the instability in the markets. In February 2009, the probability of default of the whole financial system did not exceed 2 percent. The ex-ante expected loss also proved to be very low, not exceeding 20 million Euros. Nevertheless, the distance to distress fell near 80 percent as compared to the value reached in May 2007. At the balance-sheet level, our results show that the strong fall in banks' equity market value was compensated by an increase in nominal debt leading to a relative stabilization on their risk adjusted asset value between June 2007 and May 2009 at around 155 billion Euros. As a consequence, the ratio between their debt and their risk adjusted assets rose from 81 percent in May 2007 to around 96 per cent in February 2009. The second half of 2009 has seen some improvements on these indicators in face of banks' stock market valuation. However, these improvements were partially reversed after the recent climate of distrust on the ability of some countries to solve their budget problems.

This study finishes with some suggestions for future research.

This study has five sections. Section 2 presents Merton's contingent claim analysis model. Section 3 presents the results concerning the application of Merton's model to the Portuguese banking system. Section 4 discusses the limitations of the model applied and proposes lines for future research. Section 5 concludes. The reader less interested in technicalities can skip sections 2.2, 2.3 and 2.4.

* The analyses opinions and findings of this article represent the views of the authors, which are not necessarily those of Banco de Portugal or the Eurosystem. All errors and omissions are the sole responsability of the author.

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2. A BRIEF DESCRIPTION OF THE CONTINGENT CLAIM ANALYSIS MODEL

2.1. A Simple idea

The idea behind contingent claim analysis is to use Merton's (1974) model to assess the creditworthiness of a debt issuer, which we will call the "firm", but which could be a bank or an economic sector. Conceptually, this is a very simple model. Consider a firm that issues debt at a given time with a certain maturity. The question that arises is whether the firm has enough assets to honour its obligations at maturity.

In simple terms, the firm will honour its commitments if the value of its assets exceed, at maturity, its debt. If not, the firm declares bankruptcy and all assets are liquidated to creditors. The negative difference between its assets and total liabilities will then be debt holder's loss.

Deciding on whether or not to pay back debt at maturity is very similar to the process of exercising a call option. Recall that a call option gives the holder the right, but not the obligation, to buy some security (underlying asset) at a predetermined price (strike price or exercise price) at the option's maturity.[1] In this context, the option holder will buy the underlying asset if its market price at maturity exceeds the strike price; otherwise the call option is not exercised. To understand the similarities between these two decisions, note that in this simple model without frictions, a firm's equity market value equals the difference between its assets and its debt current market value. At maturity, the firm will pay its liabilities if the value of its assets exceeds its nominal debt, and will declare bankruptcy otherwise. Each firm's equity market value can therefore be seen as equal to that of a call option with its assets as the underlying and exercise price equivalent to its nominal debt.

In this discussion we have omitted a relevant fact. Since debt payments are contingent on assets value, there is no certainty on their payment. Therefore, applying a discount factor based on the risk free interest rate on the nominal debt is not enough to calculate the current market value of debt. One needs to take uncertainty into account. Once again we turn to option pricing theory, but this time to put options. Put options give the holder the right but not the obligation to sell the underlying asset at a predetermined price at the option maturity. In this case, the current value of riskless debt should be equal to the current value of that debt (that is, assuming you have the risk of not being repaid) plus a put option on the underlying asset with exercise price equal to nominal debt at maturity. This is equivalent to say that an investor should be indifferent between taking an amount of riskless debt, or take the same amount at risk but ensuring that in case of non-repayment, it can recover the difference between what it has received (the value of the assets of the firm) and what he should have received (debt repayment). This is achieved through the put option, which will be executed if the exercise price (the value of debt) is higher than the underlying asset (total assets of the firm).

In practice, knowing a firm's equity market value, the volatility of its equity returns, its nominal debt

(1) We are considering only "European" options, in which the option can be exercised only at maturity, as opposed to "American" options, in which the option can be exercised at any time. In our application, this means that a firm can go bankrupt only at debt's maturity. Although there are results showing that in the absence of dividends, an American call option should only be exercised at maturity, this is not always the case, leading to differences in prices. The relevance of this simplifying assumption is open to discussion. Nevertheless, this question tends to be of less importance when the time to maturity is sufficiently small.

and the current risk free interest rate one can use contingent claim analysis to calculate a series of risk measures, namely the distance to distress, the probability of default and the ex-ante expected loss.

2.2. Formalization of the problem

The reader less interested in formal aspects of the model can go straight to Section 3. Define A as assets market value. Similarly, define B and E as a firm's risky debt and its equity market value, respectively. As mentioned in 2.1, in the absence of financial frictions and assuming liquidity at maturity of all assets of the company,

$$A = E + B \tag{1}$$

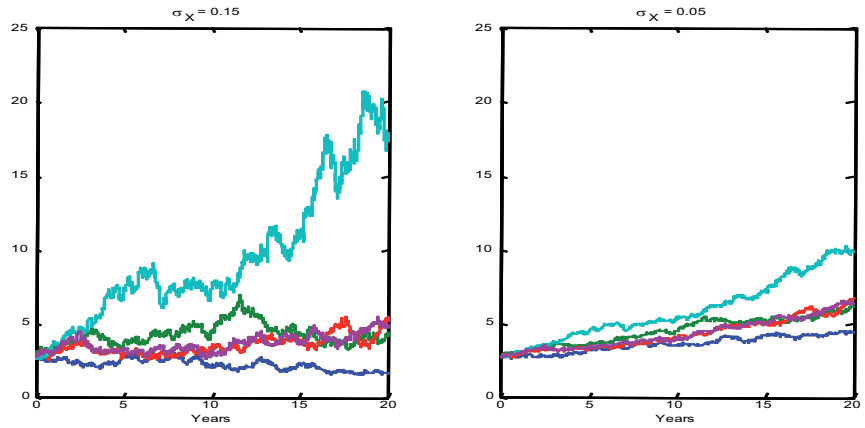
i.e. the market value of equity should equal the difference between assets and the market value of the risky debt.

Suppose that A follows a stochastic diffusion process with a deterministic trend determined by the risk free interest rate. Chart 1 shows some examples of such diffusion processes, usually known as geometric Brownian motions. Now consider that at $t = 0$, the firm issues zero coupon bonds, B_T, amounting to all its liabilities. As shown in Chart 2, a firm is bankrupted if its assets, A, are less than its nominal debt, B_T, at maturity.

It follows that, in accordance with option pricing theory, a firm's equity market value, E, equals an European call option on the underlying assets, A, with maturity $t = T$ and strike price equal to its nominal debt, B_T.

Chart 1

EXAMPLES OF DIFFERENT PATHS FOR SEVERAL STOCHASTIC PROCESSES SIMILAR TO A WITH TREND $\mu_x = 0.05$ AND DIFFERENT VALUES FOR ANNUAL VOLATILITY σx. ASSETS STARTING VALUE IS $EXP(1)$ FOR BOTH CASES



Source: Authors' calculations.

Applying Itô's Lemma,[2] imposing no arbitrage and frontier conditions equivalent to a call option, and defining $\tau = T - t$, one can obtain the following equation for E,

$$E = A\Phi\left(\mathrm{d}_1\right) - B_{\mathrm{T}}\mathrm{e}^{-r\tau}\Phi(d_2) \tag{2}$$

where

$$d_1 = \frac{\ln\frac{A}{B_T} + (r + \frac{1}{2})\tau}{\sigma_A\sqrt{\tau}} \tag{3}$$

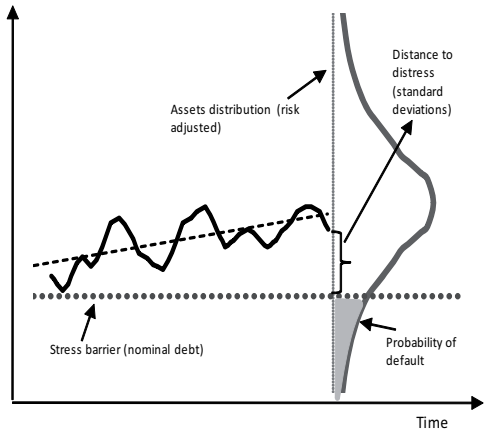
$$d_2 = \frac{\ln\frac{A}{B_T} + (r - \frac{1}{2})\tau}{\sigma_A\sqrt{\tau}} \tag{4}$$

In the equations above, σ_A stands for the volatility of assets returns, r is the risk free interest rate, which we considered to be constant, τ is the time interval up to maturity and Φ is the cumulative normal distribution. Equation (2) has a simple interpretation. The first term evaluates assets weighted by a coefficient related to the probability of the call option being exercised; the second term weights the discounted nominal debt by a coefficient slightly smaller (there is a negative signal on Φ argument) given that losses are limited.

