Financial Stability Review 2005

National Bank OF BELGIUM

Eurosystem

Contents

The Financial Stability Review is the fruit of a collective effort. The following persons have actively contributed to this issue of the Review :

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Foreword

By Guy Quaden, Governor

Faced with the recent slowdown in economic growth, the financial system can rely on several factors to withstand potential shocks. Higher profits have allowed corporate borrowers to improve their balance sheet structure. Despite a recent increase, volatility and risk premia are still at much lower levels than the average of the last decade, for corporate as well as sovereign bonds. Banks, in particular in Belgium, have substantially increased their profitability which puts them on a stronger footing to address adverse developments.

At the same time, however, some potential threats to financial stability seem to have intensified. Mounting external imbalances could impact on international capital flows and exchange rates. Sharp increases in some key commodity prices could fuel inflationary pressures, resulting in higher interest rates. These developments, especially if they coincide with a further reversal in the economic cycle, could render vulnerable the most highly leveraged borrowers, including households that have taken advantage of the present favourable financing conditions to contract larger-sized mortgage loans.

At this juncture, it is quite difficult to determine to what extent the prevailing strong valuation of several categories of financial assets is a reflection of improved fundamentals or the sign of a certain complacency concerning risks. This situation brings to the fore the discussion of the most appropriate instruments and procedures to be used to adequately monitor financial institutions. Peer comparisons, traditionally performed by supervisors in their micro-prudential surveillance, do not allow to detect the emergence of risky collective behaviour. Macro-prudential analysis has been devised precisely to remedy these shortcomings.

However, this instrument also has its constraints and limits. On the one hand, it will always be difficult to distinguish what is due to improvement or deterioration in the economic situation from what results from changes in global risk appetite. On the other hand, monitoring at the aggregate level does not in itself allow to determine how key systemic financial institutions would be able to withstand various potential macroeconomic shocks. This is all the more complex as these individual institutions differ not only in their initial positions, but also in their speed and capacity of response to shocks, which are themselves function of the nature of their activities, their risk management procedures or corporate governance structure.

The demarcation line between a micro-prudential approach, relying on peer comparison of individual data, and a macro-prudential one, focusing on aggregate positions and global economic indicators, is far from clear-cut. For example, sensitivity tests and stress scenarios, which for several years have been performed by the largest individual institutions, are part of both the micro- and macro-supervision tools.

This has also been one of the main messages of the IMF's recent Financial Sector Assessment Program (FSAP), whose aim was to assess the stability and structure of the Belgian financial system. The IMF mission has been strongly supportive of the use of stress tests in a systematic and regular manner, in order to feed the analysis and discussion of financial stability issues.

As a starting point of this exercise, the general overview of financial stability conditions, included in the first part of this Financial Stability Review, presents the preliminary results of some sensitivity tests realised on the aggregate data for the global Belgian banking sector.

The second part, which is new in this Financial Stability Review, is specifically devoted to financial infrastructures. Financial markets are underpinned by a variety of payment, clearing and settlement systems in order to provide for the finalisation of transactions. For markets to perform efficiently, it is of paramount importance that these systems are working smoothly. Central banks' keen interest in the proper functioning of financial infrastructures has crystallised in the development of a distinct activity, the oversight of payment and settlement systems. For the National Bank of Belgium, this activity is all the more important because some major cross-border infrastructures are located in Belgium, in particular Euroclear and SWIFT.

The first chapter of the second part describes the framework that has been put in place to perform the cooperative oversight of these two infrastructures. As they provide services in several jurisdictions and process different currencies, it is essential to design a good structure of consultation and cooperation among the relevant authorities to avoid conflicting requirements or oversight duplication or gaps. The second chapter goes on to present the results of the assessment of the Euroclear system, an international central securities depository, against international standards, i.e. the CPSS-IOSCO recommendations.

The first thematic article in the third part of this Financial Stability Review further emphasises the importance attached by the Bank to financial infrastructures. The article simulates, with the help of a simplified model, the direct and indirect effects of the default of the largest participant in a gross settlement system. Compared to a similar shock in a payment system, the presence of a lag in securities settlement operations implies that disruption and contagion effects may persist over several days, while the coexistence of a cash and a securities leg means that generous liquidity provision cannot completely eliminate settlement failures.

Two other thematic articles review specific issues related to important categories of financial risks, i.e. credit and interest rate risks.

A great many new techniques have been recently devised to improve the management and transferability of credit risks, e.g. securitisation, credit derivatives or structured finance instruments. The latter involve the pooling of assets and the subsequent sale to investors of tranched claims on the cash flows generated by the underlying assets. An article, written jointly by staff of the Bank for International Settlements and the National Bank of Belgium, reviews the principal features of structured finance instruments. The risk assessment of these products not only requires a good modelling of the credit risk of the underlying asset pools but also a correct understanding of their contractual structure.

In the management of interest rate risks, financial institutions have to introduce specific assumptions concerning the duration of assets and liabilities with indeterminate maturity. This indeterminate maturity often results from the existence of early repayment or withdrawal options embedded in a wide range of products, such as mortgage loans, overdrafts and sight and savings deposits. The modelling techniques available to estimate the duration of such products are discussed in the third article, which focuses on the special case of savings deposits. While an article on this subject is warranted by the major importance of these deposits as a funding source for Belgian banks, the techniques reviewed have a much wider relevance as they may, in fact, be generalised to all financial instruments with indeterminate maturity.

Finally, the fourth article fits into the debate on the resolution of international sovereign debt crises. The last few years have seen a number of initiatives (e.g. Collective Action Clauses) aimed at reducing the social and economic costs of such crises by promoting more orderly resolution mechanisms. These initiatives did perhaps not pay sufficient attention to the, sometimes kaleidoscopic, general legal framework surrounding sovereign debt crises, which includes in particular numerous bilateral investment treaties. Such treaties in essence aim at attracting foreign direct investment into less developed and emerging economies, by guaranteeing foreign investors the right to individual protection. The article analyses the existence and scope of the interaction between initiatives seeking a more orderly resolution of sovereign debt crises and bilateral investment treaties, and identifies potential ways to smoothen this interaction.

Brussels, June 2005

Executive Summary

1. Overview

In 2004, very strong global economic growth and continuously low interest rates provided the backdrop for a strong improvement of corporate profits and a further restructuring of corporate balance sheets, which resulted in higher equity prices, low credit losses and a further narrowing of risk premia. In addition, global financial markets coped very well with the gradual tightening of monetary policy in the US, which had started in June of that year.

In 2005, the international and domestic operating environment for Belgian financial institutions may prove to be less favourable, as economic indicators published so far this year have pointed to a slowdown of economic growth in a large number of industrialised countries (including Belgium) and to higher inflation in the US. Although these developments have contributed to a reassessment of risks in global financial markets, the increase of risk premia and implied volatility measures from their historically low levels of early 2005 has remained, on the whole, quite moderate up to now.

This changing environment must be kept in mind when interpreting the various financial soundness indicators on which the analysis of the Overview article is based. Balance sheet and income statement data mainly refer to 2004. As such, they do not yet take into account the potential impact of the recent economic slowdown on the financial position or the profitability of the Belgian private and financial sectors. Market indicators give more up-to-date information but they are, by nature, more difficult to read, especially in periods of changes in the cycle. Presently, the most comprehensive indicators still point to a quite resilient financial system, underpinned by banks' good profitability, abundant liquidity and improved risk management techniques. Nevertheless, past experience has shown that it is precisely in such more benign conditions that financial intermediaries or markets tend to become more complacent about risk.

The recent signs of nervousness or stress observed in some financial markets have so far been limited and well contained. However, market turbulence might become more severe in case of a bigger shift in investors' expectations or risk appetite that could be triggered, for instance, by an unorderly correction of global current account imbalances or an abrupt exit from the current low interest rate environment.

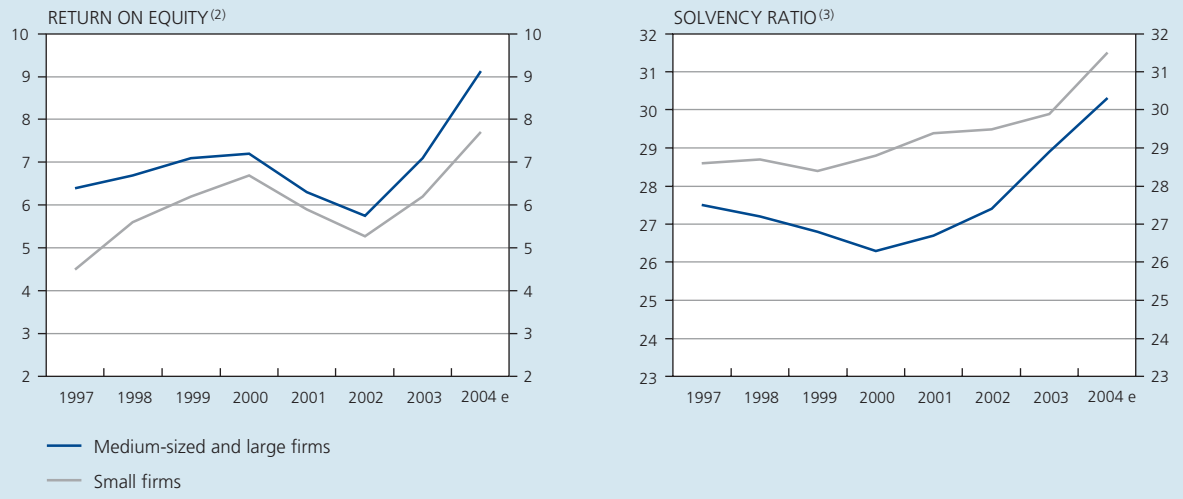
1.1 Financial position of the Belgian private sector

Benefiting from the strength of Belgian and world economic growth in 2004, the recovery of corporate profits, which had started in 2003, gained further momentum last year. In 2004, the estimated median return on equity – based on the data provided by a sample of early reporters to the Central Balance Sheet Register – increased strongly for large and medium-sized as well as for small companies, to 9.1 and 7.7 p.c., respectively (Chart 1). These higher profits also provided room for a further improvement in the solvency ratios of Belgian non-financial corporations.

Moderate levels of investment in real and financial assets kept corporations' net external financing requirements in check, but funds raised in the form of bank loans increased again in 2004 after a fall in 2003 and a stagnation in 2002. While this revival of bank loans as a source of financing reflected in part a decreased reliance on issues of debt securities – which are an alternative form of debt financing for large corporations –, it also went hand in hand with a reportedly more attractive pricing

CHART 1 MEDIAN PROFITABILITY AND SOLVENCY INDICATORS FOR BELGIAN NON-FINANCIAL CORPORATIONS (1)

(Percentages)



Source : NBB.

(1) The medians in 2004 are calculated by applying to the 2003 medians the percentage of variation observed in a constant sample of early reporters in the Central Balance Sheet Register. A company is considered to be small when it submits its annual accounts to the Central Balance Sheet Register in accordance with the abbreviated reporting scheme. Medium-sized and large companies report in accordance with the full scheme.

(2) The return on equity is the ratio between the net after tax result and capital and reserves.

(3) The solvency ratio is defined as own funds divided by the balance sheet total.

of bank loans. In this connection, a comparison of bank financing conditions faced by small and large corporations confirms that the reliance on and modalities of bank lending continue to differ significantly between both types of companies. Small companies, for example, make more extensive use of their credit lines or depend more on real estate collateral in their banking relationship than large companies. A divergent evolution for both types of companies was also apparent in the number of bankruptcies in 2004, which remained very high for small corporations but declined for large ones.

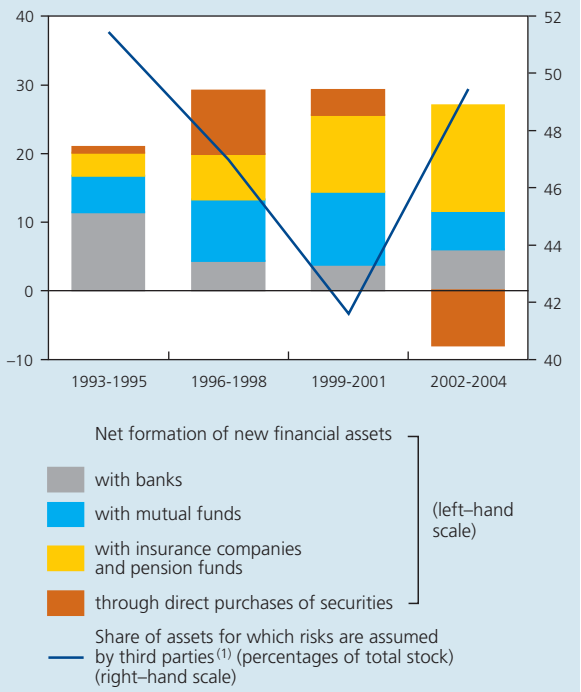
As in 2002 and 2003, Belgian households' saving behaviour in 2004 was marked by a relatively high degree of risk averseness, with households continuing to favour savings instruments with low market risk or none at all, such as savings deposits and guaranteed return life insurance products (class 21). This had a double impact. In terms of flows, the relative importance of household investments on financial markets, either directly or through mutual funds, decreased compared to the years 1996-2001, to the benefit of banks and, especially, insurance companies and pension funds which saw their market share of new savings increase significantly (Chart 2). In terms of stocks, the share of Belgian households' financial assets for which the market risks are borne by financial intermediaries, increased again from 41.6 p.c. in 1999-2001 to 49.4 p.c. in 2002-2004, in line with its level in the period 1993-1995 (51.5 p.c.).

The sharing of risks between households and financial institutions not only has important financial stability implications. It also raises consumer protection issues, as private investors have to get accurate and easily understandable information on the risks they are assuming. When they take out an insurance, as with mutual funds offering capital protection, households must also be aware of the cost of such protection and of the counterparty risk run on the protection seller.

In 2004, Belgian banks' mortgage lending to households continued to grow at a high pace. Growth was fuelled by a continuously high number of new mortgage loans and a further increase in the average loan size which rose to about 110,000 euro, representing a growth rate of 9.6 p.c. relative to 2003 and a doubling of the average loan size relative to 1995 (Chart 3). As house price inflation (6.8 p.c.) did not keep pace with this development, the average loan-to-value ratio on new mortgage loans is estimated to have increased to 89 p.c. last year, against an average 80 - 85 p.c. registered in the years before 2003. Another notable development in the Belgian mortgage market in 2004 has been the switch to variable rate mortgages, whose market share has steadily increased in

CHART 2 BELGIAN HOUSEHOLDS' FINANCIAL ASSETS AND SHARING OF RISKS

(Annual averages in billions of euro, unless otherwise stated)

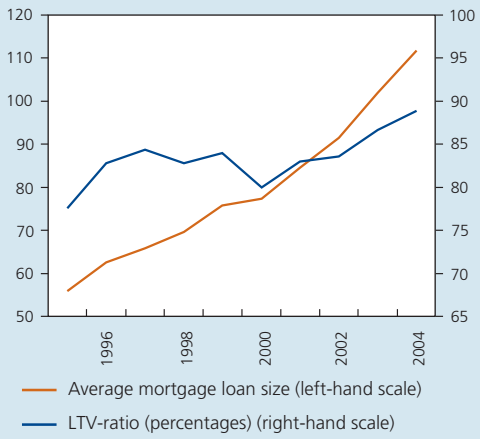


Source : NBB.

(1) The share of assets for which risks are assumed by third parties is calculated as the sum of assets placed with banks and domestic pension funds and assets held in the form of class 21 life insurance policies, divided by the total of financial assets.

CHART 3 AVERAGE MORTGAGE LOAN SIZE AND LOAN-TO-VALUE RATIO

(Thousands of euro, unless otherwise stated)



Sources : Stadim, NBB.

recent years, from on average less than 6 p.c. of total new mortgage loans in the period 1997-2001 to slightly more than 50 p.c. in 2004. As opposed to this development, the share of mortgages with initial interest rate fixation of at least 10 years has declined from an average 75 p.c. in the period 1997-2001 to below 35 p.c. in 2004.

1.2 Banks

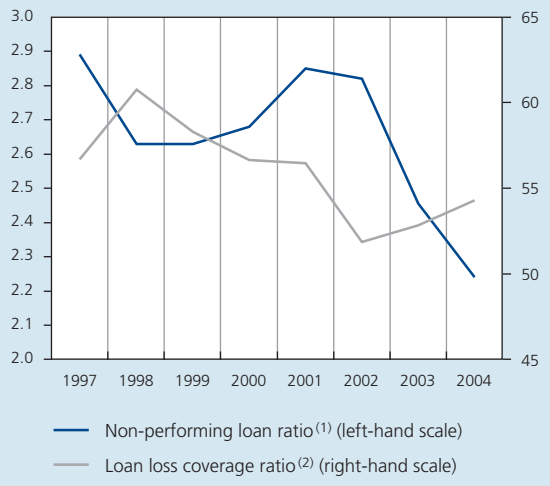
Credit risk, which is still the largest risk facing banks, benefited from better economic conditions in 2004. As a result, the percentage of non-performing loans on Belgian banks' balance sheets decreased strongly (Chart 4). Despite a small increase in the loan loss coverage ratio – defined as the ratio of credit risk provisions to non-performing loans –, this translated into a sharp reduction of net new provisioning, which went down from 0.36 p.c. of total outstanding loans in 2003 to 0.12 p.c. in 2004. The decrease in the provisioning rate of Belgian banks has been observed on an unconsolidated basis but is even more evident on a consolidated basis. This indicates that provisions made on loans granted by Belgian banks' foreign subsidiaries, which are estimated as the difference between the consolidated and unconsolidated figures, have been sharply reduced. In 2002 and 2003, substantial value adjustments were made on foreign loans, i.a. due to problems at the Dutch subsidiary of a major Belgian credit institution and on loans granted by another Belgian bank's subsidiary in Poland. As these provisions contributed to a clean-up of foreign credit portfolios, further value adjustments could be reduced in 2004.

With regard to interest rate risk, the continued growth in Belgian banks' sight and savings deposits kept increasing the proportion of funds with indeterminate maturity in banks' liabilities. As a counterpart, banks have built up higher long positions with a maturity between three months and five years while they have, at the same time, significantly reduced their net positions over ten years through a higher use of off-balance sheet instruments.

From a market value perspective, the use of funds with indeterminate maturity to finance long duration assets makes banks vulnerable to upward changes in the yield curve. Nevertheless, even with the – quite conservative – assumption that savings deposits have on average a nine-month effective duration, Belgian banks seem to be resilient to interest rate shocks (Table 1). Indeed, on the basis of such an hypothesis, an immediate parallel upward shift of the yield curve of 2 p.c. would cause a loss of market value equivalent to only 5.9 p.c. of banks' regulatory

CHART 4 BELGIAN BANKS' NON-PERFORMING LOAN AND LOAN LOSS COVERAGE RATIOS

(End of year unconsolidated figures, percentages)



Sources: CBFA, NBB.

(1) The non-performing loan ratio is the stock of defaulted and uncertain loans as a percentage of total loans to customers and loan commitments.

(2) The loan loss coverage ratio is the stock of value reductions on loans and provisions for loan losses to the stock of defaulted and uncertain loans.

own funds. Stress tests of equity and foreign exchange risks show even more moderate losses as a result of the small net equity and foreign exchange positions carried by Belgian banks.

Besides its impact in terms of interest rate risk, a significant change in the behaviour of savings deposit holders could also affect liquidity. However, Belgian banks have a rather comfortable liquidity position thanks to their substantial portfolio of easily realisable securities, such as government bonds. This portfolio would allow Belgian banks to raise, at very short notice, the liquidity needed to face an unexpectedly large withdrawal of sight or savings deposits.

TABLE 1 STRESS TESTS OF BELGIAN BANKS' INTEREST RATE AND MARKET RISKS

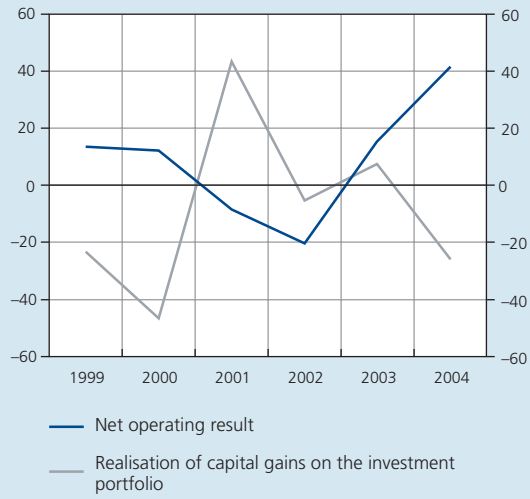
Stress-tested risk	Shock	Impact (in p.c. of regulatory own funds)
Interest rate risk	Upward parallel shift of 2 p.c.	–5.9
Equity risk	15 p.c. decline in share prices	–0.3
Foreign exchange risk	20 p.c. appreciation of the euro	–0.8

Sources: CBFA, NBB.

Following an increase of 15.3 p.c. in 2003, Belgian banks' net operating profit improved further by 41.5 p.c. in 2004 (Table 2). Unlike in the preceding year, this result was not only achieved through lower value corrections, but was also due to a rise in banking income. While interest income grew thanks to a larger volume of interest bearing assets and liabilities, the main drivers of the increase in non-interest income were trading results and fee income. Banks' fee income, in particular, went up thanks to price increases for a number of banking services and higher commissions from asset management, private banking and the sale of investment funds. An indirect indication of the favourable conditions in which Belgian banks operated in 2004 is provided by the drop in realised capital gains, which are often used to smoothen variations in the net operating result (Chart 5).

CHART 5 BELGIAN BANKS' NET OPERATING RESULT AND REALISATION OF CAPITAL GAINS (1)

(Consolidated figures, percentage changes compared to the previous year)



Sources: CBFA, NBB.

(1) In order to avoid the major impact, on the income statement, of the transfer of the participating interest in Dexia Banque Internationale de Luxembourg (BIL) from Dexia Bank Belgium to Dexia Group, 2003 percentage changes have been calculated using published figures from Dexia Group instead of supervisory data on Dexia Bank Belgium.

TABLE 2 MAJOR COMPONENTS OF THE INCOME STATEMENT OF BELGIAN CREDIT INSTITUTIONS(1)

(Consolidated figures, percentage changes compared to the previous year)

	2000	2001	2002	2003	2004
Banking income	15.3	1.4	–4.6	–1.2	5.9
Net interest income	3.0	4.6	3.2	0.0	5.2
Net non-interest income	28.5	–1.2	–11.7	–2.6	6.7
Operating costs	19.0	4.1	–3.8	–1.8	3.1
Staff costs	11.7	6.7	–0.5	0.8	1.4
Other operating costs	24.9	2.3	–6.3	–4.1	4.5
Gross operating result	6.8	–5.6	–6.9	0.1	13.8
Value corrections	–9.6	4.6	36.2	–31.3	–69.2
Net operating result	12.3	–8.3	–20.2	15.3	41.5

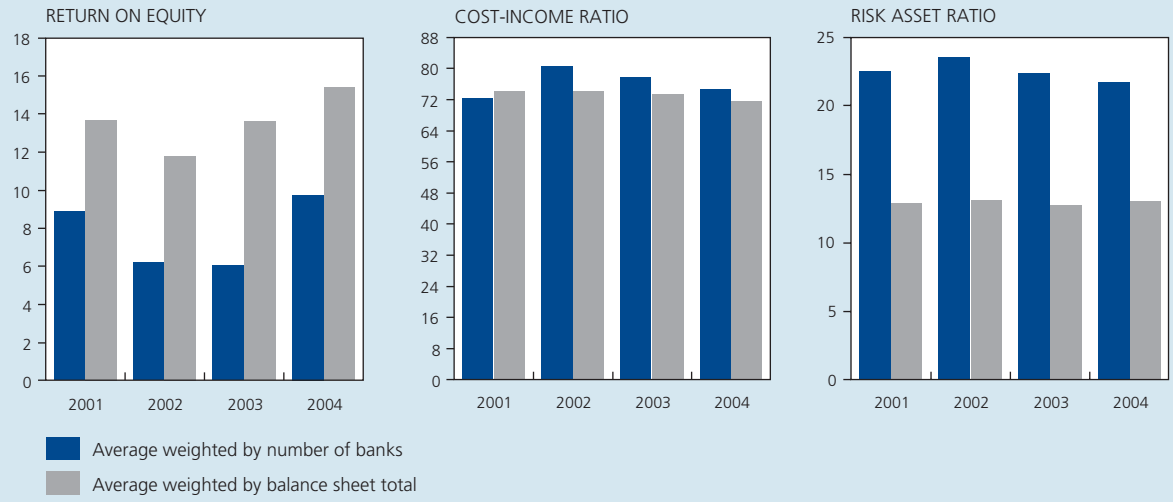
Sources : CBFA, NBB.

(1) In order to avoid the major impact, on the income statement, of the transfer of the participating interest in Dexia Banque Internationale de Luxembourg (BIL) from Dexia Bank Belgium to Dexia Group, 2003 percentage changes have been calculated using published figures from Dexia Group instead of supervisory data on Dexia Bank Belgium.

More directly, the improvement of Belgian banks' profit materialised in an increase in the return on average equity, which rose from 13.6 p.c. in 2003 to 15.8 p.c. in 2004 (Chart 6). Obviously, these figures mainly reflect the situation of the major banking groups. When the average is not weighted by the balance sheet total, but by the number of banks, the profitability indicator is less favourable, being depressed by the weaker performance of smaller banks. A similar divergence is observed for the cost-income ratio. While less profitable, smaller banks have, on average, a higher risk asset ratio. At the end of 2004, this ratio amounted to 13 p.c. when weighted by the balance sheet total and 21.7 p.c. when weighted by the number of banks.

CHART 6 KEY SOUNDNESS INDICATORS OF CREDIT INSTITUTIONS GOVERNED BY BELGIAN LAW

(Consolidated figures, percentages)



Sources : CBFA, NBB.

1.3 Insurance companies

According to the results of a sample of 13 companies accounting for around 82 p.c. of total life and 47 p.c. of total non-life insurance premiums in 2003, a further recovery of profitability took place in the Belgian insurance sector in 2004. The net result of this sample of companies amounted to 5.7 p.c. of net premiums in 2004 compared to 2.6 p.c. in 2003, which was already considerably higher than in 2002, when the sector incurred a loss corresponding to 3.6 p.c. of net premiums (Chart 7). Nevertheless, these results are still far below those recorded at the end of the 1990s.

The main source of the profitability improvement in 2004 was the return to balance of the non-technical result, which is made up of financial results that have not been attributed to life or non-life insurance, together with exceptional items and taxes. In 2003, this component of insurance companies' results had been negatively affected by large unallocated financial costs that were partly associated with the hedging operations of two large insurance companies against further adverse equity price developments. The technical results from life and non-life activities showed a mixed performance, rising from 2.6 to 3.5 p.c. in life insurance, but declining from 2.9 to 2.3 p.c. in non-life insurance.

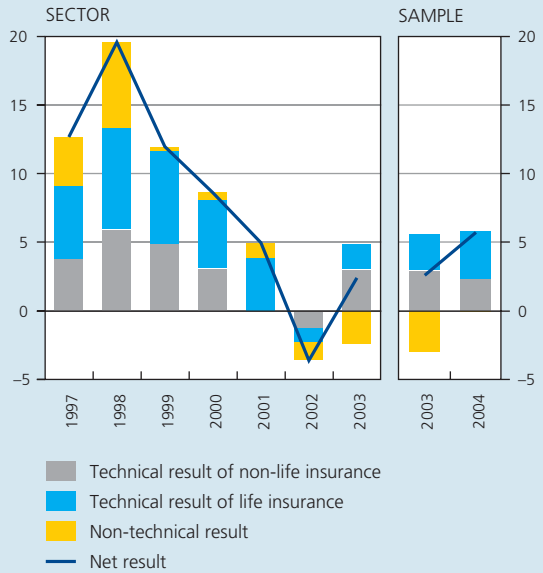
In non-life insurance, the deterioration of the technical result was linked to a slight decline of financial income and a small increase in the combined ratio, which expresses insurance and operating costs as a percentage of net premiums. After an improvement from around 115 p.c. in the late 1990s to 102 p.c. in 2003 – thanks to the realignment of premiums with costs during that period – the combined ratio went slightly up again to 104 p.c. in 2004.

In life insurance, the main challenge is the low level of long-term interest rates. It reduces the recurrent flow of interest income earned on the bond portfolio, which is used to service guaranteed returns on certain life contracts. This guaranteed return traditionally equalled its legal ceiling, amounting to 4.75 p.c. until 1999, when it was lowered to 3.75 p.c. Although, in recent years, insurance companies have further lowered these guarantees on their own initiative, Chart 8 shows that the average guaranteed return on the stock of outstanding contracts has decreased rather slowly and remained, at the end of 2004, considerably above market rates.

However, insurance companies kept distributing profits to policyholders. This was attributable to bonuses paid out on the more recent contracts with lower guaranteed rates, to the pick-up in share prices since 2003 and to the higher level of interest rates up to 1998

CHART 7 LIFE, NON-LIFE AND NON-TECHNICAL RESULTS OF BELGIAN INSURANCE COMPANIES

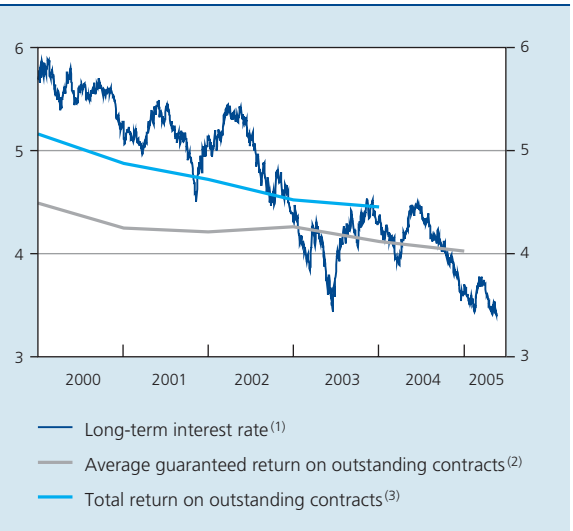
(Percentages of total net premiums)



Sources: CBFA, NBB.

CHART 8 LONG-TERM INTEREST RATE, GUARANTEED AND TOTAL RETURN ON CLASS 21 LIFE INSURANCE CONTRACTS

(Percentages)



Sources: CBFA, NBB.
(1) Ten-year Belgian government bond yield.
(2) Estimate for 2004 on the basis of a linear extrapolation of past developments.
(3) Including distributed profits.

and in the period 2000-2002. As a result, a considerable proportion of the bond portfolio still carries interest rates above the guaranteed return. Nevertheless, it is to be expected that reinvestment risk will gradually emerge as the bonds mature in the coming years.

In order to improve the profitability of their guaranteed return contracts, insurance companies have adapted their asset allocation and introduced some contractual changes. While most contracts concluded until the end of the 1990s applied the guaranteed return valid at the time of conclusion of the contract to all future premiums, a large proportion of new contracts only guarantees the rate valid at the time of receipt of the premium, which may thus be adapted if market conditions require.

However, most of these new contracts also provide more flexibility to policyholders, enabling them to surrender their policy more easily and without incurring major costs. As a consequence, insurance companies might be forced to increase the remuneration of their contracts much more quickly in order to discourage surrenders in the event of rising interest rates. A lower sensitivity to interest rate decreases would then partially be achieved at the cost of a higher sensitivity to interest rate increases.

2. Resilience of financial infrastructure

Central banks have long recognised the paramount importance of a smooth functioning of the payment and settlement infrastructure that underpins the financial markets. They have declared the safety and efficiency of the payment and settlement systems to be one of their major policy objectives. This objective has materialised in the development of a distinct central bank activity, the oversight of the payment and settlement infrastructure.

Oversight of the payment and settlement infrastructure can be defined as the activity of monitoring existing and planned systems, in order to assess them against a number of standards which reflect safety and efficiency targets, with the objective of enforcing changes if and when necessary. Central banks have, over the last few years, devoted considerable efforts to setting up these standards. The focus of the central banking community is now gradually shifting to issues related to the implementation and enforcement of oversight standards.

For the National Bank of Belgium (NBB), this activity is all the more important because some major cross-border infrastructures are located in Belgium, in particular Euroclear and SWIFT. The second part of the FSR addresses, in two separate chapters, important issues for the oversight of these two major systems.

2.1 Cooperative oversight of Euroclear and SWIFT

As financial markets become more globalised, the number of infrastructures with a cross-border dimension has increased over the last few years. The oversight activity has evolved to cope with this cross-border dimension by putting in place international cooperation arrangements for the oversight of such systems. This article describes the arrangements that are in place for the cooperative oversight of Euroclear and SWIFT.

The Euroclear group, composed of Euroclear Bank, the operator of the Euroclear system (an international central securities depository, ICSD), and the CSDs from France, the Netherlands and the UK, plans to provide a pan-European infrastructure for cross-border and domestic securities settlement. Since the corporate restructuring of January 2005, the four entities have been owned by Euroclear SA (ESA), which provides them with common services. In order to deal with the new Euroclear group structure, a new cooperation framework was created between the French, Dutch, British and Belgian central banks and securities regulators.

The arrangements, which are laid down in a multilateral Memorandum of Understanding (MoU), concern the exchange of relevant information between authorities and the co-ordinated assessment of the common services provided by ESA to the group's (I)CSDs. Each national authority remains responsible for the oversight or the supervision of its domestic (I)CSD. Since ESA is a regulated entity under Belgian law, with headquarters in Belgium, the authorities agreed to designate the NBB and the CBFA as co-ordinators. The main functions of the co-ordinators are to act as central entry point to the system, to undertake and to co-ordinate the assessment and to play a co-ordinating role between the authorities and ESA in crisis situations. As direct overseer/supervisor of ESA, the Belgian authorities are responsible for the enforcement of the Belgian regulatory framework applicable to ESA and for the follow-up and enforcement of the recommendations that will be addressed to ESA as a result of the co-ordinated assessment of common services. A technical committee and a high level committee are in charge of the implementation of the cooperation framework.

SWIFT is not itself a payment or settlement system and, as such, is not a regulated entity. However, because of the systemic importance of SWIFT in the global payment system, the central banks of the Group of Ten countries (G10) were of the opinion that SWIFT should be subject to cooperative oversight by central banks. The objectives of this oversight centre on the security, operational reliability, business continuity and resilience of the SWIFT infrastructure.

The first practical cooperative arrangements for the oversight of SWIFT were concluded in 1998. Since then, they have gradually evolved and were reviewed in 2004. They are now based on a protocol between the NBB and SWIFT and on bilateral MoUs concluded between the NBB and each of the other central banks participating in the cooperative oversight. The NBB, which plays the role of lead overseer, monitors SWIFT developments on an on-going basis and serves as the central banks' entry point. Senior policy and technical groups are in place to facilitate the cooperative oversight.