The formula above corresponds to a situation with no transaction costs or other financial frictions,

Chart 2

ASSETS DISTRIBUTION, A, RELATIVELY TO THE DISTRESS BARRIER



Source: Authors' calculations.

(2) See Hull (2009).

total divisibility of assets, no dividend distribution, no arbitrage opportunities, continuous transaction, constant risk free interest rate and where bankruptcy can only occur at maturity.

As explained in Merton (1974), this expression can also be obtained through Black and Scholes (1973) option pricing theory by means of the so-called put-call parity, which uses a no arbitrage argument to show that any investor should be indifferent between holding A until T or, alternatively, holding a portfolio with (i) a risk free asset with value equal to K in T ; (ii) a call option on A with maturity T and strike price K; (iii) and a short position on a put option on A with maturity T and strike price K.[3]

Translating this parity for our case, where K is BT, it comes that

$$A = e^{-r\tau} B_T - P + E \tag{5}$$

Rearranging the above equation one can then obtain the value of the put option, P . The value of P is a very interesting measure in risk analysis, normally interpreted as a risk premium in sight of the debt's contingent character. Note that, considering that the risky debt (B) equals the discounted risk free debt $(e^{-r\tau}B_T)$ less the risk premium (i.e. the put option value), then equation (5) is equivalent to equation (1).

2.3. Model Estimation

Equation (2) has two unknowns, A and σ_A . In order to obtain their value, one needs to impose a second condition. One possibility is to say that equity, E , also follows a geometric Brownian motion but with different parameters than A .

Applying Itô's Lemma and equating the volatility terms, we obtain

$$E\sigma_E = A\sigma_A \Phi(d_1) \tag{6}$$

where σ_E is the volatility of equity returns.
Solving the system composed by equations (2) and (6) for each moment it is possible to obtain a time series for A and σ_A . Substituting A on E in equation (1), one can then obtain B and calculate the risk measures listed ahead.

This approach allows for changes on the volatility of assets returns, σ_A , signalling that asset risk is not constant. However, if someone wants to be loyal to the theory underneath this model, assets return volatility, σ_A , must be constant. The best way to do this is to solve the following problem:

(3) For $A_T > K$, this investor receives $A_T - K$ from exercising the call option. Since the put option is not exercised, it ends with $K + A_T - K = A_T$. For $A_T < K$ the call option is not exercised but its counterparty exercises the put option. Thus, this investor has to pay K and receive A_T ending with $K - K + A_T = A_T$.

$$\min_{\{A,\sigma_A\}} \sum_t \left[A\Phi\left(\mathrm{d}_1\right) - B_{\mathrm{T}}\mathrm{e}^{-\mathrm{rT}}\Phi\left(d_2\right) - E\right]^2 + \sum_t \left[A\sigma_A\Phi\left(d_1\right) - E\sigma_E\right]^2 \quad (7)$$

Note that this minimization is done for several values of A but for a single value of σ_A. In the somatorium, t stands for each observation for equity, the stress barrier and the risk free interest rate. In this study, we will follow the latter approach. The first option would be preferable if there were equity options on these banks available in the market, which is not the case.

2.4. Risk Measures

The model described leads to a series of measures used in risk analysis. First of all, d_2 represents the number of standard deviations of $\ln(A_t)$ separating the firm assets from its distress barrier. For this reason this measure is commonly called distance to distress.

Another risk measure frequently used in the context of Merton's model is the probability of default, defined as

$$pd = 1 - \Phi(d_2) \quad (8)$$

Though useful, this measure has the caveat of being very sensitive to the curvature of the normal distribution.

Finally, one may also be interested in the ex-ante expected loss. In our model this value is given by the implicit put option. The rationale behind this interpretation is rather simple. Note that the value of a put option at maturity equals $Max\{0, B_T - A_T\}$. The first value corresponds to the case where the firm is not bankrupted (i.e $A_T \geq B_T$) while the second value corresponds to the case where the company filed for bankruptcy. In this context, the current value of the put option is usually interpreted as the ex-ante expected loss or, similarly, as the risk premium expected by investors for holding risky debt. Solving (5) for P and substituting E by equation (2), it follows that

$$P = B_T e^{-r\tau}\left(1 - \Phi\left(d_2\right)\right) - A(1 - \Phi\left(d_1\right)) \quad (9)$$

This is the expression for the *ex-ante* expected loss.

3. AN APPLICATION TO THE PORTUGUESE BANKING SYSTEM

In order to assess the risk perception of market participants on the Portuguese financial system, this study uses the Merton model to estimate the risk measures listed in section 2.4 for three Portuguese banks: BCP, BES and BPI. All results are presented in aggregate terms, meaning that all values for the distress barrier and market value of equity were summed up and the model was then estimated as if they were a single bank.

These banks were chosen based on two criteria. On the one hand, they are the only significantly large Portuguese banks listed in Lisbon's stock exchange.[4] These banks are part of the PSI-20 index, which ensures ease of access to data and reduces low turnover issues. On the other hand, these banks together account for near 44 percent of the Portuguese credit market. The dataset under analysis is composed by monthly observations ranging from January 2002 to March 2010.

Before estimating the model, some calibration procedures were needed. Therefore, for σ_E we calculated the standard deviation of the annual return on equity.[5] Then, σ_E was obtained as a three period moving average of monthly values. The stress barrier was defined as the sum of short term debt and 50 per cent of long term debt, which is the standard in the literature. Regarding the time horizon of analysis, we have also used the standard in the literature, i.e a maturity of 1 year. Finally, the 3-month Euribor rate was used as a proxy for the short term interest rate.

After applying the model to our dataset, we obtained values for total assets, the volatility of assets returns, risky debt, and all risk measures mentioned in section 2.4. Chart 3 shows the market value of equity, E, and risky debt, B, as estimated by the model for the aggregate of the three banks. The sum of these two components correspond to total assets, A. Notice that, as a consequence of the high leverage ratios common in the banking sector, the value of B is much higher than E. Despite this structural feature of the sector, in the last two years the gap between these two aggregates increased. This movement is visible, either graphically through the narrowed area corresponding to the value of E, or through the market value of the popular debt-to-equity ratio, that by the end of 2007 went above its usual interval between 5 and 10, reaching more than 20 in February 2009. Similarly, the ratio between B and A increased significantly from around 81 per cent in May 2007 to 96 percent in February 2009. The second half of 2009 saw these indicators falling slightly to 14 and 93 percent, respectively. During the first quarter of 2010, these indicators have remained relatively stable.

Chart 4 decomposes the nominal debt (approximated by the distress barrier) for the aggregate of the three banks. B_T equals the sum of the risky debt (B), the time discount ($(1-e^{-rt})B_T$) and the expected loss (estimated through the put option). The expected loss is almost negligible and difficult to see on the chart.

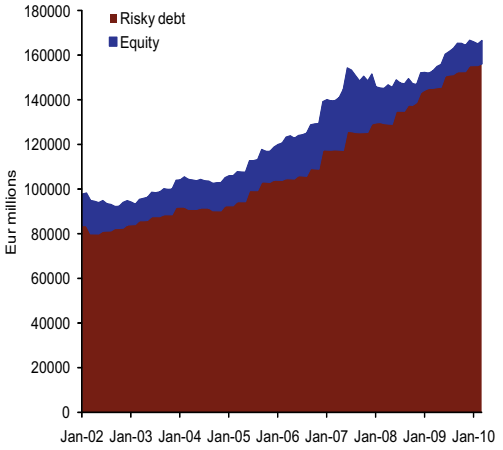
Figure 5 shows the distance to distress (measured in standard deviations of the volatility of assets returns) for the aggregate of the three banks. The vertical bars indicate how results for each bank are dispersed. Graphical inspection suggests the existence of a common trend driving the three banks under analysis. This trend can be divided in three distinct cycles. The period between 2002 and early 2003 is marked by some international accounting scandals (eg Enron) which led to a price collapse in the stock market and increased volatility. Next is a phase of recovery in prices, between 2003 and 2007. These years were characterized by a very favourable framework of expectations regarding the overall economic activity. However, following a sharp deterioration in the housing market in the

(4) Although Banif and Finibanco are listed in Lisbon's stock exchange, they were excluded from this study in face of their low trading volume (they are only listed in PSI-Geral). It adds that these banks represent a small part of the total credit stock in Portugal. Despite being listed in Lisbon's stock exchange, Santander and Banco Popular were not included in the analysis since their share price is determined by their parent companies.

(5) The daily equity return on special dates (eg. ex-dividend days, issuance of new shares) were eliminated in order to avoid spurious increases in volatility.

Chart 3

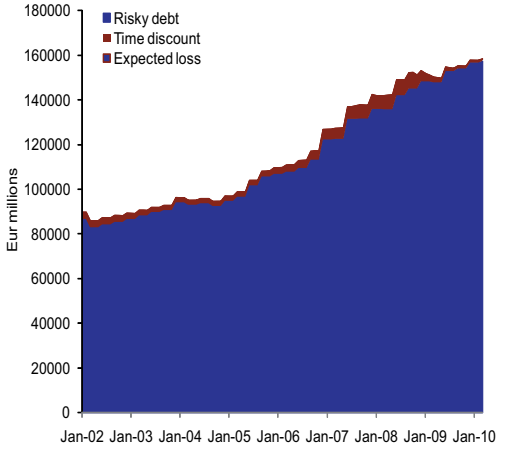
TOTAL ASSETS, EQUITY AND RISKY DEBT OF THE AGGREGATE OF THE THREE BANKS. MONTHLY VALUES IN MILLION EUROS



Source: Authors' calculations.

Chart 4

STRESS BARRIER, EXPECTED LOSS, TIME DISCOUNT AND RISKY DEBT FOR THE AGGREGATE OF THE THREE BANKS. MONTHLY VALUES IN MILLION EUROS



Source: Authors' calculations.

U.S., there was a reversal in the economic cycle from the second quarter of 2007 on. Given the high exposure of several international institutions to this market, the losses tended to be quickly transmitted across the world, generating an atmosphere of uncertainty that led to strong declines in assets value. The downward trend was reversed only in the second quarter of 2009, when stock exchanges started to climb. Though there has been some recovery, the last months of 2009 were characterized by the uprising of some doubts regarding the sustainability of public finances and the credibility of the process of fiscal consolidation in many countries, including Portugal. As a consequence, stocks devaluated and volatility increased, leading to a further decrease on the distance to distress. Nevertheless, it remained above the levels reached in February 2009.

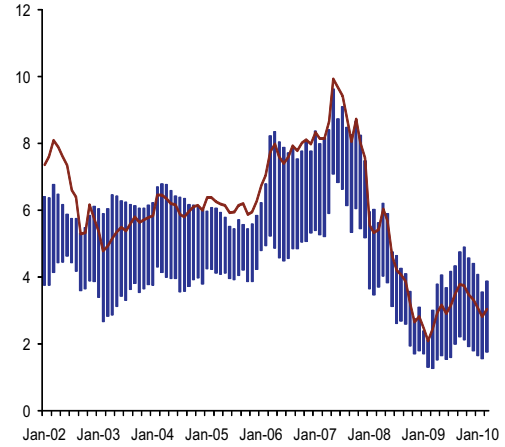
In spite of following a common trend, the wide vertical bars on Chart 5 (corresponding to the maximum and minimum of the distance to distress of the three banks) suggest the existence of different resilience levels. The period between September 2008 and April 2009 is the only exception.

As defined in 2.4, the probability of default of the aggregate of the banks (Chart 6) is exclusively determined by the distance to distress and by the cumulative normal function. Given the shape of the normal distribution, the probability of default stays near zero for most of the period under analysis. The only exception is February 2009, when the probability of default reached almost 2 per cent.

The expected value of losses showed a behavior very similar to the probability of default. This was already expected given that these measures are closely related. The highest value achieved for the period under analysis is about 20 million Euros in February 2009. However, this value is very close to zero under most of the sample period. In the current context, where governments have been willing to give their guarantees on banks' debt issues, this value gives some idea on the market perception regarding the possible cost of insuring against the bankruptcy of the aggregate of these three banks.

Chart 5

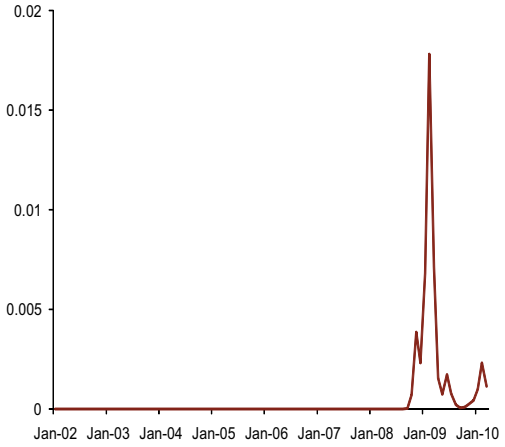
DISTANCE TO DISTRESS FOR THE AGGREGATE OF THE THREE BANKS. MONTHLY VALUES



Source: Authors' calculations.

Chart 6

PROBABILITY OF DEFAULT FOR THE AGGREGATE OF THE THREE BANKS. MONTHLY VALUES

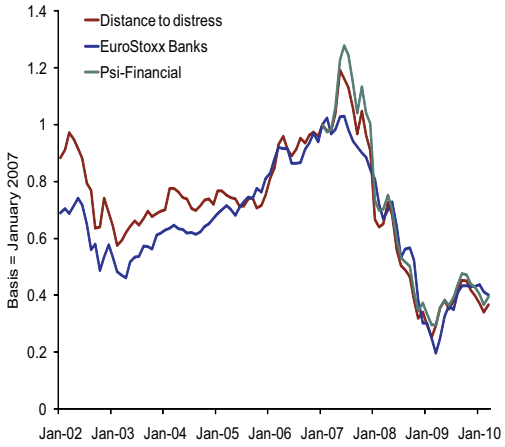


Source: Authors' calculations.

Finally, we compared the behaviour of the distance to distress of the aggregate of the three banks with the evolution of the major stock indices for the banking sector, including the DJ EuroStoxx Banks and the PSI-Financials. Chart 7 shows that in terms of growth rate, the distance to distress tends to mirror the behaviour of the PSI-Financials, which is largely determined by these three banks. Both seem to be highly correlated with the DJ Euro Stoxx Banks Index, which reflects the international nature of the crisis. This common behaviour suggests that these indicators, in spite of having a forward looking nature, particularly when compared with measures based on the history of entities under analysis (e.g. percentage of non-performing loans or financial ratios based on accounting statements), suffer from the same advantages and disadvantages of all other indicators that are based on capital markets. In other words, they do not provide significant additional information.

Chart 7

DISTANCE TO DISTRESS, PSI-FINANCIALS AND EUROSTOXX BANKS. MONTHLY VALUES



Source: Euronext and Authors' calculations.

4. FUTURE RESEARCH

As any methodology, contingent claim analysis has some advantages and disadvantages. The latter can be divided in two groups. First, this approach suffers from the limitations inherent in most pricing methods. Regarding the Black-Scholes pricing model, it ignores liquidity risk, transaction costs, the non-continuous nature of trading, the existence of dividends, the possibility of asset returns not following a normal distribution; or, finally, the fact that put options may be exercised before maturity. Furthermore, these methodologies, by relying exclusively on market prices, are vulnerable when the latter are not conscious of certain elements of systemic risk. Similarly, the dependence on short-term changes in "market sentiment" may lead these indicators to send false alarms on the overall financial situation of many institutions. Secondly, there are a number of model assumptions that are either violated or ignored in practice. For instance, the empirical volatility of equity returns σ_E can be calculated in different ways. Similarly, the stress barrier and the time to maturity are determined in an ad-hoc fashion.

Despite these limitations, our analysis suggests that contingent claim analysis can be a valuable tool in risk analysis. Thus, this study points to three lines for future research. First, it would be interesting to extend the analysis to more banks. This study focuses only in three banks, which represent roughly 44 percent of the Portuguese credit market. In order to have a better picture of the Portuguese banking system, it would be therefore interesting to include some other banks that are not listed in Lisbon's stock exchange. In these cases, however, some proxies would then be needed. One hypothesis would be to use the spreads on credit default swaps to estimate the spread implied in Merton's model. The high correlation between these two measures suggests that good results may be achieved in this way. The model can then be estimated reversely, i.e. we first obtain the value for the risky debt. Assets are then calculated using equation (1).

A second line for research consists in focusing the analysis on the entire economic system and not on the banks individually. Indeed, the model applied so far does not take into account transmission effects within the financial system, between the financial system and all other sectors, and between the national economy and the rest of the world. In this context, it would be important to study how the implicit guarantees usually assumed to be given to the banking system have evolved during the financial crisis.

Finally, it would be appropriate to incorporate Merton's methodology in a VAR model, as in Gray and Walsh (2008). However, these authors estimate equations only for the leading Chilean banks. Thus, the impulse response functions derived do not account for feedback effects between the banks and are not suitable for the study of systemic crises. One alternative would be to consider a VAR model for the whole economy.

5. CONCLUSION

Generally speaking, this study aims, firstly, to evaluate the potential of contingent claim analysis as a tool to quantify risks in the economy and, secondly, to apply the model to the Portuguese economy. Regarding its potentials and limitations, this study found that contingent claim analysis is easy to implement and able of producing sound results on the perception of markets participants about the financial situation of the institutions under review. Although it has not been explored in its broader perspective, contingent claim analysis has shown to be especially useful while analyzing changes in corporate debt value, risk transmission mechanisms and the dynamics created by the existence of implied guarantees among sectors. The latter are particularly difficult to incorporate in most models since they are highly non-linear.