2.2 Assessment of the Euroclear system against CPSS-IOSCO recommendations for securities settlement systems

In November 2001, the Committee on Payment and Settlement Systems (CPSS) of the central banks of the Group of Ten countries and the Technical Committee of the International Organisation of Securities Commissions (IOSCO) published a set of standards: the *Recommendations for securities settlement systems*. The objective of these recommendations is to contribute to financial stability by strengthening the securities settlement systems (SSSs) that are an important component of the global financial infrastructure. CPSS-IOSCO also developed an assessment methodology for the recommendations which aims at providing a clear and comprehensive framework for the assessments made on the basis of the recommendations.

In 2004, within the framework of its oversight of the Euroclear system, the NBB assessed this system against the CPSS-IOSCO recommendations. The Euroclear system, which is operated by Euroclear Bank, a Belgian credit institution, provides ICSD, securities settlement and associated services to major financial institutions located in more than 80 countries. The results of the assessment show that the Euroclear system is fully compliant with fifteen of the nineteen recommendations. For two recommendations (recommendations 9 and 19) an action plan to improve compliance is in the process of being developed. Finally, two recommendations are considered not relevant for Euroclear, as they deal with aspects (trade confirmation, settlement cycle) for which Euroclear bears no responsibility.

3. Summary of articles

3.1 Liquidity risk in securities settlement

Securities settlement, which effects the legal transfer of securities that are traded in financial markets, is a critical element of the financial market infrastructure. Disruptions in settlement can increase trading risks for participants and, if serious enough, can lead to an erosion of market liquidity, which may undermine financial stability. This article uses a multi-period, multi-security model of a gross settlement system to simulate the effect of a shock to securities settlement arising from the default of the largest participant in the system. It shows that differences between securities settlement and payment systems lead to different impacts of shocks.

A first specificity of securities settlement systems is the presence of a settlement lag: trades are settled with a lag of at least one day after the trade has occurred. The simulation results show that this settlement lag causes the impact of a participant's default to last for more than one day. Thus, in assessing the potential severity of a settlement disruption, policy makers need to look beyond the first-day impact. Indeed, the simulations illustrate that the impact on trade settlement may last even longer than the period corresponding to the settlement lag.

A second peculiarity of securities settlement systems is the coexistence of a securities and a cash leg in transactions. This suggests that, in the absence of securities lending facilities, the impact of a default by a large participant and the degree of contagion may be greater if the defaulting participant is a net buyer than if it is a net seller. This is because cash is needed for every transaction, whereas securities are needed only in transactions involving those particular securities. The simulations reveal that when little or no credit is provided during the settlement process, the impact of a default is greater if the defaulting participant is a net buyer. Although generous liquidity is sufficient to eliminate the differential impact of a net buy versus a net sell position for the defaulter, liquidity provision is not sufficient to completely eliminate settlement contagion, due to the existence of the securities leg.

Finally, the results suggest a potential policy trade-off between liquidity provision by the securities settlement system and participants' reactions to a disruption in settlement. That is, either generous liquidity provision or participants' voluntary limitations of the volume of trades – in an attempt to avoid additional settlement failures – can help to rapidly restore the system's settlement efficiency to its normal level. Whereas generous liquidity

provision can sharply reduce contagion, it places a potentially heavy burden on the liquidity provider. On the other hand, conservative reactions by market participants would avoid the burden on the liquidity provider but may entail a potentially severe fall in trading volume, thereby impacting market liquidity.

3.2 Structured finance : complexity, risk and the use of ratings

This article reviews the principal features of structured finance instruments and the economics of structured finance markets. It is argued that ratings, though useful, have intrinsic limitations in fully gauging the risk of these products. At the same time, the complexity of structured finance instruments creates incentives for investors to rely more heavily on ratings than in the case of other rated securities. Market participants and public authorities need to take account of this in their assessments of structured finance instruments and markets.

Structured finance involves the pooling of assets and the subsequent sale to investors of tranched claims on the cash flows backed by these pools. Like other forms of credit risk transfer, structured finance instruments can be used to shift credit risk across financial institutions and sectors. Yet, a key difference is that, via the tranching of claims, structured instruments also transform risk by generating exposures to different "slices" of the underlying asset pool's loss distribution. As a result of this "slicing" and the contractual structures needed to achieve it, tranche risk-return characteristics may be particularly difficult to assess. The pooling of assets creates the need for modelling the loss distribution of the underlying asset pool, which may be complicated when the pool consists of a small number of heterogeneous assets. Tranching adds an extra layer of analytical complexity, requiring modelling of the deal's specific structural features, which determine the distribution of cash flows from the asset pool to the tranches.

Depending on their position in the seniority structure of a transaction, tranches of structured finance instruments can be more leveraged than the portfolio of underlying assets; in other words, the more subordinated a given tranche, the greater the probability that the holder of the tranche will lose a significant portion of its investment. As a result, tranched products can have risk properties that differ substantially from those of equally rated bond portfolio exposures. An important implication is that, due to the joint effects of pooling and tranching, ratings of structured finance products – which, like all ratings, are based on expected loss or probability of default – are likely to provide only an incomplete description of their riskiness relative to traditional instruments. In particular, as "tail events", or unexpected losses, tend to be more likely than for like-rated bonds, undue reliance by market participants and public authorities on ratings can lead to unintended exposures to unexpected loss.

3.3 Measuring the interest rate risk of Belgian regulated savings deposits

Deposits are at the core of banks' financial intermediation function. In Belgium, savings deposits are special because they are the subject of an important regulation which affects their pricing, remuneration structure, and fiscal treatment. The favourable tax treatment and the liquidity services that regulated savings deposits provide to the deposit holder, as well as the stable source of finance they represent for Belgian banks, account for their importance.

Savings accounts raise important financial stability issues. On the one hand, they represent a significant proportion of banks' liabilities. On the other hand, banks use this large volume of funds as a major maturity transformation instrument, since aggregate savings deposit volumes tend to be fairly stable. However, in general, the stability of the deposited funds is only optional, as depositors have the right or option to withdraw all or a part of their deposited funds. The existence of this "embedded" option, together with the banks' option to change the deposit rate that applies to all outstanding balances in reaction to market rate changes, turns out to severely complicate banks' risk management and supervisors' prudential assessment. For example, when banks only partially raise deposit rates in response to increased market rates, depositors may withdraw (some of) their balances in order to invest their funds in higher yielding market instruments. However, when banks increase savings deposit rates in line with market rates, costs would still be incurred as the increase would apply to all existing deposit balances, including the portion that would not have been withdrawn in the absence of a full adjustment. Such considerations and interactions show that price and volume effects should be studied jointly within an interest rate risk framework.

This article presents stylised facts regarding the dynamics of Belgian savings deposit balances and rates, discusses the models that are being proposed and used by banks to account for their interest rate riskiness and analyses potential model weaknesses, not specific to the Belgian context, from a prudential point of view. Simple static replicating portfolio models may fail to reflect the impact of a stress event and are particularly vulnerable to model

risk. Net present value Monte Carlo and dynamic replicating portfolio models seem conceptually stronger and are able to introduce uncertainty about future events, but remain heavily dependent on behavioural assumptions. In the end, interest rate risk management of non-maturity accounts remains an art as well as a science, being inherently exposed to model risk.

3.4 Bilateral investment treaties and the resolution of sovereign debt crises

Recent years have seen a number of initiatives aimed at reducing the social and economic costs of international sovereign debt crises by promoting a more orderly (and hence more timely) resolution of such crises. Some initiatives have actually been implemented by the respective parties involved: contractual Collective Action Clauses (CACs) are inserted into the documentation of new bond issues under US law, and a number of emerging economies and private creditors' associations have agreed upon the text of non legally binding "Principles for stable capital flows and fair debt restructuring in emerging markets". Other initiatives have been shelved, in particular the so-called "statutory approaches", such as the Sovereign Debt Restructuring Mechanism (SDRM) initially proposed by the First Deputy Managing Director of the IMF, Anne Krueger.

These initiatives, concerning in particular the provision of adequate information and addressing co-ordination problems among creditors, perhaps did not pay sufficient attention to the, sometimes kaleidoscopic, general legal framework surrounding sovereign debt crises.

Indeed, under international law, several legal norms exist that could impact upon the rights and obligations of the different parties involved in sovereign debt restructuring. Among them are the numerous Bilateral Investment Treaties (BITs). Such BITs in essence aim at attracting foreign direct investment into less developed and emerging economies, by guaranteeing foreign investors the right to individual protection (and, if need be, to appropriate defence and compensation).

In view of the substantive differences, legal as well as economic, between their nature, aim and effects, one would not expect BITs to interfere in any way with crisis resolution initiatives such as CACs. However, this article indicates that there are sound legal arguments permitting private creditors to invoke the protection granted by BITs. That possibility could affect the incentives for different classes of creditors either to participate in a debt restructuring or to hold out. The rights granted to individual creditors under a rather general legal framework (BITs) could hence impact upon the functioning of another, very specific framework, designed to establish a proper balance between the public good of an orderly and timely resolution of a debt crisis, and the preservation of the rights of private creditors as a group (CACs).

Such interaction between two different spheres is unwarranted, in particular as the amounts involved could become significant: in the case of Argentina, the debt remaining unrestructured after the closing of the debt exchange offer represents 19.6 billions of US dollar, or 11.5 p.c. of GDP. The potential direct and indirect costs involved are thus substantial.

A solution to the problem should be sought at the international - and preferably the multilateral - level. Both a multilateral agreement on investment and a multilateral statutory mechanism for debt restructuring could clarify the situation overall, with the latter presenting the advantages of transparency and consistency. Ultimately, this article therefore adds to the arguments in favour of the international community resuming work on a sovereign debt restructuring mechanism.

Financial Stability Overview

1. International financial markets

With a supportive macroeconomic environment and still accommodative monetary policies, the developments in global financial markets in the second half of 2004 and early 2005 were mainly characterised by low price volatilities and reduced risk premia in a large number of market segments (Chart 1). This happened notwithstanding a tightening of monetary policy in the US, which lifted the federal funds target rate in eight consecutive steps of 25 basis points, from 1 p.c. in June 2004 to 3 p.c. in May 2005.

By announcing its willingness to proceed at a measured pace, the US Federal Reserve left much room for market participants to adjust to the prospect of higher interest rates. Moreover, the very gradual monetary tightening did not herald a major withdrawal of the ample liquidity provided to financial markets since the bursting of the equity market bubble in March 2000. Taking account of the rise of US inflation, the *real* monetary policy rate was left close to zero, as was the case as well in the other two main currency areas, where the European Central Bank and the Bank of Japan left their policy rates unchanged.

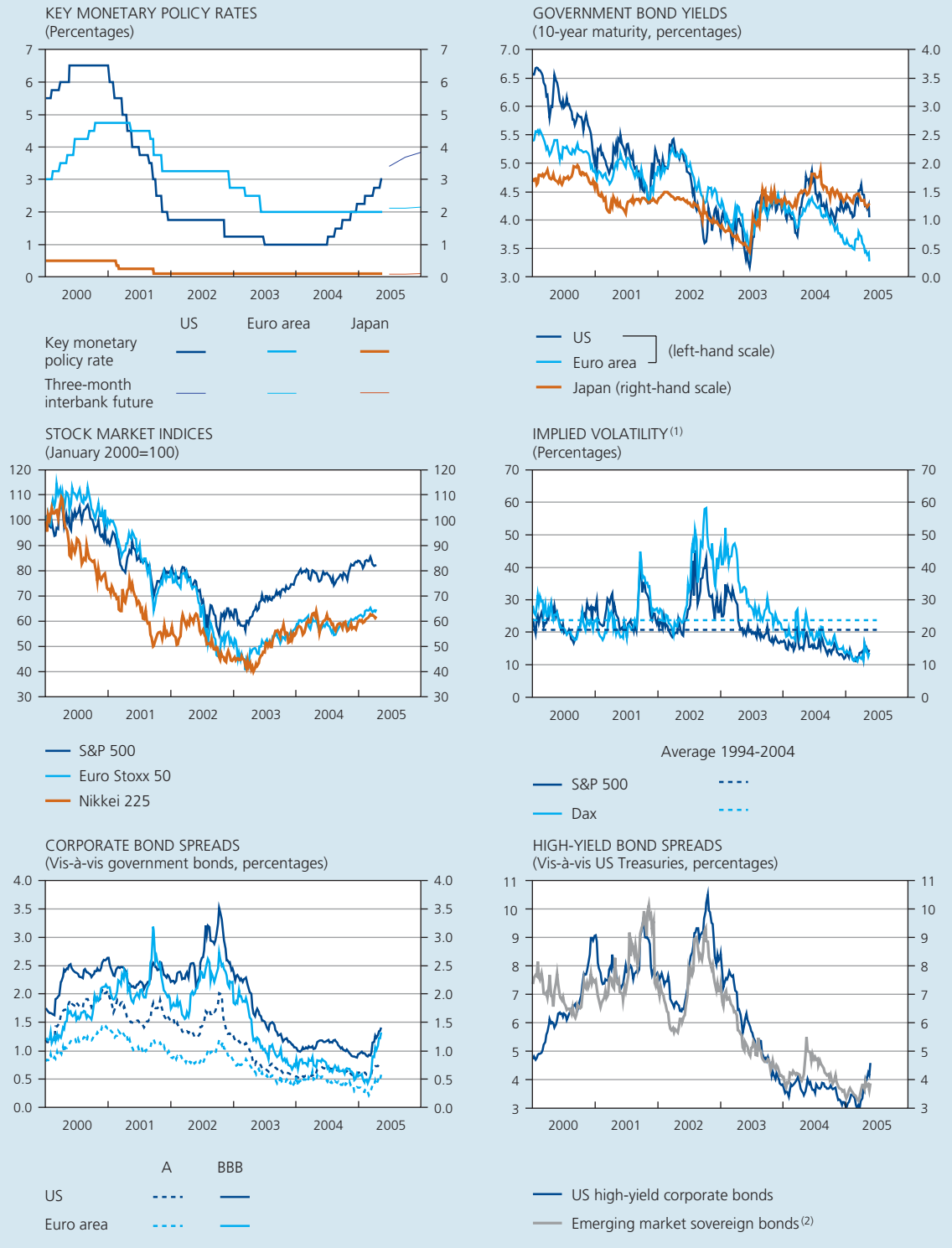
Real rates at the long-end of the yield curve also remained low, and even showed a tendency to decline further during the period under review. While strong economic growth, rising inflation and monetary tightening led many to expect an increase of nominal long-term interest rates in the US, yields on the 10-year Treasury traded in a range of 4 to 4.75 p.c., without showing a distinctive trend up or down. In the euro area, where the strength of economic growth remained below initial expectations, the 10-year benchmark yield declined from 4.25 p.c. at the end of June 2004 to historically low levels of below 3.5 p.c. in the course of 2005.

Well-contained inflation expectations undoubtedly contributed to the persistence of low long-term interest rates in the US and the euro area, but long-dated bonds appear to have benefited as well from an increased demand by insurance companies and pension funds. Faced with the impact of low interest rates on the net present value of their liabilities and (in anticipation of) new regulatory and accounting rules, these institutional investors reportedly tried to achieve a better match between their assets and liabilities by allocating a larger share of their assets to long-duration fixed-income products. Long-term US Treasuries also continued to benefit from Asian central banks' interventions in the foreign exchange markets, as the resulting increased dollar holdings were partly placed in US government bonds.

US and European firms benefited all the more from the lower level of long-term interest rates because corporate bond spreads went further down in 2004 and early 2005. Markets reacted positively to corporations' efforts to purge the financial excesses of the late 1990s through a restoration of their profit margins and a restructuring of their balance sheets. This also showed up in stock market volatility which remained well below the average level of the past 10 years, signalling investors' confidence in the sustainability of current stock price levels.

More recently, some increases have been observed in implied volatility measures and risk premia in US and European stock and bond markets. In part, this upward movement was associated with idiosyncratic credit concerns in the US automotive sector and downward revisions of the profit growth forecasts for blue-chip companies. It also reflected, more fundamentally, concerns over a certain deceleration in profit growth, which might be expected in line with the completion of the financial restructuring process. As many corporations have now restored a considerably higher level of profits, the

CHART 1 DEVELOPMENTS IN SOME KEY FINANCIAL MARKETS



Sources : Bloomberg, Chicago Board Options Exchange, Deutsche Börse, Financial Times, JP Morgan, Merrill Lynch, Thomson Financial Datastream.
(1) Based on the volatility implied in S&P 500 and Dax options.
(2) EMBIG emerging market bond index.

potential for further one-off increases in profits may indeed have decreased.

The slowing momentum of corporate profit growth should not necessarily lead to a correction in stock market prices. As the earlier recovery of equity prices from the multi-year lows reached in March 2003 did not keep pace with the strong growth of corporate profits, the deceleration of corporate profit growth is taking place at a moment when price-earnings ratios have declined to more reasonable levels (in line with or slightly above historical averages). Equity investors have moreover benefited from increased dividend yields, with higher cash flow levels allowing the corporate sector to finance a higher distribution of cash to shareholders without materially affecting corporate credit quality.