Among all risk indicators, the distance to distress has shown to be the most interesting since it allows comparability among institutions and countries and is less dependent on considerations regarding neutrality towards risk. Nevertheless, the ability of contingent claim analysis to produce early warning indicators should be assessed carefully to the extent that its forward looking nature is limited by the perception of market participants. Thus, these indicators are unable to detect a "bubble" that has not busted; similarly, they can signal negative perspectives in the market that are not based on economic fundamentals. Regarding other risk measures, the probability of default proved to be very dependent on the curvature of the normal distribution. In turn, the expected loss is highly dependent on the probability of default.

As regards the application of contingent claim analysis to the Portuguese economy, our results indicated that, in aggregate, the three banks under analysis ended the first quarter of 2010 with total risk adjusted assets slightly above 165 billion Euros, i.e. 70 percent above January 2002 figures. Concerning leveraging, risky debt stood at 94 percent of total assets, i.e. 156 billion. As a consequence, the ratio between the risky debt and the market value of equity stood at near 15. Nevertheless, these values are below those obtained in February 2009, when they were 96 and 22 percent, respectively. Regarding other risk measures, the distance to distress showed a great degree of variability, with a maximum slightly above 10 standard deviations in May 2007 and a minimum of 2.1 standard deviations in February 2009. Except for February 2009, when it reached 1.8 percent, the probability of default has remained very low for most of the sample. In late March 2010, the distance to distress was at 2.1 standard deviations, corresponding to a probability of distress of 0.11 percent. The expected loss showed a trend in line with the probability of default not exceeding 20 million Euros in February 2009.

Finally, we have indicated some lines for future research, such as increasing the number of banks under analysis, focusing the analysis on the entire economic system instead of banks individually and incorporating contingent claim analysing in a VAR for the whole economy.

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BANK RELATIONSHIPS AND BORROWING COSTS*

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*Qinglei Dai****

*Francesco Franco****

1. INTRODUCTION

Firms may benefit from engaging in exclusive and lasting relationships with banks. Through these lending relationships, banks obtain important soft information regarding firms' performance, organization and strategy, which would be very hard to obtain otherwise. This information can be reflected in better funding conditions for firms, either through improved accessibility to credit or through better price conditions. However, firms may also be harmed by these relationships. For instance, banks can initially offer good conditions to attract customers, but once they are locked in the relationship banks may extract rents from these firms. There is a large theoretical and empirical literature debating the costs and benefits of relationship banking.[1]

In this article, we address a specific issue in this literature: how does the number of bank relationships affect borrowing costs. Given the arguments outlined above, this effect can either be positive or negative. Moreover, the results obtained so far provide mixed evidence (Degryse, Kim and Ongena, 2009).

Using a detailed dataset for Portuguese firms, we find that firms usually borrow simultaneously from several banks, even if they are small firms. The larger firms are, the more bank relationships they usually hold. Furthermore, we find that when firms increase the number of lenders, they benefit from a significant decrease in borrowing costs. This result is broadly valid regardless of firm size, except for the smallest firms in the sample. Moreover, the largest firms are those which benefit more from engaging in multiple bank relationships. Instead of considering only the number of bank relationships, we also analyze the impact of the distribution of loan amounts amongst different banks. We find that when firms concentrate their lending in fewer banks, their borrowing costs increase, what reinforces our previous findings.

This article proceeds as follows. In Section 2 we present a brief review of the relevant literature. In Section 3 we describe the data used and in Section 4 we present some summary statistics. In Section 5 we analyse our main econometric results. Finally, in Section 6 we present some concluding remarks.

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(1) For a recent and extensive survey, see Degryse, Kim and Ongena (2009).

2. LITERATURE REVIEW

According to Diamond's (1984) classical delegated monitoring theory, in a setting of asymmetric information between firms and investors, the former should be better off when they borrow from only one bank. This result derives from the fact that single bank relationships decrease overall monitoring costs, which in turn generate lower borrowing costs. This theory was empirically tested by Petersen and Rajan (1994), who found that the existence of multiple lenders increases loan interest rates and broadly reduces the availability of credit.

However, other empirical works find that firms rarely keep exclusive bank relationships. For example, Ongena and Smith (2000), in a survey including 1079 firms across 20 European countries, find that the majority of firms (85 per cent) borrow from more than one bank. These authors observe that firms usually maintain more bank relationships in countries with inefficient judicial systems and poor enforcement of creditor rights. D'Auria, Foglia and Reedtz (1999) obtain similar results for Italy. In our dataset we also find that the majority of Portuguese firms, including micro firms, borrow from several banks.

There are many theories attempting to provide an explanation for why firms may prefer to borrow from several different banks. According to Sharpe (1990) and Rajan (1992), in an exclusive bank relationship, the informationally privileged bank might exploit its bargaining power over the firm and extract rents from loan contracts. This implies that micro and small firms with a unique lender should face higher borrowing costs. In turn, Berger and Udell (1998) argue that the refusal of credit from the firm's only lender may send a negative signal to the market, thus making exclusive bank relationships undesirable. Detragiache, Garella, and Guiso (2000) show that firms borrowing from less fragile banks are more likely to engage into multiple bank relationships. Bolton and Scharfstein (1996) consider that multiple bank relationships might prevent the firm manager from strategic defaulting by holding up the renegotiation process. Furthermore, Dewatripont and Maskin (1995), Holmstrom and Tirole (1997), and Carletti, Cerasi and Daltung (2007) predict that multiple bank relationships will be more likely when banks face financial constraints or monitoring costs. Carletti *et al.* (2007) also suggest that multiple bank relationships allow banks to diversify their lending risk. They predict that banks are more attracted to multiple-bank lending when the bank has lower equity, when the cost of monitoring is high, and when the profitability of the firm is low. Moreover, in the face of fierce competition, multiple arms-length lending might substitute relationship lending as analyzed by Boot and Thakor (2000). These authors predict that bank competition should lead to lower interest rates and that firms will not commit to exclusive bank relationships. On the other hand, they argue that relationship lending might protect banks from price competition. Finally, in a recent paper, Ioannidou and Ongena (2010) show that when firms change banks they initially benefit from lower interest rates. However, as time goes by, hold-up effects gradually emerge.

3. DATA

We use two large datasets in this work. All information concerning the number of bank relationships comes from the Central Credit Register of Banco de Portugal. This extensive database includes information on all credit exposures above 50 euros, reported monthly by all Portuguese credit institutions. The reporting is mandatory. The main objective of this database is to disseminate information among participating institutions in order to improve their credit risk assessment on current and potential borrowers. Participating banks can observe, for each borrower, the number of bank relationships this borrower has, the total outstanding debt, as well as the status of the loans. It is also 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 part of a credit line or a bank guarantee. This database does not include any information regarding collateral and interest rates, and includes only partial information on individual loans maturities.

We obtain information on the cost of borrowing from another large dataset: the Central Balance Sheet Database of Banco de Portugal. This database provides detailed yearly accounting information, including firm age, economic sector, profitability, leverage, etc., for a large sample of Portuguese firms. Reporting to the Central Balance Sheet Database was not compulsory during the sample period and, as a consequence, this database covers only a limited (but large) sample of Portuguese firms. 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.

Using end of year data for the period comprised between 1996 and 2004, the Central Credit Register includes 3,990,802 records. Banks do not report information on a strict loan-by-loan basis, given that it is possible to aggregate loans granted to the same firm with similar status. We aggregate loans by firm, in order to count the number of bank relationships. Hence, each record is defined as a firm-year pair. Taking into account data for the same period of time, the Central Balance Sheet Database includes 202,364 records. Merging the two databases we obtain 154,682 common observations, comprising 38,342 firms.[2] Even though both databases were created before 1996, the interest payments on bank loans of the Central Balance Sheet Database are available only from 1996 onward, constraining our sample to start in 1996. We analyze only lending relationships between firms and banks, excluding all lending relationships with non-monetary credit institutions, such as leasing companies.

We define the interest rate r_{it} as:

$$r_{it} = \frac{IP_{it}}{D_{it}}$$

where IP_{it} are interest payments on bank loans and D_{it} is total debt to credit institutions of firm i. r_{it} is therefore the implicit interest rate of firm i at time t across all the firm's bank loans.

(2) Not all observations in the Central Balance Sheet Database can be matched with the Credit Register because a substantial percentage of firms do not rely on bank credit, as discussed in Antão and Bonfim (2008).

Several filters were applied in order to guarantee a reasonable quality of the data used, even if at the cost of a lower number of observations. The first step was to exclude all observations for which debt or interest paid was negative or equaled zero, given that it would not make sense to compute implicit interest rates in such cases. We also excluded all firms that had zero employees. Such firms should be mainly holding companies or firms in liquidation, though this may also reflect isolated reporting problems in the database. Additionally, we dropped all observations below the 5th percentile and above the 95th percentile of the implicit interest rates distributions. In order to avoid results driven by outliers we also exclude all observations below the 1st percentile and above the 99th percentile of the distribution of each firm specific variable used in the regressions. Moreover, we dropped all observations for which the estimated implicit interest rate was below the interbank money market interest rate.