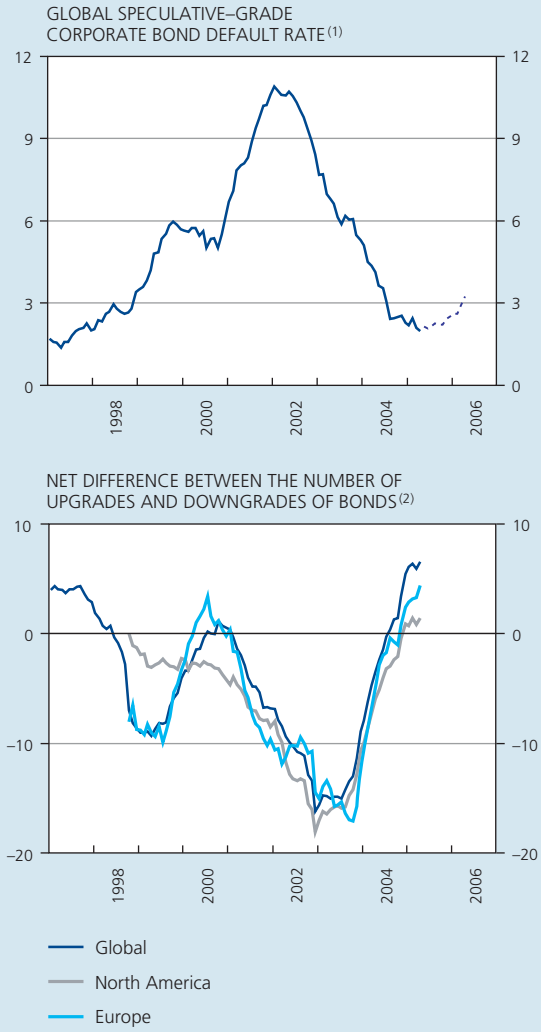
Indicators of corporate credit quality continued to improve during the period under review (Chart 2). The global speculative-grade corporate bond default rate, which had peaked at nearly 11 p.c. in early 2002, dropped below 2 p.c. in April 2005, the lowest level since mid-1997. Although projected to gradually increase from this low level, the default rate is expected to remain well below its historical average of 4.9 p.c. in the period ahead. The general improvement of the creditworthiness of borrowers was also reflected in the return of a positive balance between the number of upgrades and downgrades of bond ratings.

While the persistence of low credit spreads on global bond markets thus went hand in hand with a further improvement in the credit quality of borrowers, it also reflected a continuously strong search for yield by investors. This search for yield was apparent in the high-yield segment of the corporate bond market and in emerging market bonds, but it also contributed to significant investment flows towards hedge funds and structured finance instruments, such as collateralised debt obligations (CDOs), where issuance volumes continued to increase strongly. As discussed in an article in this FSR, these CDOs, while offering attractive returns relative to traditional credit risk products, are complex products, whose risk profiles can be quite different from those of similarly rated bonds.[1]

More generally, the development of CDOs and other credit risk transfer instruments has greatly widened the range of the risk management techniques available to banks. As those instruments can be used to shift credit risks across financial institutions and markets, they should, in principle, increase the resilience of the system to financial crisis.

CHART 2 GLOBAL CORPORATE BOND DEFAULT RATE AND BOND RATING CHANGES

(Percentages of total number of bond issues)



Sources: Moody's, Thomson Financial Datastream.

(1) The global speculative-grade corporate bond default rate is an issuer-weighted, 12-month trailing figure, measuring the number of corporate-grade corporate bond defaults as a percentage of the number of rated issuers. For this series, Moody's makes a projection one year ahead, based on a proprietary model.

(2) The net upgrade ratio is a 12-month trailing figure, expressing the difference between the number of up- and downgrades of bond ratings as a percentage of the total number of rated issuers.

Nevertheless they also raise important issues. The first one is the increased difficulty to effectively monitor the flow and location of risk. To the extent that investors who are taking on the credit risk shed by banks are financing their positions through bank loans, part of these risks will flow back to banks. A second problem is the reliance of market participants on models and correlation estimates which

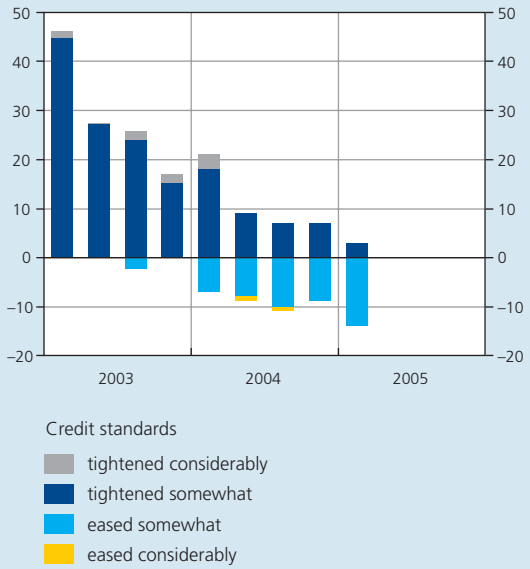
(1) Fender, I and J. Mitchell, 'Structured finance: complexity, risk and the use of ratings.'

have not yet been tested in stressed environments. As a consequence, hedging techniques which are efficient in normal times could potentially contribute to aggravating losses in case of abrupt changes in market conditions. The third issue follows directly from the two previous ones. Credit and market risks are increasingly interdependent, which calls for a more integrated approach to managing financial risks.

According to the results of the Eurosystem's quarterly *Bank Lending Survey* (BLS), very favourable borrowing conditions in the corporate bond markets contributed to a net easing of euro area banks' credit standards for corporate loans during the period under review (Chart 3). Following a period during which a substantial tightening of credit standards on corporate loans had taken place, this net easing of credit standards remained quite moderate up until the last quarter of 2004. It accelerated however in the first quarter of 2005, leading to narrower interest margins, lower non-interest charges and less restrictive loan covenants. Although these results do not necessarily indicate an unwarranted easing of credit standards in corporate lending, the reported heightened competition between bank and non-bank lenders as one of the main driving forces behind this relaxation of credit standards may suggest increased risk-taking by banks in their lending activities. In a similar vein, the BLS results also show that a non-negligible proportion of banks have lowered their margins on housing loans under the pressure of intense competition.

CHART 3 RESULTS OF THE EURO AREA BANK LENDING SURVEY FOR CORPORATE LOANS

(Percentages of the total number of banks included in the survey) (1)



Source : ECB.

(1) A negative number indicates the percentage of banks easing their credit standards.

Efforts to boost revenues in a low interest rate environment may have induced banks to increase risk-taking in other business lines as well, by expanding for example their activities in growing, but potentially high-risk markets, such as the credit risk transfer market (as protection seller) or the hedge funds business. Given the low levels of volatility, banks have also been able to step up their market risk positions for a same amount of capital, as calculated by Value-at-Risk models.

As the low risk premia in global financial markets leave little insurance against less favourable credit or market developments in the future, banks with large market risk positions could be vulnerable to major shifts in investors' expectations and risk appetite. In this regard, the still large current account imbalances in the world economy remain a significant potential source of market volatility, as an unorderly adjustment of financial markets to the persistently large external financing needs of the US economy would probably not only lead to large price swings in the foreign exchange market, but would affect other asset prices as well. An abrupt exit from the current low interest rate environment, due to higher inflation or an upward correction of long-term bond yields, could also prove to be destabilising, as it may trigger an unwinding of leveraged investment positions.

This being said, the resilience of financial institutions and their ability to cope with investment losses is likely to have strengthened during the period under review. In the case of large European banks, for example, rising business volumes, cost control and very low credit losses led to historically high profitability ratios in 2004 and a preservation of satisfactory capitalisation levels. European insurance companies also reported a notable improvement in their performance for 2004, although some challenges remain in the sector, related in particular to the low level of interest rates and the presence of life insurance policies with high guaranteed rates of return on the liabilities' side of their balance sheets.

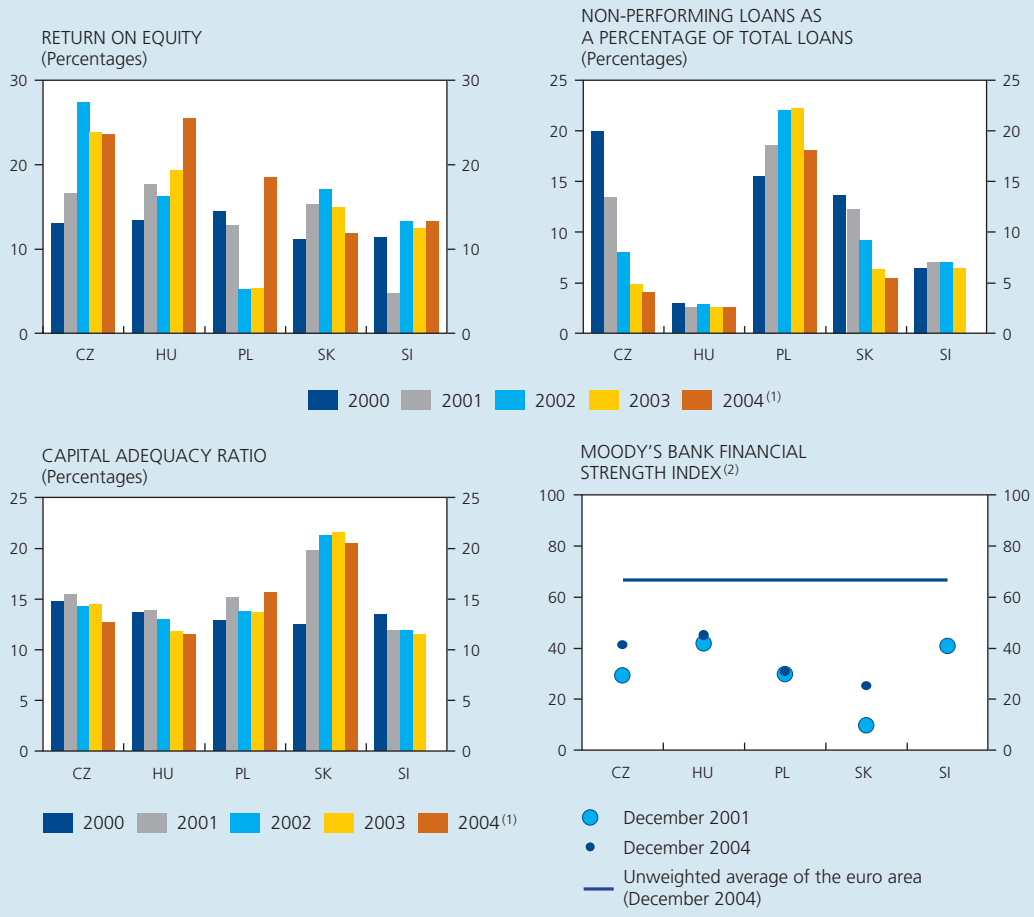
Conditions also developed favourably in the banking systems of the five Central European countries where one of the major Belgian banks has developed a second home market (Chart 4). Most notably, a significant turnaround in the profitability of the Polish banking sector took place in 2004, which lifted its return on equity from the single

digit figures registered in 2002 and 2003 to above 15 p.c. This development reflected in part the more favourable macroeconomic environment, but it also resulted from the restructuring efforts undertaken in recent years to address persistent asset quality problems.

In 2004, lending to the domestic private sector continued to expand strongly in Central Europe. While being a welcome development in the light of the still low level of financial intermediation in these markets, some concerns have been raised about potential financial stability implications. In a number of countries, the credit boom is taking place against the backdrop of remaining gaps in basic supporting infrastructures for sound credit risk management, such as efficient bankruptcy regimes or liquid collateral markets. In some countries, moreover, a non-negligible share of lending to the domestic private sector takes the form of foreign currency loans, which may expose banks to additional credit risk in the case of borrowers without a natural hedge against unfavourable exchange rate developments.

Although this strong expansion of loans has, in turn, also contributed to a decline in capital adequacy ratios in some countries, risk asset ratios remain well above 10 p.c. When assessing the financial resilience of Central European banks, it is worth recalling moreover that their financial strength should not be assessed only on the basis of stand-alone banking institutions, as is being done for the bank financial strength index shown in the bottom-right panel of Chart 4. As many banks in Central Europe have become subsidiaries of foreign (mainly EU) banks, an assessment of their resilience must also take into account the potential capital support that these institutions may receive from their parent companies in the event of difficulties.

CHART 4 DEVELOPMENTS IN THE FINANCIAL SECTORS OF CENTRAL EUROPEAN EU MEMBER STATES



Sources : IMF, Moody's, national sources.

(1) Latest available data.

(2) The average bank financial strength index is constructed according to a numerical scale assigned to the different weighted average bank financial strength ratings by country. Financial strength ratings measure the strength of a financial institution on a "stand-alone" basis, disregarding for example possible external financial support (e.g. from a foreign-owned parent bank).

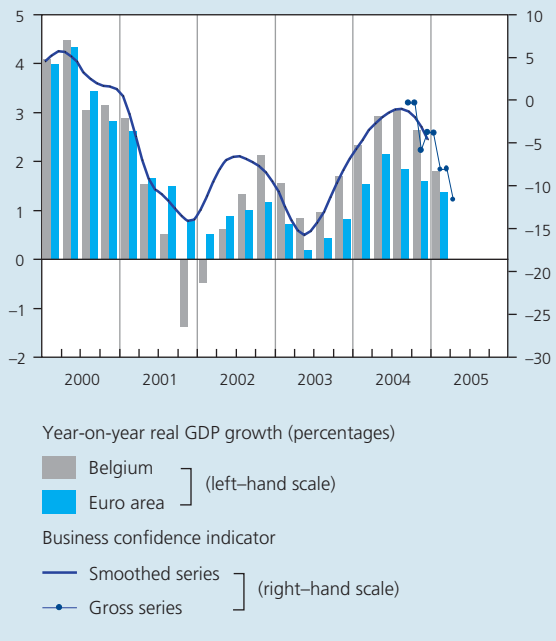
2. Financial position of the Belgian private sector

In 2004, the Belgian economy expanded by 2.7 p.c. in real terms, for the second year in a row outstripping euro area growth (Chart 5). The differential mainly resulted from higher growth of domestic demand, boosted by the vigour of private consumption. Yet, in line with the reversal of the NBB business confidence indicator, GDP growth slowed down in the last quarter of 2004 and the first quarter of 2005. Against this background, current consensus forecasts project Belgian GDP growth to be lower in 2005.

2.1 Corporate sector

Benefiting from the strength of Belgian and world economic growth in 2004, the recovery in corporate profits, which had started in 2003, gained further momentum last year. In 2004, the estimate of the median return on equity, based on a sample of non-financial corporations whose 2004 annual accounts are already available in the Central Balance Sheet Register, increased strongly for large and medium-sized as well as for small companies, reaching 9.1 and 7.7 p.c. respectively (Chart 6). (1)

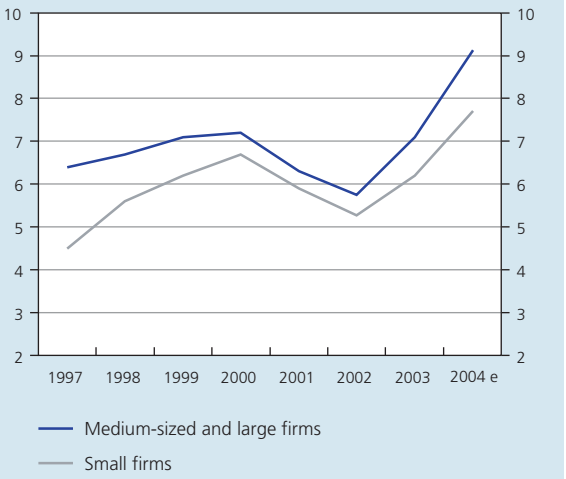
CHART 5 REAL GDP GROWTH (1) AND BUSINESS CONFIDENCE INDICATOR



Sources : EC, NAI, NBB.
(1) Seasonally adjusted data.

CHART 6 MEDIAN RETURN ON EQUITY (1) FOR NON-FINANCIAL CORPORATIONS (2)

(Percentages)



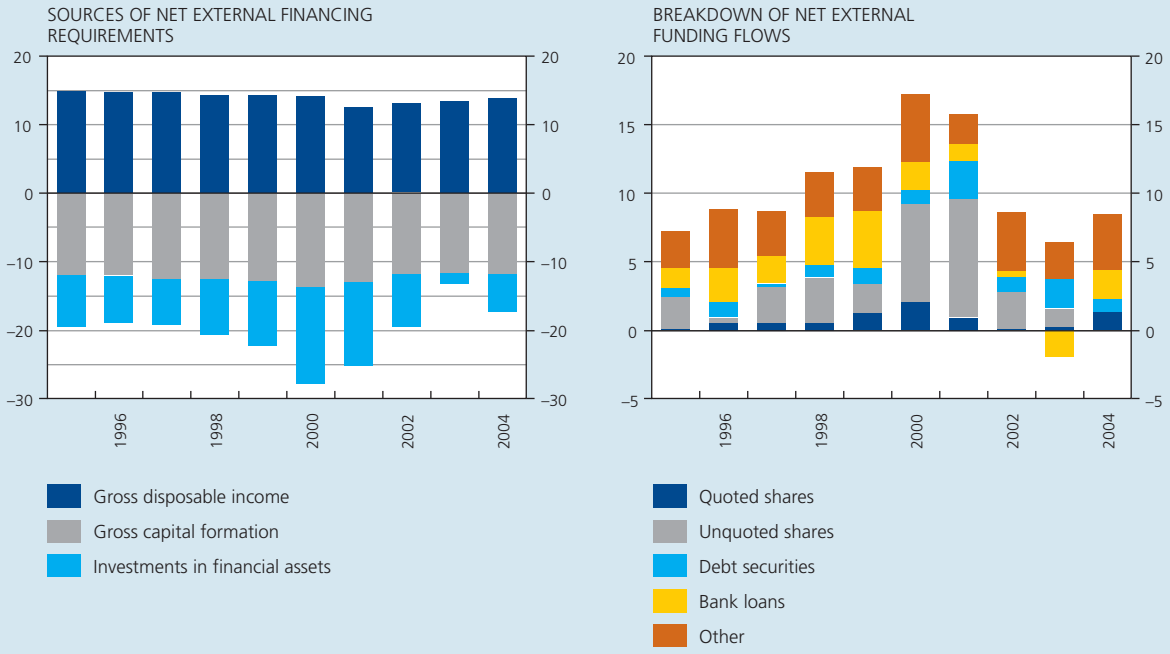
Source : NBB.
(1) The return on equity is the ratio between the net after tax result and capital and reserves. The medians in 2004 are calculated by applying to the 2003 medians of the whole population the percentage of variation observed in a constant sample of early reporters in the Central Balance Sheet Register.
(2) A company is considered to be small when it submits its annual accounts to the Central Balance Sheet Register in accordance with the abbreviated reporting scheme. Medium-sized and large companies report in accordance with the full scheme.