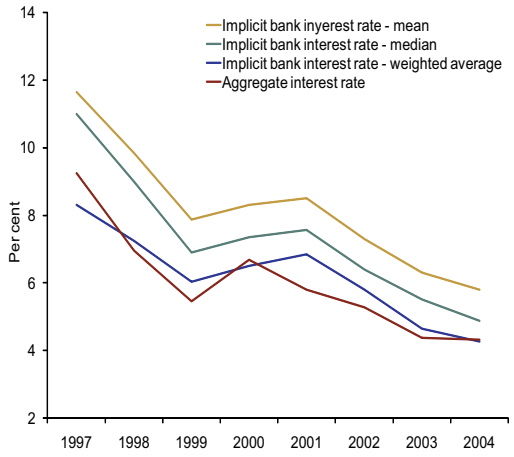
After these filters are applied, our final dataset is an unbalanced panel data containing 42,263 observations, for 17,516 firms, between 1996 and 2004. Each firm has on average 2.4 years of data. Firms' entries and exits from the sample are not strictly associated with firms' creations and extinctions. They reflect primarily the voluntary nature of the survey. If we consider only firms with two consecutive years of data and with information on all variables considered relevant for our analysis, we have a sample of 16,804 observations, covering 7,700 different firms. All summary statistics presented in the next section consider this restricted sample, which will be used for most of the regression analysis.

4. SUMMARY STATISTICS

Chart 1 shows the average, median, and weighted mean of our measure of interest rate against the aggregate interest rate on all outstanding loans to non-financial corporations in Portugal disclosed by Banco de Portugal (Monetary and Financial Statistics). The weighted average of the interest rate

Chart 1

IMPLICIT INTEREST RATE MEASURES



Sources: Banco de Portugal and authors' calculations.
Notes: The aggregate interest rate is the interest rate on outstanding amounts of loans to non-financial corporations disclosed by Banco de Portugal in its Monetary and Financial Statistics. This interest rate is a weighted average of interest rates reported by banks. Implicit interest rates were computed as the amount of interest paid on bank loans as a percentage of total debt to credit institutions at the end of the year. The weighted average of the implicit interest rate considers the total credit outstanding of each firm.

appears to track the aggregate interest rate rather well. The decreasing interest rate during the 1990s reflects the convergence and integration in the European Monetary Union and probably also changes in bank competition during the sample period.[3]

The upper panel of Chart 2 shows a histogram of the bank interest rate over the entire sample. In the lower panel of Chart 2 we present the histograms of the interest rate for each year in our sample. The distribution of interest rates across firms changed significantly between 1997 and 2004. Whereas in the earlier years of the sample period interest rates showed an almost uniform distribution, exhibiting a large dispersion in borrowing costs across firms; in the latter years of the sample period the distribution became closer to a log-normal. In these latter years, there was not only a decrease in average interest rates paid by firms, but also a substantial decline in their dispersion. As discussed in Antão *et al.* (2009), this lower dispersion results mainly from the decrease of interest rates for those firms with higher interest payments.

We observe that approximately one fifth (18 per cent) of the firms hold one exclusive lending relationship. Chart 3 shows that the average number of bank relationships did not vary significantly over time, ranging between 3.3 and 3.7 across the sample period. The chart shows that the average number of bank relationships exhibits an increasing trend starting in 1998. The observed decrease in 2001 is probably due to the strong merger and acquisition activities during this period in the Portuguese banking system.

Chart 4 shows that the number of lending relationships increases steadily with the firm age. Start-up firms have, on average, two or three lending relationships, whereas older firms hold a more diversified creditor structure. Furthermore, younger firms pay higher interest rates than do older firms, as expected. Farinha and Santos (2002), who also investigated the number of bank relationships in Portugal, observe that almost all firms start borrowing only from a single bank, but soon afterward diversify their creditor structure, most notably when growth opportunities are stronger.

Table 1 reports the distribution of the number of bank relationships together with the interest rate and proxies for firm size and maturity such as the number of employees and firm age. Columns 2 and 3 show that firms with a single banking relationship pay a higher interest rate than firms with two or three relationships. Columns 4 to 7 suggest that the number of bank relationships is positively related to firm age and to the number of employees.

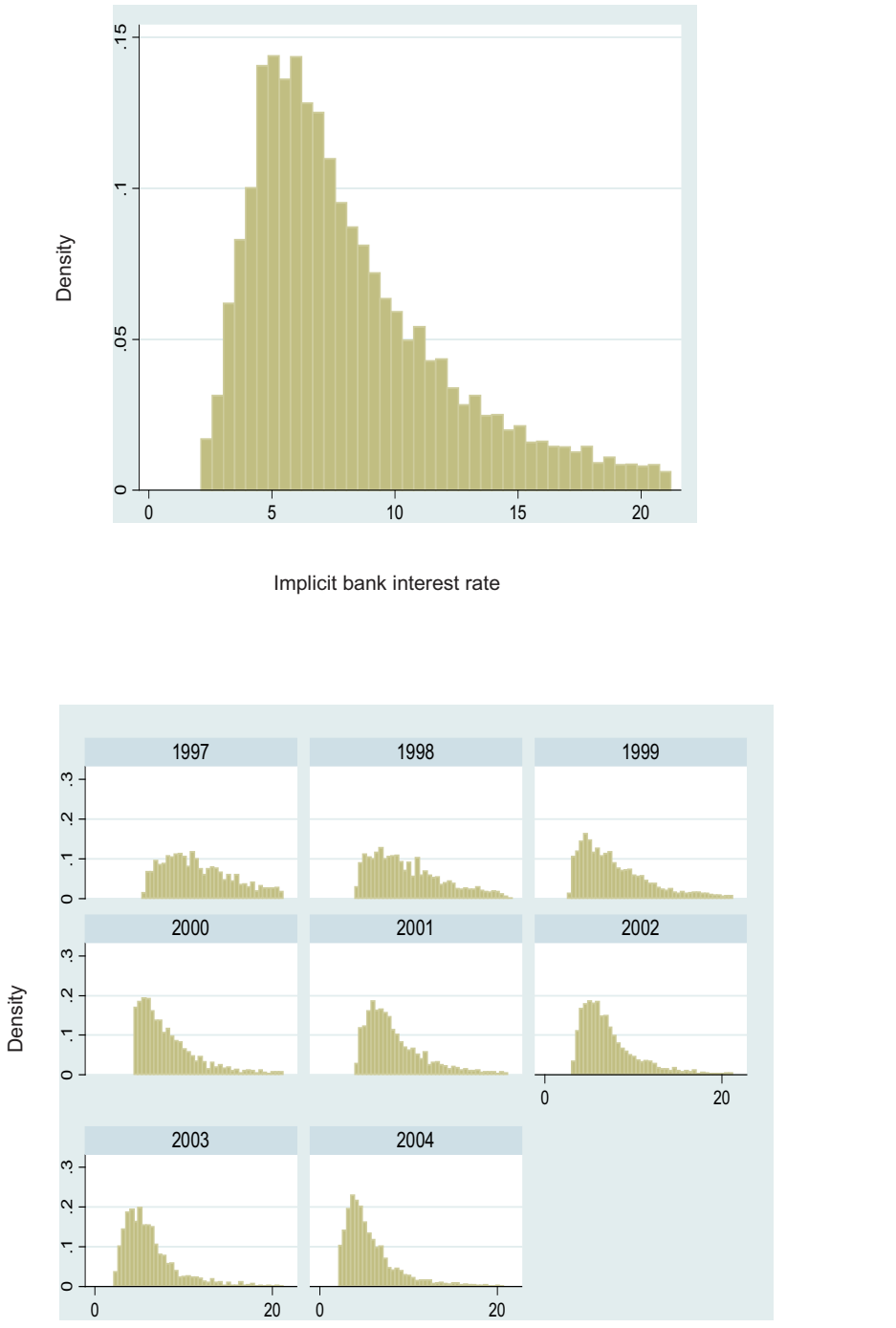
We construct a measure of firm size following a definition suggested by the European Commission that considers the number of employees and sales volumes to define four different size categories: micro, small, medium and large.[4] We end up with 3,780 micro, 7,836 small, 4,204 medium and 984 large firms. Table 2 displays the number of bank relationships and the interest rate for these four categories. On average, micro and small firms hold, respectively, two and three bank relationships, medium-sized firms borrow from more than four banks, while larger firms have more than six different

(3) An analysis of competition in the Portuguese banking market in this period may be found in Boucinha and Ribeiro (2009).

(4) More precisely, in the European Commission Recommendation of 6 May 2003 (2003/361/EC) micro firms are defined as those with fewer than 10 employees and less than 2 million euro of business volume; small firms are those with fewer than 50 employees and less than 10 million euro of business volume; medium firms are those with fewer than 250 employees and a business volume below 50 million euros. All remaining firms are considered to be large firms.

Chart 2

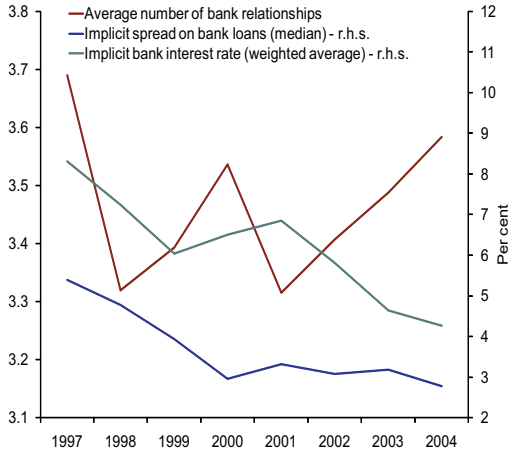
EMPIRICAL DISTRIBUTION OF THE IMPLICIT BANK INTEREST RATE



Sources: Banco de Portugal and authors' calculations.
Note: Empirical distribution of the implicit interest rate on bank loans, computed as interest paid to banks as a percentage of total debt to credit institutions for each firm.

Chart 3

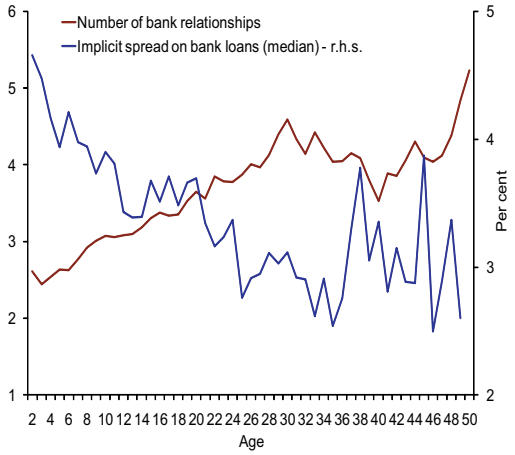
NUMBER OF BANK RELATIONSHIPS AND IMPLICIT BANK INTEREST RATE



Sources: Banco de Portugal and authors' calculations.
Notes: The implicit interest rate was computed as the amount of interest paid on bank loans as a percentage of total debt to credit institutions at the end of the year. The implicit spread on banks loans was defined as the difference between the implicit interest rate and a money market interest rate (3-month Euribor). The number of bank relationships was computed as the number of different banks that were lending to a given firm at the end of each year.

Chart 4

NUMBER OF BANK RELATIONSHIPS BY FIRM AGE



Sources: Banco de Portugal and authors' calculations.
Notes: The implicit spread on banks loans was defined as the difference between the implicit interest rate and a money market interest rate (3-month Euribor). The number of bank relationships was computed as the number of different banks that were lending to a given firm at the end of each year.

bank relationships. Table 2 also shows that the interest rate decreases with the firm size.

To conclude our descriptive analysis, we perform mean comparison tests to evaluate if interest rates are statistically different for firms with many relationships (above the 4th quartile of the distribution of the number of relationships) and for firms with few relationships (below the 1st quartile of the same distribution). As shown in Table 2, interest rates paid by these two groups of firms are indeed different. Firms with fewer relationships pay, on average, higher interest rates. We also performed these tests for the four size categories. For both micro and small firms, interest rates are statistically higher for firms with fewer relationships. For medium-sized firms, the mean comparison tests suggest that there are no significant differences in interest rates for firms in the 1st and 4th quartiles of the distribution of the number of relationships. Finally, for large firms, interest rates are significantly higher with many bank relationships.

Table 1

NUMBER OF BANK RELATIONSHIPS

Number of bank relationships	Obs.	Implicit bank interest rates		Age		Number of employees	
		Mean	Median	Mean	Median	Mean	Median
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
1	3 028	8.8	7.9	15.6	12	22	9
2	3 917	8.5	7.4	17.7	14	31	15
3	3 202	8.1	7.1	20.1	16	48	21
4	2 387	7.7	6.8	22.6	18	71	33
5	1 599	7.6	6.7	22.7	19	107	43
6	1 039	7.4	6.5	25.2	20	135	65
7	676	7.3	6.3	26.1	21	141	76
8	378	7.5	6.5	27.0	24	182	108
9	247	7.2	6.5	29.2	24	214	118
10	136	7.5	6.6	33.6	28	296	185
11	78	7.5	6.7	37.1	30	269	202
12	39	7.2	6.5	34.2	30	459	219
13	31	8.3	7.2	38.6	30	506	395
14	13	8.7	8.0	31.5	26	743	577
15	11	8.6	9.1	48.4	55	983	828
Total	16 804	8.1		20.5		71	

Sources: Banco de Portugal and authors' calculations.
Notes: The interest rate was computed as the amount of interest paid on bank loans as a percentage of total debt to credit institutions at the end of the year. The number of relationships was computed as the number of different banks that were lending to a given firm at the end of each year. To ease the reading of the table we exclude firms with more than 15 relationships.

Table 2

NUMBER OF BANK RELATIONSHIPS AND INTEREST RATES BY FIRM SIZE

	Number of observations	Number of bank relationships		Implicit bank interest rate		Mean comparison tests				
						Average interest rate for firms with few relationships[a]	Average interest rate for firms with many relationships[a]	Mean comparison test $Ho: diff = 0$		
		Mean	Median	Mean	Median			$diff$	$t\text{-}ratio$	$Pr(\|T\| > \|t\|)$
Micro	3 780	2.0	2.0	9.1	8.2	9.2	8.8	0.42	2.59	0.01
Small	7 836	3.1	3.0	8.2	7.2	8.4	8.0	0.36	3.59	0.00
Medium	4 204	4.7	4.0	7.2	6.3	7.3	7.2	0.08	0.59	0.55
Large	984	6.7	6.0	6.8	6.0	6.6	7.5	-0.90	-3.16	0.00
Total	16 804	3.5	3.0	8.1	7.1	8.7	7.5	1.26	16.11	0.00

Sources: Banco de Portugal and authors' calculations.
Notes: (a) Firms with few relationships were defined as those included in the first quartile of the distribution of the number of relationships. In turn, firms with many relationships were considered to be those in the fourth quartile of the same distribution.

5. BANK RELATIONSHIPS AND BORROWING COSTS

The descriptive analysis performed in the previous section suggests that firms that have one or few lending relationships pay, on average, higher interest rates, especially if they are smaller firms. In this section, we perform a regression analysis and control for several firm characteristics that may influence interest paid on bank loans. For instance, it is reasonable to consider that profitability, collateral, leverage or the firm's credit risk are taken into account by banks when pricing loans. We define *Turnover* as sales and services as a percentage of the firm's assets. Firms with higher turnover are able to generate larger cash-flows with their activity and may face lower funding costs. Next we define *Tangible assets as % of debt* to proxy for collateral. Leverage is defined as debt over assets to control

for the influence of the outstanding debt on the interest rate. *Credit risk* is a dummy variable that takes the value of one whenever the firm is in default at the end of the year. Debt coverage, calculated as net profits over debt to credit institutions, is another measure of the firm's financial health. We also include size measured by *Assets* and the *Age* of the firm, the latter measured as the number of years since a firm's inception.[5] In the regressions, all firm-specific variables are lagged by one year, motivated by the fact that banks can only observe the previous year balance sheet when negotiating the loan. Moreover, this choice mitigates potential concerns of endogeneity biases due to simultaneity issues. Table 3 reports summary statistics for the dependent and independent variables.

The sample period corresponds to a time of structural changes in the Portuguese banking sector as well as to the period of convergence that led to the European Monetary Union participation. These developments contributed to the steady downward trend seen in money market interest rates during this period. At the same time the Portuguese economy went through a full business cycle. To capture all these time effects we include in the regressions a set of time dummies and, in a different specification, the 3-month Euribor, the total number of banks granting credit in each year and GDP growth.

We estimate the following fixed-effects model:

$$r_{it} = \alpha_i + \delta n_{it}^r + \beta X_{it} + \varphi X_{it-1} + \gamma Z_t + u_{it}$$

where r_{it} is the interest rate, n_{it}^r is the number of bank relationships, X_{it} and X_{it-1} are vectors of contemporaneous and lagged firm-specific variables,[6] and Z_t is a vector of time-varying variables.