As this improved profitability led to a significant growth in the payment of dividends, the earnings retained by firms to finance their investments, as measured by the corporate sector's gross disposable income, recorded a more modest increase (Chart 7, left panel). Despite a better economic environment, investments in real assets remained stagnant, increasing only slightly from 11.6 p.c. of GDP in 2003 to 11.8 p.c. of GDP in 2004. In addition to the persistence of excess production capacity, this delayed response of corporate investments to the recent upturn may have been due to the uncertainty over the outlook for growth or, to some extent, also to the relocating of investments to new geographical growth areas. At the same time, investments in financial assets rose to 5.7 p.c. of GDP in 2004 but remained lower than the average of 8.1 p.c. recorded during the last decade and the peak of 14.1 p.c. in 2000.

(1) Those preliminary estimates should be interpreted with caution, as the majority of firms which have already reported their 2004 accounts have a financial book year that does not correspond to a full calendar year. As a consequence, their financial ratios reflect the business conditions prevailing at the juncture between 2003 and 2004.

CHART 7 NON-FINANCIAL CORPORATIONS' NET EXTERNAL FINANCING (1)

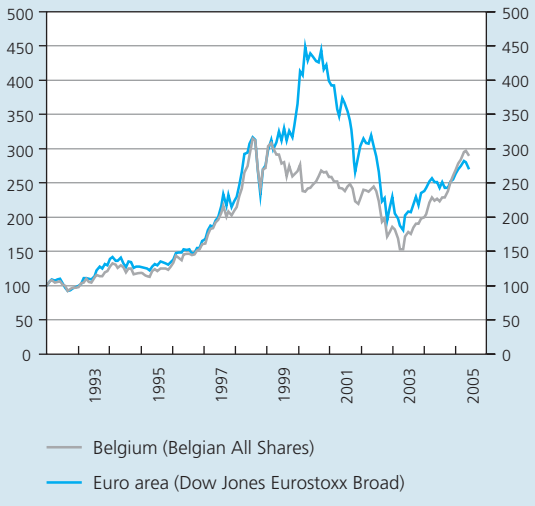
(Percentages of GDP)



Sources : NAI, NBB.
(1) Excluding inter-company loans.

CHART 8 STOCK MARKET INDICES IN BELGIUM AND THE EURO AREA

(Monthly averages, indices January 1992=100)



Sources : Euronext Brussels, Thomson Financial Datastream.

As a result of these developments in profits and investments, the total net external financing requirement went up from 4.5 p.c. of GDP in 2003 to 8.3 p.c. of GDP in 2004 (Chart 7, right panel). In addition to this upward trend, changes in sources of funding were also observed. The net amount of funds raised as equity capital remained generally low. However, in 2004, net issues of quoted shares were higher than those of unquoted shares, which is unusual. This took place against the backdrop of the strong performance of the Belgian stock index (Belgian All Shares), which outstripped the performance of comparable indices in the euro area in 2004 and the first quarter of 2005 (Chart 8).

In 2005, listed Belgian companies will report their consolidated accounts according to the new international accounting rules, IAS/IFRS. Although this will improve the transparency of financial reports, it could involve some uncertainties in the transition period. Box 1 discusses the impact of the introduction of IAS/IFRS for the non-financial corporate sector in Belgium.

Box 1 – Impact of the introduction of IAS/IFRS for the non-financial corporate sector in Belgium

For financial years starting on or after 1 January 2005, nearly all European listed companies publishing consolidated accounts have the obligation to report these accounts under IAS/IFRS.[1] About 115 Belgian non-financial corporations listed on Belgian financial markets are concerned by the application of these new accounting rules. However, amongst these companies, only around 100 will have to implement IAS/IFRS for the first time in 2005, as the others already apply them or are allowed to use the US GAAP[2] until 2007. Even if the number of Belgian corporations directly concerned by these new accounting rules is very limited compared with the total number of Belgian companies (around 280,000), the economic weight of companies implementing the IAS/IFRS rules is important. A large number of Belgian companies are also indirectly concerned, as a subsidiary, a joint venture or an associated company of a Belgian or foreign listed company applying IAS/IFRS.

The IAS/IFRS rules involve major changes as some of their main principles are quite different from the ones defining the Belgian accounting standards. In particular, they introduce the notion of fair value in order to systematically relate the valuation of some corporate assets to market prices, while Belgian GAAP usually value assets and liabilities on the basis of (amortised) historical cost. Moreover, the implementation of IAS/IFRS involves major modifications in the presentation of financial statements and in the information provided to market participants.

For the presentation of financial statements, IAS require, in addition to a balance sheet and an income statement, a statement of changes in equity and a cash flow statement as well as rather detailed segment information and an elaborate set of notes. The scope of consolidation will be affected by explicit rules on the consolidation of special purpose entities, while changes will be brought to the valuation rules of a wide range of assets or liabilities. The major differences in valuation rules between IAS/IFRS and Belgian GAAP are shown in the Table below. The importance of these changes will largely depend on the characteristics of the companies concerned, but they will in most cases have a significant impact on earnings and equity.

(1) IAS stands for International Accounting Standards and IFRS for International Financial Reporting Standards.

(2) GAAP stands for Generally Accepted Accounting Principles.

MAJOR DIFFERENCES IN VALUATION RULES BETWEEN IAS/IFRS AND BELGIAN GAAP

	Belgian GAAP	IAS/IFRS
Property, plant and equipment	Historical amortised cost (but possibility to revalue)	Amortised cost / Fair value
Intangible assets		More restrictive definition and detailed rules
Goodwill	Amortised	Annual impairment test
Provisions		More restrictive criteria to book provisions
Deferred taxes	Tax assets allowed under certain conditions	Tax assets compulsory if certain detailed conditions are met
Employee share option plans	No explicit requirements	In the income statement at fair value when granted
Post-employment benefits	In the income statement	In the income statement and the balance sheet

Under Belgian GAAP, property, plant and equipment are normally valued at historical amortised cost. Under IAS 16, companies may opt for a valuation at cost (less accumulated depreciation and impairment) or for periodic revaluation at fair value with revaluation gains credited to equity in most cases.

IFRS 3 usually requires, as is already the case under Belgian GAAP, a company acquiring another one to recognise a goodwill for future economic advantages provided by assets which cannot be valued individually and recorded separately. While, under Belgian GAAP, goodwill must be amortised annually, the new IAS/IFRS rules impose an annual impairment test. If the goodwill, and the groups of assets to which it is allocated, are valued at a higher amount than the recoverable amount, the company has to recognise an impairment loss. Moreover, an impairment loss for goodwill can never be reversed later on.

In contrast to the two preceding new rules, which could have a positive impact on Belgian companies' earnings and own funds, the IAS/IFRS rules for employee share option plans and pension plans are generally expected to have, on balance, a negative impact.

IFRS 2 could have an adverse influence on the reported earnings of Belgian companies because it imposes that employee share option plans, measured at fair value at grant date, are recognised as expenses in their income statements. Under Belgian GAAP, expenses associated with the distribution of share options were often omitted.

IAS 19 should also influence the accounting results of Belgian companies. Under Belgian GAAP, post-employment benefits financed by an insurance group or a pension fund only lead to expenses in the income statement when payments are effectively made to the insurance company or to the pension fund. Moreover, there is often no provision for pension plans in the balance sheet.

Under IAS, the accounting of these post-employment benefits will differ according to the modality of the pension plan (defined contribution plans or defined benefit plans). In a defined contribution plan, the company pays fixed contributions to a separate entity (a fund) and has no obligation to pay any further contributions. In this case, the employee bears the risk, and the IAS rules for this type of plans are similar to those used under Belgian GAAP.

IAS uses a different accounting treatment for defined benefit plans. As these plans involve future obligations and a future risk for companies, these have to be taken into account in the financial statements. IAS require that companies measure their pension plan assets at fair value and the liabilities attached to these plans according to actuarial methods. If the latter is higher than the value of the plan's assets, a provision has to be recorded on the liabilities' side of the balance sheet. In the opposite case, and subject to certain conditions, receivables are recorded in the balance sheet.

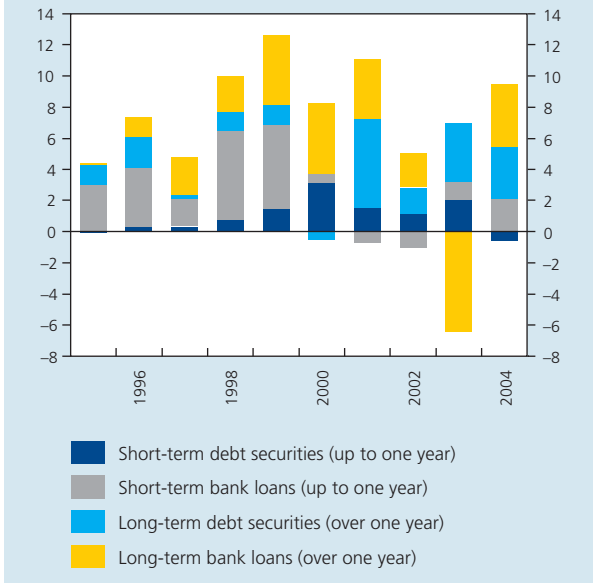
In Belgium, as the law imposes that a minimum return is guaranteed even in the case of defined contribution plans, the employer bears part of the risk. Consequently, Belgian companies will recognise these plans as defined benefit plans and probably record provisions for these plans. Under Belgian GAAP, companies have no such obligation. Only if the minimum return is guaranteed by another entity (for instance, an insurance company) can the pension plan be treated as a defined contribution plan under IAS/IFRS.

While funds raised in the form of debt securities and bank loans were quite low in 2003 (0.2 p.c. of GDP), they increased to 3.1 p.c. of GDP in 2004. These two sources of financing evolved somewhat differently. The volume of bank loans went up again in 2004 after a fall in 2003 and a stagnation in 2002, but the net amount of funds raised through the issue of debt securities was lower than in 2003. In a new survey conducted by the NBB on the appreciation, by firms, of bank credit conditions, the number of corporations considering those conditions to be favourable increased from 40 p.c. of total in November 2003 to 45 p.c. in November 2004 and the number of companies considering the opposite decreased from 14 to 9 p.c. This broadly favourable assessment resulted only from the level of interest rates charged by banks. Despite a recent improvement, other factors such as administrative costs, credit volume and required guarantees continued to be negatively perceived by companies seeking to obtain bank loans.

Moreover, non-financial corporations tried to take advantage from the low level of long-term interest rates (Chart 9). While in 2003, they had reimbursed a significant portion of their long-term bank loans, in 2004, they contracted the major part of their fixed-income liabilities through long-term bank loans and debt securities.

CHART 9 BREAKDOWN OF NEW CORPORATE DEBTS ACCORDING TO MATURITY

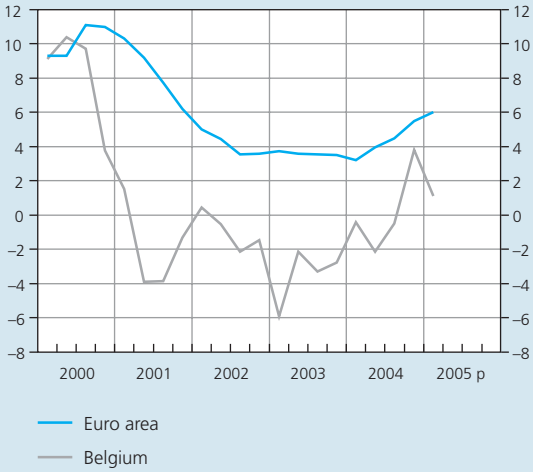
(Billions of euro)



Source : NBB.

CHART 10 BANK LOANS TO NON-FINANCIAL CORPORATIONS (1)

(Percentage changes in outstanding amounts compared to the corresponding quarter of the previous year)



Sources : ECB, NBB.

(1) Data for loans granted by monetary financial institutions according to Eurosystem definitions.

According to the harmonised euro area statistics on lending by monetary financial institutions, the growth of corporate loans in Belgium, which had been negative during the past four years, turned positive again at the end of 2004 and early 2005 (Chart 10). The growth rate remained however below the rate registered for the euro area.

In Belgium, substantial differences can be observed between bank loans for small and for medium-sized and large corporations. Between 2001 and 2004, the volume of loans increased, on average, by 3.5 p.c. for small firms but decreased by 3.4 p.c. for medium-sized and large firms (Table 1).

In addition to the rate of growth, differences extend to other aspects of the banking relationship. The degree of utilisation of credit lines seems, on average, much higher for small companies. This category of firms does not only rely more intensively on bank credit lines but, also, borrows from a smaller number of institutions. This characteristic is probably linked to the relative information opaqueness of small firms, which induces banks to establish closer relationships with this client segment to reduce problems of information. A similar motivation probably explains why banks, on average, require a higher level of guarantees, usually in the form of real estate collateral, from small than from medium-sized and large

TABLE 1 BANK FINANCING CONDITIONS FOR NON-FINANCIAL CORPORATIONS (1)

(Percentages, unless otherwise stated)

	Bank loans (average annual growth rate; 2001-2004)	Degree of credit line utilisation (average; 2001-2004)	Number of bank relationships (average; 2002)	Importance of collateral (2) (2003)		
				Real estate	Other (3)	Total
Small firms	3.5	81.8	1.2	34.1	15.6	49.7
Medium-sized and large firms	–3.4	58.8	1.8	9.7	31.3	41.0

Source : NBB.

(1) A company is considered to be small when it submits its annual accounts to the Central Balance Sheet Register in accordance with the abbreviated reporting scheme. Medium-sized and large companies report in accordance with the full scheme.

(2) In percentage of total bank credits.

(3) The item "other" includes financial assets and pledges on stock and receivables.

companies. Moreover, as larger companies can potentially offer financial collateral or pledges on part of their stock or receivables, a proportionally greater use seems to be made of that type of collateral.

Large corporations also benefit from the lower interest rates that are usually charged for large borrowings (Table 2). A comparison of bank financing conditions in Belgium and the euro area reveals that interest rates for bank loans are slightly lower in Belgium than in the euro area as well for amounts exceeding one million euro as for smaller amounts. However, interest rates on overdrafts, a type of credit intensively used by many small corporations, seem to be higher in Belgium, although this latter comparison does not take into account other pricing factors such as fees or commissions that are associated, in some countries, with the use of overdrafts.

(1) Here too, estimates for 2004 should be interpreted with caution as they reflect the business conditions at the juncture between 2003 and 2004.

TABLE 2 BANK FINANCING CONDITIONS FOR BELGIAN AND EURO AREA NON-FINANCIAL CORPORATIONS

(Average for the year 2004, percentages)

	Large loans (1) (2)	Small loans (1) (2)	Overdrafts
Belgium	2.83	3.82	7.88
Euro area	3.01	4.10	5.45

Sources : ECB, NBB.

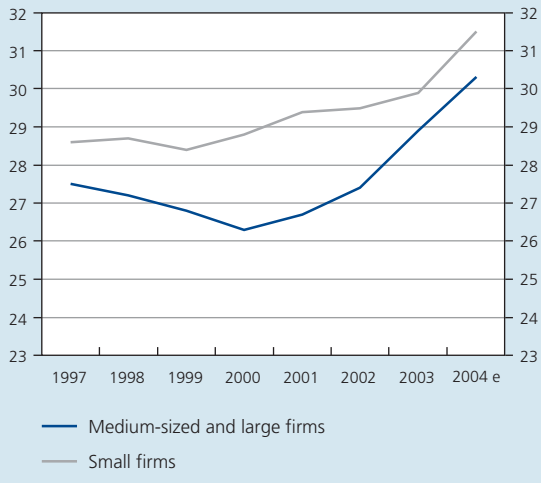
(1) Large loans are those for which the amount exceeds one million euro.

(2) The averages were calculated in two steps. First, a weighted monthly average of interest rates of different maturities was calculated (the weight being the Belgian average volume of new loans per sub-category in 2004). These monthly averages were used in turn to calculate an average for the year 2004.

Global improvements in the financial structure of non-financial corporations in the past few years translated into higher solvency ratios (Chart 11). Compared with 2003, the estimated (1) median of the solvency ratio for small as well as for medium-sized and large companies increased from 29.9 to 31.5 p.c. and from 28.9 to 30.3 p.c., respectively, in 2004.

CHART 11 MEDIAN SOLVENCY RATIO (1) FOR NON-FINANCIAL CORPORATIONS (2)

(Percentages)



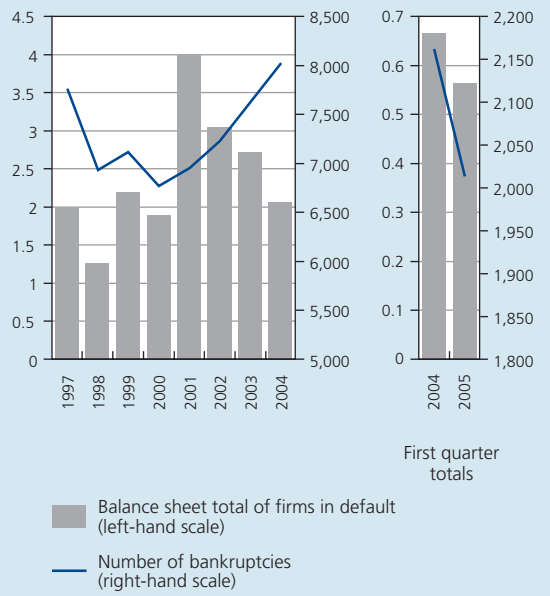
Source : NBB.