In Table 4 we present our main econometric results. We begin by regressing the interest rate on the number of bank relationships and time dummies with firm fixed-effects. The results are shown in the first column of Table 4. The coefficient on the *Number of bank relationships* is -0.142 with a *t-statistic*

Table 3

SUMMARY STATISTICS FOR EXPLANATORY VARIABLES

	N	Mean	Std dev	Min	p5	p25	p50	p75	p95	Max	Skewness	Kurtosis
Implicit bank interest rate	16 804	8.1	3.9	2.1	3.5	5.2	7.1	10.1	16.4	21.2	1.1	3.8
Number of bank relationships	16 804	3.5	2.3	1.0	1.0	2.0	3.0	5.0	8.0	25.0	1.6	8.1
Turnover	16 804	126.5	79.2	0.7	30.5	74.7	111.6	158.9	276.2	603	1.7	7.5
Tangible assets as a % of debt	16 804	49.5	42.9	0.2	2.8	16.4	39.6	70.7	132.8	286	1.5	5.9
Leverage	16 804	74.5	21.4	9.0	43.2	62.7	74.3	84.9	101.6	454	2.4	25.0
Credit risk	16 774	0.04	0.198	0.000	0.000	0.000	0.000	0.000	0.000	1.000	4.6	22.5
Debt coverage	16 804	8.0	43.5	-257	-44.4	0.2	3.7	14.5	70.8	322	0.9	15.9
Firm age	16 804	20.5	16.7	0.0	4.0	10.0	16.0	25.0	55.0	248.0	2.3	10.9

Sources: Banco de Portugal and authors' calculations.
Notes: The implicit interest rate was computed as the amount of interest paid on bank loans as a percentage of total debt to credit institutions at the end of the year. The number of bank relationships was computed as the number of different banks that were lending to a given firm at the end of each year. Turnover represents sales and services over assets; leverage is defined as debt over assets; credit risk is a dummy variable that takes the value one when the firm is in default; and debt coverage is defined as net profits over debt to credit institutions.

(5) Age defined as log(1+age).

(6) The only contemporaneous firm-specific variable considered is firm age.

Table 4

REGRESSION RESULTS
Dependent variable: Implicit bank interest rate

	Fixed-effect regressions									
	All firms				Micro firms	Small firms	Medium firms	Large firms	Young firms	Mature firms
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Number of bank relationships$_t$	-0.142	-0.196	-0.172	-	-0.259	-0.185	-0.120	-0.230	-0.236	-0.192
	-5.51	*-4.96*	*-4.34*	-	*-1.31*	*-2.51*	*-1.80*	*-2.27*	*-2.88*	*-4.04*
Ln(number of bank relationships+1)$_t$	-	-	-	-0.857	-	-	-	-	-	-
	-	-	-	*-4.16*	-	-	-	-	-	-
Turnover$_{t-1}$	-	-0.003	-0.003	-0.003	-0.009	-0.001	0.003	-0.002	-0.005	-0.003
	-	*-2.28*	*-2.21*	*-2.30*	*-2.30*	*-0.52*	*0.88*	*-0.27*	*-2.25*	*-1.64*
Tangible assets as % of debt$_{t-1}$	-	-0.007	-0.008	-0.008	0.000	-0.009	-0.008	-0.001	-0.007	-0.006
	-	*-2.84*	*-3.05*	*-2.87*	*0.04*	*-2.13*	*-1.95*	*-0.07*	*-1.45*	*-1.89*
Leverage$_{t-1}$	-	0.003	0.004	0.003	-0.007	0.013	0.006	-0.004	0.003	0.009
	-	*0.68*	*0.86*	*0.63*	*-0.77*	*1.53*	*0.60*	*-0.14*	*0.37*	*1.24*
Credit risk$_{t-1}$	-	0.492	0.520	0.496	0.432	0.905	0.042	0.075	0.384	0.576
	-	*2.23*	*2.32*	*2.25*	*0.70*	*2.32*	*0.11*	*0.14*	*0.95*	*2.05*
Debt coverage$_{t-1}$	-	-0.004	-0.004	-0.004	-0.003	-0.003	-0.007	-0.004	-0.001	-0.007
	-	*-2.73*	*-2.45*	*-2.73*	*-0.72*	*-1.41*	*-2.01*	*-0.92*	*-0.31*	*-3.57*
Firm age$_t$	-	-0.076	-2.887	-0.136	0.735	-0.569	1.076	2.652	-	-
	-	*-0.17*	*-7.69*	*-0.31*	*0.54*	*-0.83*	*1.09*	*1.23*	-	-
Assets$_{t-1}$	-	-0.521	0.933	-0.459	-6.762	4.026	-9.423	5.792	-0.196	-2.593
	-	*-0.36*	*0.63*	*-0.32*	*-1.31*	*1.12*	*-1.61*	*0.64*	*-0.08*	*-1.09*
Assets$^2_{t-1}$	-	0.035	-0.030	0.032	0.275	-0.109	0.318	-0.141	0.032	0.095
	-	*0.70*	*-0.60*	*0.65*	*1.37*	*-0.86*	*1.73*	*-0.54*	*0.36*	*1.22*
3-month Euribor$_t$	-	-	0.543	-	-	-	-	-	-	-
	-	-	*9.16*	-	-	-	-	-	-	-
Number of banks$_t$	-	-	-0.035	-	-	-	-	-	-	-
	-	-	*-9.04*	-	-	-	-	-	-	-
GDP growth$_t$	-	-	0.014	-	-	-	-	-	-	-
	-	-	*0.51*	-	-	-	-	-	-	-
Constant	13.764	13.453	15.123	13.789	54.291	-21.218	77.407	-53.848	9.993	29.665
	116.22	*1.26*	*1.40*	*1.30*	*1.60*	*-0.83*	*1.65*	*-0.69*	*0.57*	*1.64*
Year dummies	Y	Y	N	Y	Y	Y	Y	Y	Y	Y
Number of observations	38 764	16 804	16 804	16 804	3 780	7 836	4 204	984	7 584	9 220
Number of firms	16 014	7700	7 700	7 700	2 174	3 822	1875	435	4 043	4 115
R^2 within	0.268	0.186	0.160	0.186	0.122	0.198	0.234	0.174	0.159	0.197
R^2 between	0.265	0.094	0.073	0.098	0.037	0.084	0.132	0.037	0.037	0.171
R^2 overall	0.259	0.102	0.077	0.105	0.042	0.093	0.134	0.026	0.044	0.163

Sources: Banco de Portugal and authors' calculations.
Notes: *t*-statistics in italics (using robust standard errors). The implicit interest rate was computed using data from the Central Balance Sheet Database, which includes detailed accounting information for a large sample of Portuguese companies. This interest rate was computed as the amount of interest paid on bank loans as a percentage of total debt to credit institutions at the end of the year. The number of bank relationships was computed using information from the Central Register of Banco de Portugal, by counting the number of different banks that were lending to a given firm at the end of each year. Turnover represents sales and services over assets; leverage is defined as debt over assets; credit risk is a dummy variable that takes the value one when the firm is in default; and debt coverage is defined as net profits over debt to credit institutions. Firm age defined as log(age+1). The definition of firm size was based on the European Commission Recommendation of 6 May 2003 (2003/361/EC), by taking into account the number of employees and sales volume. Young firms defined as those created within the last 14 years and mature firms defined as those with more than 14 years. All regressions were estimated using year dummies, except for the regression in column (3).

of -5.51. On average one additional bank relationship decreases the interest rate by 14 bps[7]. This result is consistent with the predictions of Sharpe (1990) and Rajan (1992), for instance.

In column 2 we control for the firm characteristics, including T*urnover, Tangible assets as % of debt, Leverage, Credit risk, Debt coverage, Firm age, Assets* and (*Assets*^{2}). The number of observations drops by approximately half in this specification due to the inclusion of the lagged variables. All coefficients show up with the expected sign when statistically significant. *Turnover, Tangible assets as % of debt and Debt coverage* reduce interest rates, while *Credit risk* has the opposite effect. The coefficients on *Leverage, Assets, (Assets)*^{2} and *Age* are not statistically significant at a 5% level. The coefficient of the *Number of bank relationships* is similar to the previous regression without the firm controls: one additional relationship should decrease interest rates by 20 bps. The time dummies are highly significant, suggesting that it is important to control for macroeconomic and financial developments.

In column 3, we include macroeconomic variables instead of the time dummies: the *3-month Euribor,* the *Total number of banks* granting credit in each year and *GDP growth*. The coefficient of the *3-month Euribor* is significant and positive as expected. We control for the total number of banks because there were entries, exits, mergers, and acquisitions in the banking sector during this period. The number of banks can also serve as a proxy for the overall competition level in the credit market. The coefficient of the *Total number of banks* is negative and significant. Finally *GDP growth* is not statistically significant. The coefficient of the number of bank relationships decreases slightly in this specification to 17 bps.