(1) The solvency ratio is defined as own funds divided by the balance sheet total. The medians in 2004 are calculated by applying to the 2003 medians of the whole population the percentage of variation observed in a constant sample of early reporters in the Central Balance Sheet Register.

(2) A company is considered as small when it submits its annual accounts to the Central Balance Sheet Register in accordance with the abbreviated reporting scheme. Medium-sized and large companies report in accordance with the full scheme.

CHART 12 BANKRUPTCY INDICATORS

(Billions of euro, unless otherwise stated)



Sources : Graydon, NBB.

While the number of bankruptcies increased again in 2004, the amount of total assets involved in bankruptcy proceedings fell as the number of large bankruptcies remained limited (Chart 12). In the first quarter of 2005, both the number of bankruptcies and the total amount of assets involved dropped.

As the evolution of the number of bankruptcies is an important indicator of the corporate sector's creditworthiness, it is interesting to know how the aggregate corporate sector default rate reacts to macroeconomic fluctuations. Box 2 reviews some results of a small model linking the aggregate corporate sector default rate to some macroeconomic variables.

Box 2 – Impact of key macroeconomic variables on corporate default rates

As domestic credit risk remains one of the largest risks faced by Belgian banks, it is essential to accurately assess the evolution of the Belgian corporate sector's creditworthiness over time. One of the main indicators used to that end is the evolution of bankruptcies in Belgium. The goal of this Box is to analyse the relationship between some macroeconomic variables and the aggregate corporate sector default rate, calculated by dividing the total number of defaulted companies by the total number of firms recorded in the Central Balance Sheet Register. The relationship will then be used to measure the sensitivity of the default rate to a macroeconomic stress scenario.

Typically, models explaining default rates contain GDP, (real) interest rates (short and/or long) and sometimes (real) wages as explaining factors. Following common practice in bankruptcy studies, a logistic functional form has been used, which mathematically ensures a default rate estimate in the range from zero to one. It can be represented as :

$$L(P_t) = \ln\left(\frac{1-P_t}{P_t}\right) = \alpha_0 + \alpha_1 X_{1,t} + \alpha_2 X_{2,t} + \ldots + \alpha_n X_{n,t} + \varepsilon_t$$

where : $L(.)$: logistic transformation;
P_t : aggregate corporate sector probability of default;
X_i : explanatory macroeconomic determinants, such as GDP growth, interest rates, etc.

This logistic transformed default rate can be seen as an index summarising the state of the economy. A high level for the index corresponds to a low level of the default rate and vice versa. Once estimated, this expression can be used to calculate the impact of macroeconomic shocks on the default rate itself.

The estimated equation contains an output gap and a long-term interest rate that are both statistically significant. The equation, estimated with quarterly data from the first quarter of 1990 up to the second quarter of 2004, looks as follows (standard errors reported between brackets):

$$L(P_t) = 1.5441 + 0.3245\ L(P_{t-1}) + 0.3861\ L(P_{t-5}) + 3.5185\ Ygap_t - 0.0151\ LR_t$$
$$\quad\quad (0.4205)\quad (0.1066)\quad\quad (0.08161)\quad\quad (0.8285)\quad\quad (0.0052)$$

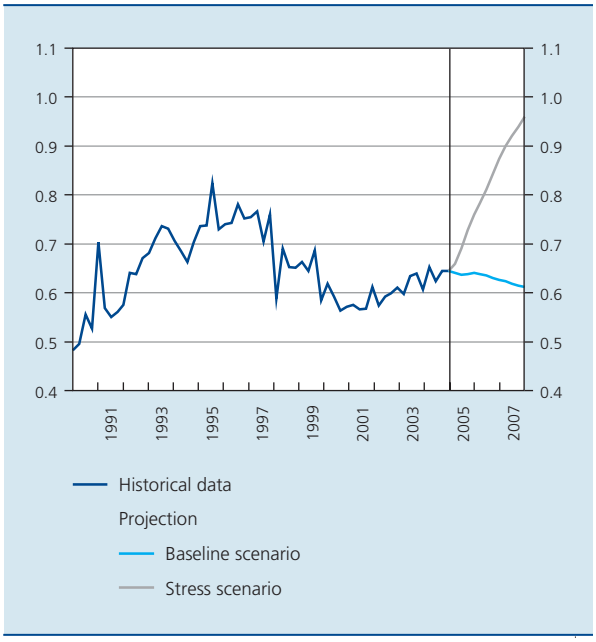
with: $L(P)$: logistic transformed aggregate corporate sector default rate;
$Ygap$ = output gap = ln (gdp) – ln (gdp_hp); (with gdp_hp = trend filtered output)
LR: Belgian nominal long-term interest rate;
and: $R^2 = 0.7514$;
Durbin Watson = 2.4261;
Standard error of the regression = 0.0557.

Given that only two determinants are used, and that smoothing takes place through the presence of the lagged dependent variable, the equation is, of course, unable to fit the erratic quarter-on-quarter jumps that the default rate series sometimes exhibits. This asks for some caution when reference is made to short-run point forecasts of the default rate. But on average, the equation captures quite well the evolution in the default rate.

In the context of the IMF's FSAP mission in Belgium, this equation has been used to test, in combination with the econometric model of the bank and NIGEM[1], a large scale econometric world model, a hypothetical stress scenario. This scenario consists of a series of exceptionally large but still plausible shocks, i.e. an appreciation of the

(1) National Institute Global Econometric Model, developed at NIESR (National Institute of Economic and Social Research), London.

QUARTERLY DEFAULT RATE OF BELGIAN NON-FINANCIAL CORPORATIONS
(Percentages)



Source: NBB.

euro (25 p.c. vis-à-vis the US dollar, 12.5 p.c. vis-à-vis other currencies), a stock market decline (equity prices fall by 20 p.c.) and a substantial increase of long-term interest rates worldwide (+300 basis points, although long rates continue to react endogenously to other shocks). An important commodity and oil price shock was added to this, in order to tie the hands of the monetary authorities, who are then unable to lower short-term interest rates in the context of an upswing in inflation. As a result, most macroeconomic variables in the euro area and in Belgium were pushed far off their baseline path, before gradually returning to it. Particularly, after three years, cumulated output in Belgium would be some 5 p.c. lower than would have been the case in the baseline scenario.

Using these shock results together with the estimated default rate equation, the impact of this stress scenario on the default rate of Belgian companies was calculated.

At the end of 2004, the quarterly default rate stood at an average level of about 0.64 p.c. Over the first three years of the shock period, this quarterly default rate is projected to increase gradually to a level that is 0.3 percentage points higher. With the number of companies fixed at their 2004 level, this would amount to an increase in the number of defaulting companies of about 50 p.c.

Both determinants (GDP and the long-term interest rate) influence the default rate negatively. The shock description shows that the effect from the long-term interest rate alone leads to a 0.075 percentage point increase in the quarterly default rate. However, the main contribution obviously comes from the contraction of the output gap, the impact of which is about three times as large.

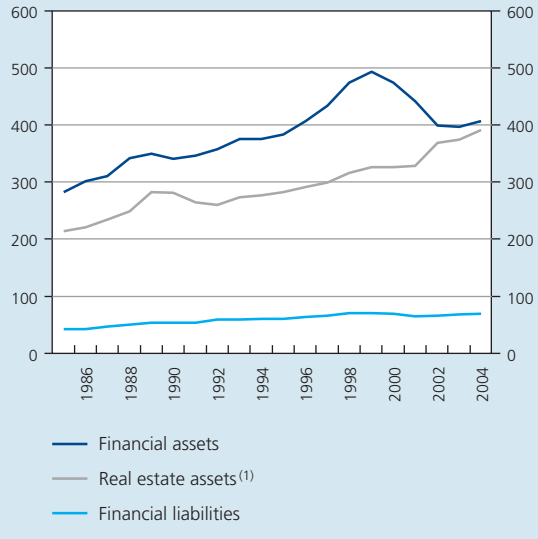
2.2 Household sector

In 2004, households' financial position remained strong, even if their financial assets levelled off at around 400 p.c. of disposable income, a much lower percentage than the historical maximum reached in 1999 (Chart 13). This recent evolution was not so much due to valuation effects – as was the case between 1999 and 2002 when the bursting of the stock market bubble sharply reduced the value of equity portfolios – but due to a reduced acquisition of new financial assets in 2004, itself resulting from a decline in Belgian households' savings ratio. Nevertheless, at 14.2 p.c. of gross disposable income, the Belgian savings ratio remains much higher than the average of the euro area.

The largest part of the stock of households' financial assets is still placed with banks (Chart 14, left panel). It went up from 32.6 p.c. of total financial assets in 2000 to 36 p.c. in 2004, on the back of a strong increase in the constitution of savings deposits (see Chapter 3 and Box 3). At the same time, institutional investors kept increasing their role in the management of households' financial assets, with insurance companies (and pension funds) having recently superseded mutual funds as the fastest expanding group of intermediaries on this market.

CHART 13 DEVELOPMENTS IN BELGIAN HOUSEHOLDS' BALANCE SHEET

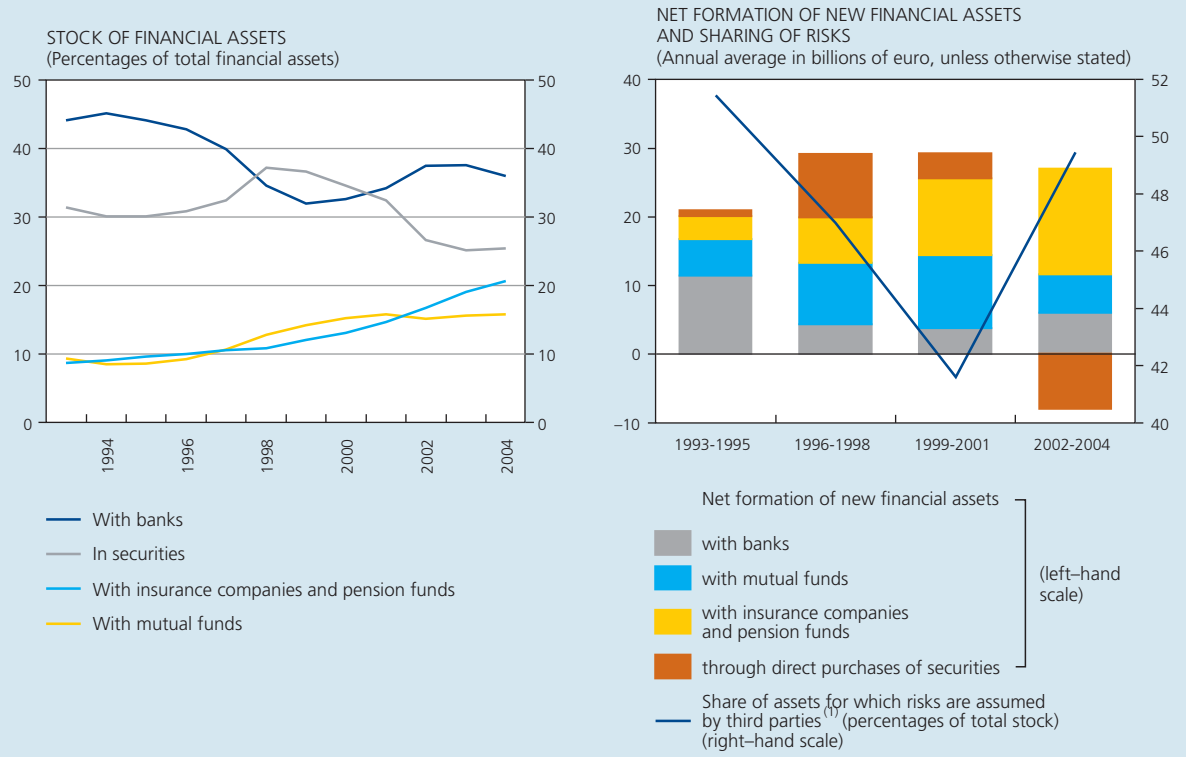
(Percentages of gross disposable income)



Sources: NSI, Rademaekers and Vuchelen (1998), Stadim, NBB.

(1) For the years up to 1997, the stock of households' real estate assets, at market value, was taken from Rademaekers and Vuchelen (1998) "Het Belgische gezinsvermogen 1992-97", Bulletin de documentation/Documentatieblad, Federal Public Service Finance. Figures as from 1998 are obtained by applying the annual price and volume changes for the different categories of real estate assets to the 1997 figure.

CHART 14 HOUSEHOLDS' FINANCIAL ASSETS



Sources : CBFA, NBB.

(1) The share of assets for which risks are assumed by third parties is calculated as the sum of assets placed with banks and domestic pension funds and assets held in the form of class 21 life insurance policies, divided by the total of financial assets.

These developments come out more plainly if we refer not to stocks but to flows, which eliminates valuation effects and concentrates on the net formation of new financial assets (Chart 14, right panel). This concept of flows illustrates pretty well the continued dominance of banks in 1993-1995, followed in 1996-1998 by a period of relatively important direct acquisitions of securities in a buoyant equity market, and then by the prevalence of flows to mutual funds (between 1999 and 2001) and insurance companies and pension funds in the recent years.

The recently observed large flows to life insurance contracts were mostly directed towards class 21 products (with a guaranteed rate of return), as opposed to the preceding period when Belgian households were strongly attracted by class 23 contracts (linked to investment funds). As this shift was also associated with a recovery of financial flows towards banks, it clearly signals a return of Belgian households to more conservative investment behaviour.

The recent shift, which hardly came as a surprise after the sharp correction in equity markets at the turn of the last decade, almost completely reversed a trend whereby a growing share of financial risks was transferred to households. The share of the stock of Belgian households' financial assets for which risks are borne by financial intermediaries bounced back from 41.6 p.c. in 1999-2001 to 49.4 p.c. in 2002-2004, in line with its level in the period 1993-1995 (51.5 p.c.). This trend is even reinforced if we consider that, for their investments in UCITS, households increasingly try to obtain insurance against some of the risks they are assuming. At the end of 2004, investments in funds with capital protection represented almost 28 p.c. of the total volume of funds collected by UCITS, compared to only 20 p.c. in 2000 (Table 3).

The sharing of risks between households and financial institutions not only has important financial stability implications. It also raises consumer protection issues as private investors have to get accurate and easily understandable information on the risks they are assuming. When they

TABLE 3 BREAKDOWN OF INVESTMENTS IN UCITS ACCORDING TO INVESTMENT POLICY

(Percentages of total amount outstanding)

	1996	2000	2004
Fixed-income funds	29.2	25.1	29.0
Equity funds	25.8	29.1	18.7
Funds with capital protection	21.8	20.0	27.7
Balanced funds	14.3	17.8	15.7
Pension-savings funds	6.4	5.6	5.8
Real estate and other funds	2.5	2.4	3.1

Source : BEAMA.

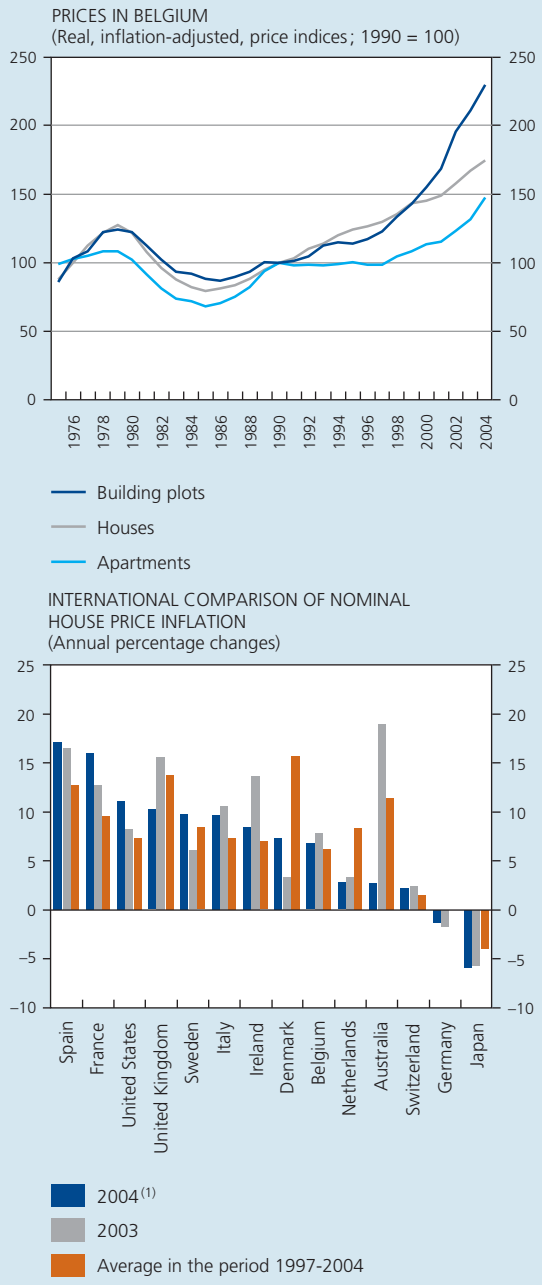
take out an insurance, as with mutual funds offering capital protection, households must also be aware of the cost of such protection and of the counterparty risk run on the protection seller.

In 2004, the value of Belgian households' real assets benefited again from strong price increases of houses, apartments and building plots of 6.8, 14.5 and 11.3 p.c. respectively (Chart 15). Although this rate of nominal house price inflation represented only a marginal acceleration relative to the average growth rate registered in the period 1997-2004 (6.0 p.c.), it consolidated a trend towards a higher level of *real* house price inflation, which has risen from 3.8 p.c. in the period 1990-2001 to 5.5 p.c. in the last three years.

The average price of a medium-sized house is now estimated to represent more than six times the median Belgian household's annual disposable income (against a ratio of four in 1995 and three in the mid-1980s). Although this development does not necessarily signal a deviation of Belgian house prices from their fundamentally justified level – as other factors, such as the lower level of interest rates, should be taken into account –, it does highlight the need for market participants to exercise due caution when assessing the sustainability of current price developments on the real estate market. As shown by the recent slowdown of real estate prices in the Netherlands, the UK and Australia, residential real estate markets can indeed cool off quite rapidly if excesses develop and fundamental valuation yardsticks become stretched.

Buoyant housing market conditions in Belgium and a large number of other euro area countries went hand in hand with additional strong growth in the outstanding stock of mortgage loans (Chart 16). In Belgium, this evolution reflected a continuously high number of new mortgage loans and a further increase in the average loan size. In the case of mortgage loans taken out to finance

CHART 15 HOUSE PRICE INFLATION

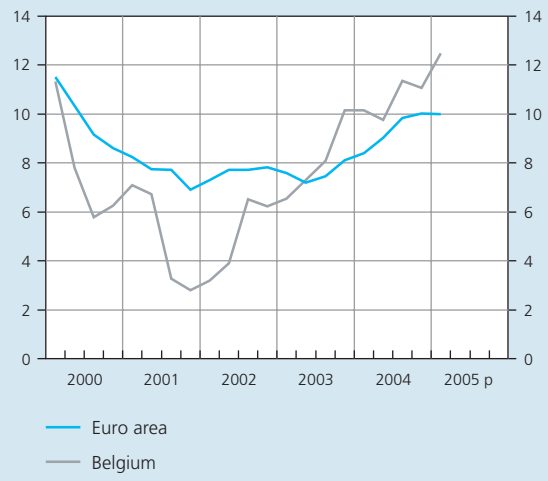


Sources : The Economist, Stadim.

(1) Latest available data.

CHART 16 GROWTH OF HOUSING LOANS GRANTED BY MFIS [1]

(Percentage changes in outstanding amounts compared to the corresponding quarter of the previous year)

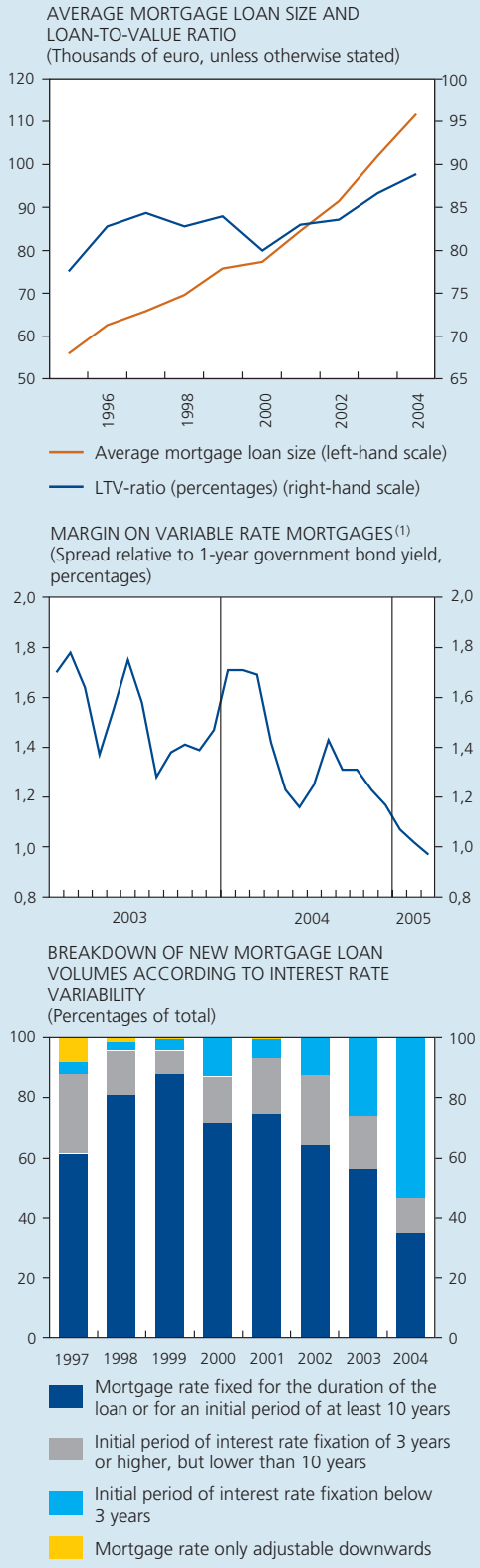


Sources : ECB, NBB.
(1) MFIs are monetary financial institutions according to Eurosystem definitions.

the acquisition of an existing house, the average loan size went up to about 110,000 euro in 2004, representing a rise of 9.6 p.c. relative to 2003 and a doubling of the amount relative to 1995 (Chart 17, upper panel).

As the growth of the average size of new mortgage loans outpaced the growth of the average house price, the estimated loan-to-value ratio for the Belgian market rose to 89 p.c. last year. This level is higher than the 80-85 p.c. range registered in the years before 2003, and seems to suggest – in line with the Belgian results of the *Eurosystem's Bank Lending Survey* – that an easing of lenders' credit standards for housing loans took place in 2004. This finding is also consistent with the observed decline in banks' commercial margin on mortgage loans with annual variability of interest rates (the so-called 1/1/1 formula), which is the only mortgage product for which a clean spread can be calculated on the basis of the MIR bank loan rate survey. From an average 1.5 p.c. in 2003, the margin relative to the one-year government bond yield declined to 1 p.c. in early 2005 (Chart 17, middle panel). While this easing of credit standards for housing loans may have been motivated by buoyant housing market conditions and the low rates of default on these loans, a reported intensification of competition between lenders on the mortgage market in recent months may also have contributed to this development.

CHART 17 DEVELOPMENTS IN THE BELGIAN MORTGAGE LOAN MARKET



Sources : Stadim, UPC, NBB.
(1) Mortgage loans with annual variability of interest rates.

The further expansion of the average size of mortgage loans in 2004 took place at a time of declining interest rates on mortgage loans to historically low levels. Recent developments in the Belgian mortgage market thus conformed to the traditional mortgage borrowing behaviour of Belgian households described in last year's FSR. This mortgage borrowing behaviour since 1975 has indeed appeared consistent with the existence of a constraint on the share of disposable income that households are willing (or allowed) to devote to servicing their mortgage debts – estimated at around one-third in the first year of a 20-year fixed rate mortgage loan for a median disposable income –, whereby households use declining interest rates as an opportunity to borrow higher amounts for the same level of debt service. In this connection, further expansion of the average mortgage loan size in 2004 may also have been fostered by the switch of households to variable rate mortgages, which typically carry a lower interest rate cost than fixed rate mortgages (Chart 17, lower panel).

In contrast with the earlier preference of Belgian mortgage borrowers for fixed rate mortgage loans, the market share of variable rate mortgages – which in practice mainly consist of mortgage loans with rates that are revisable every year –, has steadily increased, from an average of less than 6 p.c. of total new mortgage loans in the period 1997-2001 to slightly more than 50 p.c. in 2004. The counterpart of this development has been mainly a decline of the share of mortgages with initial interest rate fixation of at least 10 years, their market share declining from an average 75 p.c. in the period 1997-2001 to below 35 p.c. in 2004.

Mortgage borrowers who have chosen these variable rate mortgage loans run the risk of higher debt service levels in the future if short-term interest rates rise. However, this risk is not open-ended in Belgium, as the mortgage loan law imposes strict limits on the maximum interest rate variability that lenders are allowed to pass on to mortgage borrowers. In addition to the general rule that the rate charged to borrowers may never exceed a level that is twice the initial rate, the law also imposes that the minimum period of interest rate fixation must be at least one year. It is moreover standard practice for variable rate mortgage loans to have a cumulative cap of 1, 2 and 3 p.c. respectively on the up- or downward adjustment that can take place in the first, second and subsequent years of the loan. Even with these caps, however, the vulnerability of households' debt service levels to adverse interest rate developments can remain substantial, as a surcharge of 3 p.c. relative to the initial rate amounts to an increase of about 25 p.c. in the nominal debt service burden of a mortgage loan with fixed instalments. In the case of accordion loans, this increase in the debt service burden will take the form of a lengthening of the maturity of the loan, thereby limiting the short-term impact of interest rate rises on borrowers.

Notwithstanding the above-mentioned mitigating factors, recent developments in the mortgage market suggest that instead of the traditional 20-year fixed rate mortgage loan, households have increasingly opted for products which allow them to borrow more for the same initial debt service burden, but which expose them to risk of rising debt service levels and/or longer maturities. In this connection, it may also be noted that the new fiscal regime for mortgage-related expenses, which entered into force in 2005, may contribute to a further increase in the average amounts borrowed by households. By frontloading the fiscal advantage in the first 10 years of the loan (in comparison with the previous system), the new fiscal regime may indeed contribute to a further easing of the borrowing constraint in the first years of the loan, when it is most binding for households.

3. Banking sector

Belgian banks' balance sheet total, which had levelled off in the two preceding years, increased by a hefty 11 p.c., from 1,033 billions of euro at the end of 2003 to 1,143 billions of euro in 2004 (Chart 18).

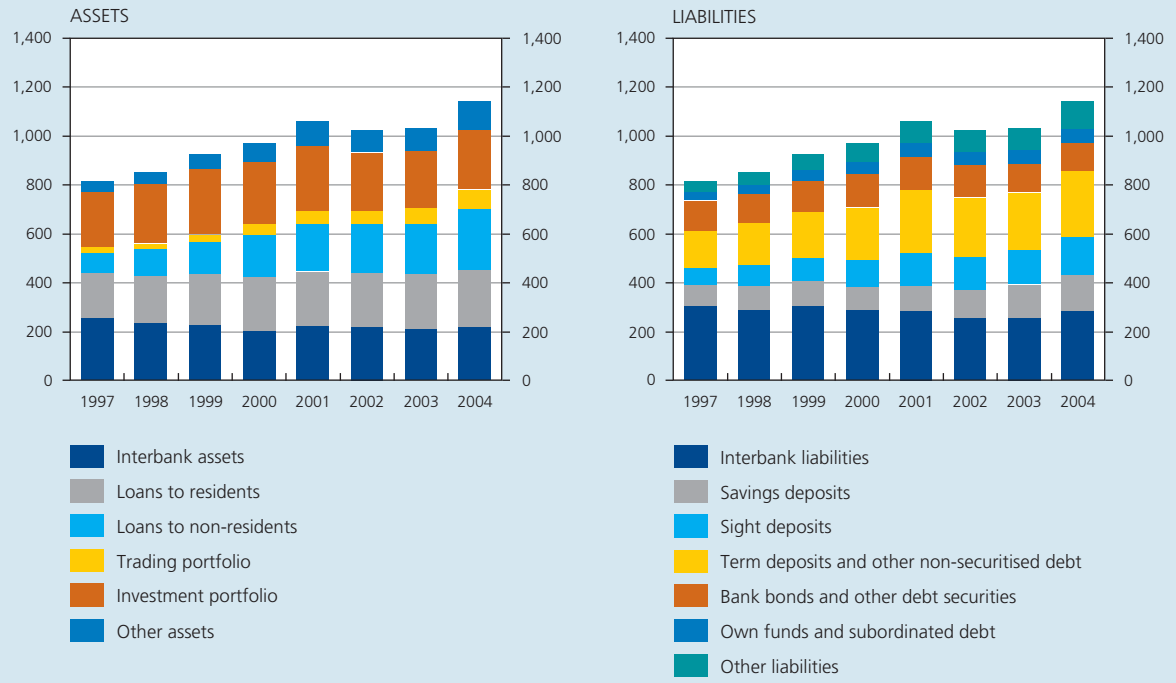
On the assets side, this expansion mainly resulted from a sharp increase in the credit portfolio. While loans to residents only rose 4 p.c., those to non-residents went up by 22 p.c., thereby exceeding loans to residents for the first time. This illustrates the growing diversification of credit risks endorsed by Belgian banks.

The increase in the trading portfolio (24 p.c.) also contributed to the asset growth. While this is partly explained by a rise in market values as the trading portfolio is marked to market, it also reflects the growing importance of market activities and, consequently, market risks for Belgian banks.

On the liabilities side, a further shift took place from items with fixed maturity, such as bank bonds and term deposits, to liabilities with indeterminate maturity, such as savings and sight deposits. Last year, savings deposits grew by 13 p.c. and sight deposits went up by 8 p.c. to amount together to more than 300 billions of euro at the end of 2004. Apart from their favourable fiscal treatment, the success of savings deposits can also be attributed to the narrowing spread between market and deposit rates. This growing importance of savings deposits in the funding structure of Belgian banks strongly influences the management of interest rate and liquidity risks. Box 3 illustrates in more detail the characteristics of savings deposits and their importance in Belgian banks' funding structure.

CHART 18 BALANCE SHEET STRUCTURE OF THE BELGIAN BANKING SECTOR

(End of year consolidated figures, billions of euro)



Sources : CBFA, NBB.

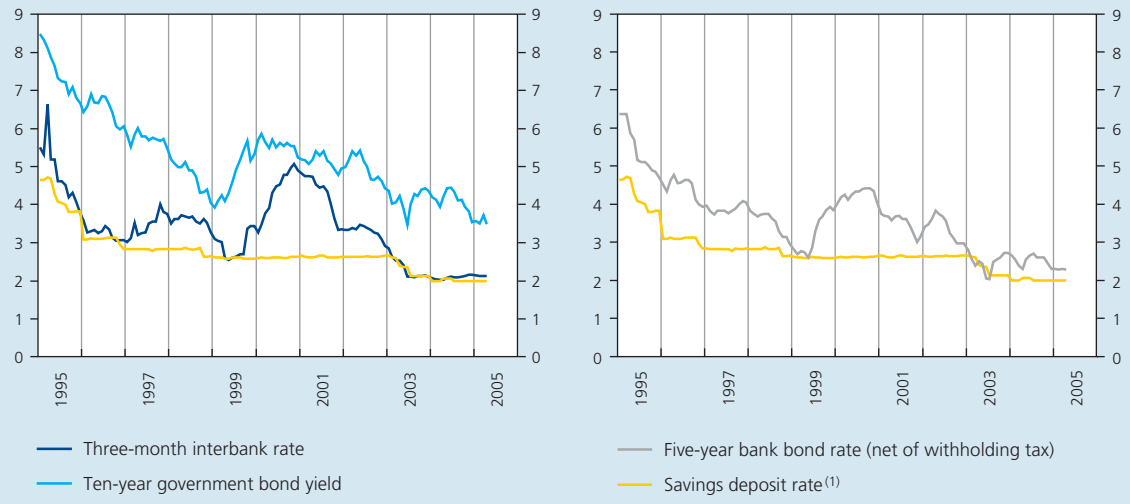
Box 3 – Key features of and recent developments in Belgian banks' savings deposits

Being a popular savings instrument for Belgian households, regulated savings deposits ("savings books") have traditionally been an important – and recently growing – source of funding for Belgian credit institutions. On an unconsolidated basis, they represented around 15 p.c. of total liabilities and one-third of the funds collected from customers in the form of deposits or bonds at the end of 2004. Although savings deposits are concentrated with the four major banks (Fortis, Dexia, ING and KBC), their 70 p.c. market share is smaller than their weight in the balance sheet total of Belgian banks, reflecting the non-negligible role played by smaller retail banks in the collection of savings deposits. The smaller banks' market share has increased from 25 p.c. to 30 p.c. between 1995 and 2004, largely as a result of the adoption of more aggressive pricing strategies.

The popularity of regulated savings deposits stems mainly from the favourable fiscal treatment of interest payments on these deposits, which are exempted from the fully discharging withholding tax (currently 15 p.c.) up to an amount of 1,520 euro of annual interest income per taxpayer, provided that the deposit account fulfils the conditions specified in a Royal Decree of 1992. These include the requirement that the account is denominated in euro, that there are limits on the possibilities to use the savings account as a quasi sight deposit account and that the institution may require a five-days' notice for withdrawals exceeding 1,250 euro and limit withdrawals to 2,500 euro each half month. In addition, the law also stipulates precisely how the account should be remunerated, by using a compulsory, tiered remuneration structure that must exclusively consist of (1) a base deposit rate, which is legally capped at 4 p.c. and (2) a growth or a loyalty premium, which are both legally capped at 2 p.c.

DEVELOPMENT OF THE SAVINGS DEPOSIT RATE RELATIVE TO MARKET AND BANK BOND RATES

(Percentages)



Sources : Thomson Financial Datastream, NBB.
(1) Sum of base rate and loyalty premium.

While the base deposit rate remunerates the outstanding balances as in an ordinary deposit account (on a *pro rata temporis* basis), the rules governing the additional premiums – which can never be cumulated – are quite specific :

- the growth premium can only be paid for a period of six months on new inflows that have remained on the savings account without interruption for at least six months;
- the loyalty premium can only be paid on balances that have remained on the savings account without interruption for at least twelve months (after which a new twelve-month period starts in which to earn a new loyalty premium).

Compared with the development of market interest rates, advertised rates on savings deposits – proxied in the Chart by the sum of the base rate and the loyalty premium – have been remarkably stable in recent years, remaining close to 2.7 p.c. for a period of six years (1997-2002), before declining to 2 p.c. in the period 2003-2004. Since 2003, the level of the savings deposit rate has been close to the level of the three-month interbank rate, which appears to have acted in the past as a "maximum" level for the savings deposit rate.