However, it is likely that the negative effect of number of bank relationships on interest rates is not linear. In other words, we would expect that the marginal benefit of holding bank relationships is decreasing. In order to test this, we consider the variable *ln(Number of bank relationships + 1)* instead of using simply the *Number of bank relationships*. As shown in column 4, this variable is significant and has a negative coefficient, thereby giving some support to the possibility of non-linear effects on interest rates. Thus, the decrease in interest rates obtained with additional bank relationships should be more significant for firms with a small number of relationships, as illustrated in Chart 5.

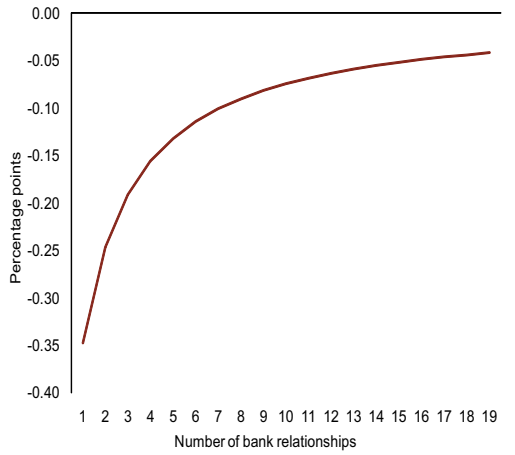
In order to better explore differences across firm size, we repeat the regression in column 2 for each size category. We find that the *Number of bank relationships* decreases the cost of debt for all firm sizes, with the exception of micro firms, for which the coefficient is not significantly different from zero.[8] The largest statistically significant slope coefficient is obtained for large firms: an additional bank relationship reduces the interest rate on average by 23 bps for large firms and by 19 and 12 bps for small and medium firms, respectively. The differences in economic and statistical significance across firm sizes may reflect asymmetric information issues, as informationally opaque (small and young) firms may benefit more from having concentrated lending relationships. Moreover, this result should also derive from larger firms having more bargaining power in their relationships with banks.

(7) In this specification we consider all the observations in the sample after application of the filters mentioned in Section 3 and not only those with two consecutive years of data

(8) In fact, most regressors are not significant in explaining interest rates for micro firms. This may reflect some discretionarity in loan pricing behavior for the smaller firms, as discussed by Cerqueiro, Degryse and Ongena (2007).

Chart 5

NON-LINEAR EFFECT OF THE NUMBER OF BANK RELATIONSHIPS ON INTEREST RATES



Sources: Banco de Portugal and authors' calculations.

Firm age fails to be significant in most of the regressions estimated, even though the descriptive analysis presented in the previous section seemed to give support to the existence of an age effect in interest rates. This age effect is documented by Kim, Kristiansen and Vale (2007), who find that young firms benefit initially from lower interest rates, as banks compete to attract them. Once they are locked-in, markups on interest rates increase. However, as firms get older and information asymmetries become less severe, interest rate markups decrease again. To further explore if firm age affects the linkage between the number of bank relationships and interest rates, we estimate the same regression for two different age groups: younger firms that have an age lower than the median age in our sample (14 years), and more mature firms that are above the median age. The results are displayed in the last two columns of Table 4. On average one additional relationship for older firms significantly decreases interest rates by 19 bps, whereas younger firms benefit from a larger decrease (24 bps). Nevertheless, firm age does not seem to be a main driver of the impact of the choice of the number of bank relationships on interest rates.

For robustness purposes, we consider a different measure of the number of bank relationships. In fact, loan pricing may be influenced not only by the number of banks the firm borrows from, but also by the way loan amounts are distributed across these relationships. For instance, a firm with three different bank relationships may obtain almost all its funding from one of these banks or may choose to divide its total bank debt in three equal parts. The importance of considering the concentration of lending relationships is discussed, for instance, by Ongena, Tumer-Alkan and Westernhagen (2007).

We define *Concentration in Lending (HHI)* and construct it as a Herfindahl Index of the value of loans from different banks at the firm level in order to control for the dispersion of borrowing, which is a feature not directly captured by the *Number of Bank Relationships*. This measure is similar, to some extent, to the weighted number of bank relationships.

Table 5 shows regression results with this alternative measure of the number of bank relationships.

Table 5

CONCENTRATION IN LENDING
Dependent variable: Implicit bank interest rate

	Fixed-effect regressions						
	All firms	Micro firms	Small firms	Medium firms	Large firms	Young firms	Mature firms
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Concentration in lending $(HHI)_t$	0.871	1.059	0.663	0.347	4.689	1.138	0.844
	2.94	*1.28*	*1.53*	*0.59*	*3.22*	*2.29*	*2.12*
$Turnover_{t-1}$	-0.003	-0.009	-0.001	0.002	-0.001	-0.005	-0.003
	-2.30	*-2.30*	*-0.56*	*0.84*	*-0.22*	*-2.29*	*-1.63*
Tangible assets as % of $debt_{t-1}$	-0.008	0.000	-0.009	-0.008	-0.005	-0.008	-0.006
	-2.91	*0.04*	*-2.13*	*-1.96*	*-0.46*	*-1.46*	*-1.98*
$Leverage_{t-1}$	0.003	-0.008	0.012	0.005	-0.017	0.002	0.008
	0.53	*-0.79*	*1.49*	*0.52*	*-0.63*	*0.24*	*1.12*
Credit $risk_{t-1}$	0.485	0.379	0.909	0.047	-0.006	0.369	0.567
	2.20	*0.61*	*2.33*	*0.12*	*-0.01*	*0.92*	*2.01*
Debt $coverage_{t-1}$	-0.004	-0.003	-0.003	-0.007	-0.006	-0.001	-0.007
	-2.66	*-0.71*	*-1.34*	*-1.98*	*-1.29*	*-0.26*	*-3.49*
Firm age_t	-0.209	0.689	-0.607	1.018	2.407	-	-
	-0.47	*0.51*	*-0.88*	*1.04*	*1.13*	-	-
$Assets_{t-1}$	-0.623	-6.528	4.058	-10.188	4.770	0.070	-2.993
	-0.43	*-1.28*	*1.12*	*-1.75*	*0.51*	*0.03*	*-1.25*
$Assets^2_{t-1}$	0.035	0.265	-0.113	0.340	-0.112	0.020	0.105
	0.71	*1.33*	*-0.89*	*1.86*	*-0.42*	*0.23*	*1.33*
Constant	13.981	51.899	-21.710	83.433	-46.339	7.382	32.085
	1.31	*1.55*	*-0.84*	*1.79*	*-0.58*	*0.42*	*1.75*
Number of observations	16 804	3 780	7 836	4 204	984	7 584	9 220
Number of firms	7 700	2 174	3 822	1 875	435	4 043	4 115
R^2 within	0.185	0.122	0.197	0.233	0.191	0.158	0.194
R^2 between	0.102	0.040	0.088	0.138	0.037	0.040	0.181
R^2 overall	0.107	0.045	0.096	0.137	0.034	0.046	0.167

Sources: Banco de Portugal and authors' calculations.
Notes: *t*-statistics in italics (using robust standard errors). Concentration in lending is a Herfindahl index using bank shares at the firm level. All other variables are defined in Table 4. All regressions were estimated using year dummies.

Our earlier results are confirmed by these regressions. When *Concentration in Lending (HHI)* increases, the cost of borrowing also increases. However, when we estimate the regressions for different firm size groups this result is statistically significant only for large firms. If large firms concentrate all their lending in one bank, they face higher borrowing costs than if they diversify. For the remaining firms, what seems to matter most is the number of relationships, rather than how loan amounts are distributed across those relationships.

In sum, each additional relationship enhances the outside option of the firm, increasing its bargaining power. This outside option exists as long as there is some relationship between a firm and a bank, even if the amounts involved are not very large.

6. CONCLUDING REMARKS

In this article we empirically study the impact of the choice of the number of bank relationships on firms' borrowing costs. We observe that, on average, Portuguese firms usually borrow from three different banks. Moreover, we find that, other things controlled for, when a firm initiates one additional relationship with a bank, its interest rate decreases significantly, on average. This result is consistent with the theoretical predictions of Sharpe (1990) and Rajan (1992), as well as with empirical results found for other European countries (Degryse, Kim and Ongena, 2009). Furthermore, we find that this result holds for all firm sizes, with the exception of micro firms, for which the result obtained is not statistically significant. Larger firms are those that benefit more from holding multiple bank relationships. These differences across firm size may reflect asymmetric information issues, as informationally opaque firms may benefit more from having concentrated bank relationships. In addition, larger firms should also have more bargaining power in their relationships with banks, what may also contribute to explain these results. In turn, we do not find significant evidence of differences between young and mature firms. Furthermore, we find that the decrease in interest rates obtained with additional bank relationships is more significant for firms with a small number of relationships.

To complement our analysis, we consider another measure of relationships: instead of using the number of bank relationships held by each firm, we consider how are loan amounts distributed across these relationships, using a Herfindahl Index. We find that when firms' borrowing is more concentrated, their borrowing costs increase. However, this result is significant only for large firms.

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