In order to understand the recent success of regulated savings deposits, it is also important to compare the regulated savings deposit rates with yields offered on similar savings products offered by banks, such as bank bonds and term deposits. This is done in the right panel of the Chart where (after tax) yields on five-year bank bonds ("*bons de caisse/kasbons*") are compared with advertised savings deposit rates. While these bank bonds were an important alternative retail funding channel for Belgian banks in the past, their outstanding amount has declined significantly in recent years. This crowding out of bank bonds by savings deposits was associated with a significant decline in the (after tax) spread between both yields.

This observed shift of household savings from bank bonds to savings deposits has led to a decrease in the proportion of retail funding instruments with long *contractual* maturities. As a consequence, it has become increasingly important, for banks, to accurately assess the *effective or behavioural* duration of savings and other deposits in their risk management models. As shown in Table 5 of this Chapter, estimates of the impact of interest

rate changes on the value of Belgian banks' net interest rate positions strongly depend on what assumptions are made about the duration of savings deposits. While the estimated duration is a crucial parameter in Belgian banks' interest rate risk management, the analysis in an article included in this FSR(1) shows that the quantitative models that can be used to that end suffer from several weaknesses. This argues in favour of a conservative assumption about the duration of savings deposits in banks' risk management.

(1) Maes K. and Th. Timmermans, 'Measuring the interest rate risk of Belgian regulated savings deposits'.

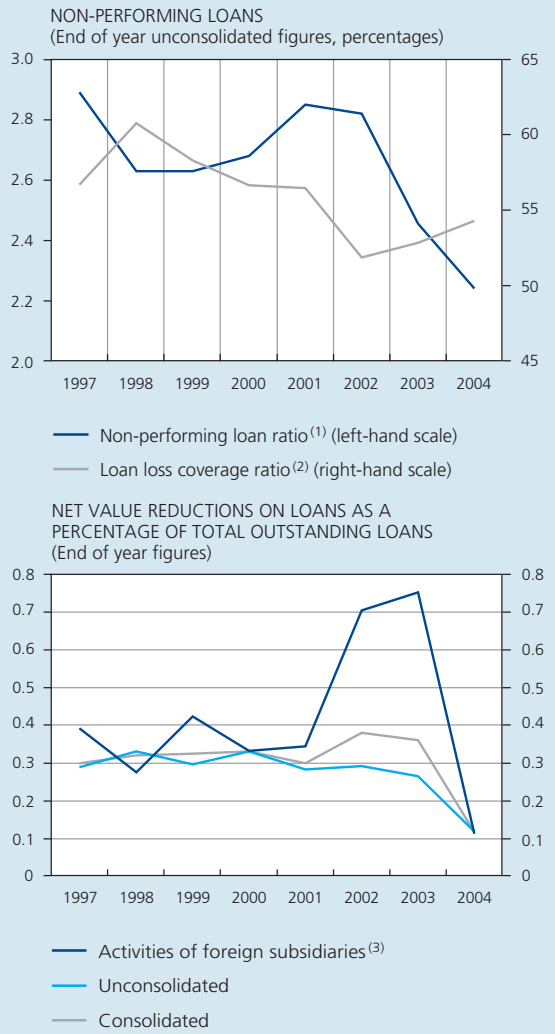
3.1 Credit risk

Credit risk is still the largest risk facing banks, with capital requirements for this type of risk accounting for more than 90 p.c. of total capital requirements under the Basel I framework. Better economic conditions in 2004 resulted in a strong decrease in the percentage of non-performing loans on Belgian banks' balance sheets (Chart 19, upper panel). Despite a small increase in the coverage ratio – defined as the ratio of credit risk provisions to non-performing loans – this translated into a sharp reduction of net new provisioning which went down from 0.36 p.c. of total outstanding loans in 2003 to 0.12 p.c. in 2004 (Chart 19, lower panel). The positive signal given by this lower level of provisioning about the credit riskiness of banks' loan portfolios is consistent with indicators of the capital market, where corporate bond spreads have been narrowing between 2002 and 2004.

The decrease in the provisioning rate of Belgian banks has been observed on an unconsolidated basis but is even more evident on a consolidated basis. This indicates that provisions made on loans granted by Belgian banks' foreign subsidiaries, estimated as the difference between the consolidated and unconsolidated figures, have been sharply reduced. In 2002 and 2003, substantial value adjustments were made on foreign loans due i.a. to problems at the Dutch subsidiary of a major Belgian credit institution and on loans granted by another Belgian bank's subsidiary in Poland. As these provisions contributed to a clean-up of foreign credit portfolios, further value adjustments could be reduced in 2004.

For their monitoring of credit risk exposures in the Belgian corporate market, supervisors may refer to long data series allowing them to calculate probabilities of default per firm size and sector. These aspects are analysed in detail in Box 4.

CHART 19 NON-PERFORMING LOANS AND VALUE REDUCTIONS ON BELGIAN BANKS' CREDIT PORTFOLIO



Sources: CBFA, NBB.

(1) The non-performing loan ratio is the stock of defaulted and uncertain loans as a percentage of total loans to customers and loan commitments.

(2) The loan loss coverage ratio is the stock of value reductions on loans and provisions for loan losses to the stock of defaulted and uncertain loans.

(3) Value reductions on the activities of foreign subsidiaries have been estimated as the difference between consolidated and unconsolidated figures.

Box 4 – Default rates of Belgian non-financial corporations

The treatment of corporate credit risks in the Basel II framework distinguishes between three types of firms: corporates, corporate SMEs and retail SMEs. Corporates are defined as firms with more than 50 millions of euro in annual sales, SMEs have sales below 50 millions of euro, and retail SMEs are those SMEs where the total exposure of a banking group is less than 1 million euro. Exposures of Belgian banks to domestic SMEs have gained in importance in recent years (Table 1, two left columns). This trend can be partially explained by a growing reliance of large domestic corporations on market finance.

TABLE 1 BELGIAN BANKS' DOMESTIC CORPORATE EXPOSURES AND DEFAULT RATES PER FIRM SIZE AND SECTOR
(Percentages)

	Banks' corporate exposures as a percentage of total exposures		Average annual default rates for the period 1990-2004	
	December 1998	November 2004	Average	Coefficient of variation (1)
1. Per firm size				
Corporates	23.9	18.1	0.34	0.53
Corporate SMEs (2)	48.1	51.9	1.00	0.28
Retail SMEs (2)	27.9	30.0	1.78	0.19
2. Per sector				
Industry	28.5	16.9	1.89	0.16
Construction	5.6	5.4	2.18	0.18
Wholesale	19.9	17.3	2.03	0.20
Hotels / Restaurants	2.1	2.0	3.89	0.26
Transport / Communication	6.8	6.2	2.44	0.16
Services to firms / Real estate	25.3	34.0	0.96	0.21
Retail	5.2	4.5	2.05	0.24
Other (3)	6.6	13.6	1.50	0.57

Source : NBB.
(1) The coefficient of variation is the standard deviation divided by the average.
(2) To distinguish default rates for corporate SMEs and retail SMEs, a proxy had to be calculated. Data on banks' exposures to SMEs from the Credit Register were compared with data on the total assets value of those SMEs from the Balance Sheet Register. A calibration was performed and a threshold of less than 2 millions of euro was selected to classify firms as retail SMEs.
(3) Includes agriculture, fishing, extracting industry, utilities and services to households.

At the same time, a change has taken place in the sectoral composition of the Belgian banking sector's corporate exposures. Based on the NACE-BEL classification scheme (1), with the exclusion of exposures to the financial sector, a clear shift has been observed from industry to services provided to firms between end 1998 and end 2004. This evolution also helps to explain the higher proportion of loans to small corporations as the latter are proportionally more present in the services than in the industry sector.

A specific probability of default can be associated with each of these categories of size or sector. Default probabilities have been calculated by using a database linked to the Belgian Balance Sheet Register, which provides information on the identity of firms filing for bankruptcy proceedings and on the timing of these bankruptcies. With the aid of these data, default rates may be estimated on an annual basis, by dividing the number of corporate

(1) The NACE scheme is the classification scheme of economic activities adopted in 1990 at the EU level. In Belgium, it is called the NACE-BEL codes. In general, similar conclusions are reached when using the GICS classification system, a system launched by Standard&Poor's and Morgan Stanley Capital International in 1999.

defaults[1] during a given year by the number of firms existing at the end of the previous year. These estimated default rates may differ from the ones used by individual banks for a number of reasons:

- the dataset only contains information regarding legal bankruptcy, which is a more restrictive definition of default than the definition put forward in Basel. The Basel II framework defines a default as the situation in which one of two events has taken place, i.e. the bank considers that the obligor is unlikely to pay its credit obligations or the obligor is past due for more than 90 days on any credit obligation to the bank;
- a proportion of the total number of Belgian firms (mainly very small SMEs) are not observing the legal obligation to register their balance sheets. The total number of defaulted firms is therefore proxied by the total number of default entries into the Balance Sheet Register;[2]
- default rates are computed at an aggregate level, so they are not necessarily representative of individual banks' portfolios. As banks may be unwilling to extend credit to firms with a high probability of default, they may have lower firm-level default probabilities than what would be implied by aggregate default rates.

The two right columns of Table 1 give the average and the coefficient of variation of default rates per size and per sector for the period 1990-2004.

From an analysis of default rates per size, two main conclusions can be drawn. The average default rates decrease with the size of the firms, but the coefficient of variation of default rates increases with firm size.[3] The higher expected default rates of smaller corporations should be covered by higher provisions. As these losses can be predicted with high accuracy, thanks to the lower coefficient of variation, capital requirements for unexpected losses on loans to small corporations can be reduced proportionally. This is, indeed, the position adopted by Basel II.

(1) A small number of firms enter the bankruptcy dataset more than once. When the second default occurs within the next twelve months following the first default, only the first default is considered and the second default is assumed a reporting error. When the second default occurs after the next twelve months following the first default, both events are regarded as a default.

(2) The introduction of this assumption, necessary to get separate default rates per size and sector, partly explains why default rates in this Box differ from the default rates discussed in Box 2, for which the total number of defaulted firms was taken into account, including those firms which had not fulfilled the obligation to register their balance sheets. The other difference between both concepts is that default rates in this Box are calculated on an annual basis, while those in Box 2 are calculated on a quarterly basis.

(3) See also Masschelein N. (2003), "The Basel II Capital Accord, SME Loans and Implications for Belgium", NBB Financial Stability Review 2003, pp. 151-171.

TABLE 2 AVERAGE DEFAULT RATES PER FIRM SIZE AND SECTOR

(Percentages)

	Average annual default rates for the period 1990-2004		
	Corporates	Corporate SMEs[1]	Retail SMEs[1]
All sectors combined	0.34	1.00	1.78
Industry	0.34	1.24	2.07
Construction	0.21	1.68	2.21
Wholesale	0.39	1.06	2.18
Hotels / Restaurants	1.90	1.44	3.95
Transport / Communication	0.54	1.25	2.63
Services to firms / Real estate	0.20	0.58	1.00
Retail	0.11	1.23	2.08
Other[2]	0.14	1.46	2.20

Source: NBB.

(1) To distinguish default rates for corporate SMEs and retail SMEs, a proxy had to be calculated. Data on banks' exposures to SMEs from the Credit Register were compared with data on the total assets value of those SMEs from the Balance Sheet Register. A calibration was performed and a threshold of less than 2 millions of euro was selected to classify firms as retail SMEs.

(2) Includes agriculture, fishing, extracting industry, utilities and services to households.

Furthermore, SMEs' credit risk can also be diversified away more easily in a large portfolio given that SMEs' higher default rates are mainly due to idiosyncratic risk.

The comparison of estimated default rates per sector suggests that there are significant differences between various categories of activities. Default rates range from 0.96 p.c. for corporations active in services to firms and real estate to almost 4 p.c. for the sector hotels and restaurants. These differences partly reflect sectoral differences in the size distribution of firms, as some sectors may be heavily weighted towards retail SMEs. Table 2, which crosses default rates per sector and per firm size shows that the differences between the default rates of firms classified per sector remain when controlling for the size of the firms.

Through their activities in the international markets, Belgian banks have largely diversified the geographical composition of their credit portfolios. As already mentioned, loans to non-residents exceeded for the first time loans to residents and accounted for 52 p.c. of the total at the end of 2004 (Chart 20, upper panel). Although lending to EMU countries went up by 14 p.c., most of this growth was due to an increase of 28 p.c. in lending to non-EMU countries. The bulk of these counterparties are located in the United Kingdom. While exposures to that country strongly increased in 2004, a large proportion of the new claims were of a very specific nature, consisting of reverse repo transactions with a non-bank financial corporation, aiming at settling and netting cross-border securities transactions.

Claims on the United States amounted to 85 billions of euro at the end of 2004 and consist for most part of local claims in local currency and cross-border claims on the non-bank private sector (Chart 20, middle panel).

With the major part of their foreign exposures concentrated in Western Europe and the United States, Belgian banks are mainly active in developed markets. However, strong growth in claims on some emerging economies has been observed during recent years. Part of this growth is the result of increased exposures to Central and Eastern European countries. Indeed, KBC, one of the four major Belgian banks, has been developing a second home market in Central and Eastern Europe, which explains why the bulk of Belgian banks' assets in these countries

TABLE 4 USE OF CREDIT DERIVATIVES AND ASSET SECURITISATION PRODUCTS BY BELGIAN FINANCIAL INSTITUTIONS

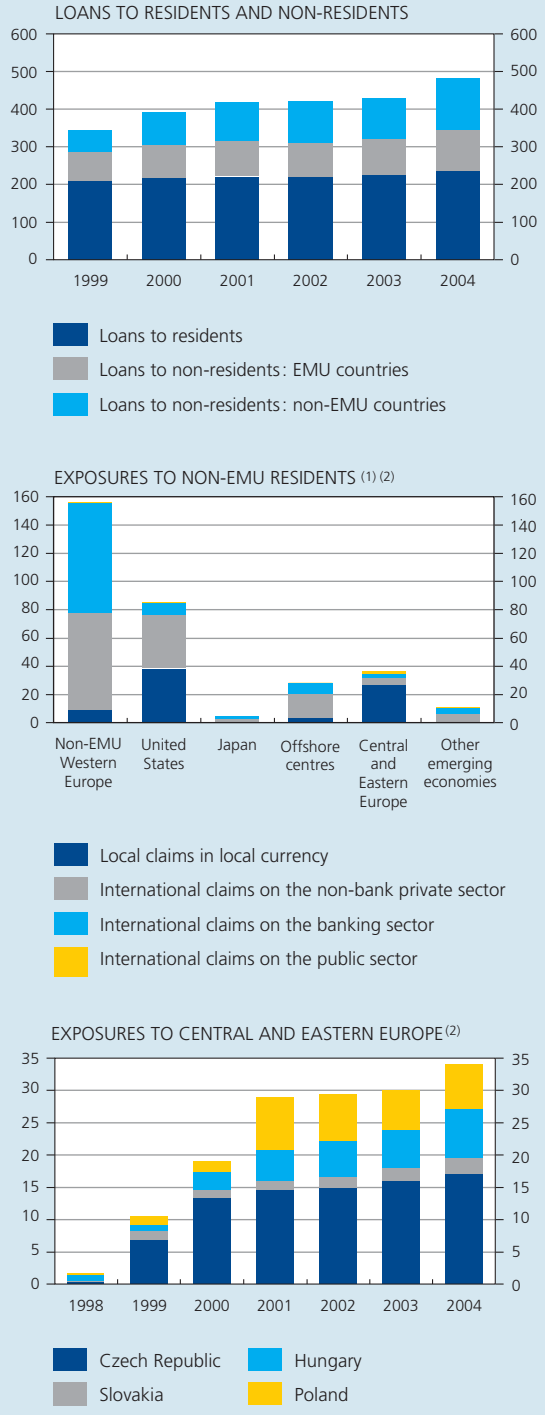
(Consolidated figures, notional amounts in billions of euro)

	December 2003				December 2004			
	Banks		Insurance companies		Banks		Insurance companies	
	Protection bought	Protection sold	Protection bought	Protection sold	Protection bought	Protection sold	Protection bought	Protection sold
Total return swaps	0.4	0.1	…	0.2	…	0.0	…	0.4
Credit default swaps	39.0	37.1	…	0.5	51.5	53.3	…	0.3
Credit spread options	…	0.0	…	…	…	0.0	…	…
Credit linked notes	1.6	1.6	…	0.9	1.8	1.6	…	1.1
Traditional securitisation (1)	9.4	3.5	0.0	1.2	13.0	2.9	0.2	1.9
Synthetic securitisation (2)	3.7	…	…	0.5	1.9	…	0.2	0.4
Total	**54.2**	**42.2**	**0.0**	**3.4**	**68.2**	**57.8**	**0.4**	**4.2**

Source : CBFA.
(1) Securitisation products such as ABS, ABCP, MBS, CLO, CDO, CBO, etc.
(2) Securitisation products such as the synthetic CDO, etc.

CHART 20 GEOGRAPHICAL BREAKDOWN OF BELGIAN BANKS' ASSETS

(End of year consolidated figures, billions of euro)



Sources: CBFA, NBB.

(1) International claims comprise local claims in foreign currency and cross-border claims. The small part of the international claims not allocated to a specific sector does not appear in the chart.

(2) Before risk transfers.

are claims of local subsidiaries in local currency. KBC is especially active in the Czech Republic, Hungary and Poland (Chart 20, lower panel). Significant value adjustments had to be made on the Polish loan portfolio in 2003 which, together with a depreciation of the zloty to the euro, explains the temporary reduction of claims on Poland in 2003.

In order to manage their credit risk, Belgian banks have in recent years made an increasing use of credit risk transfer instruments, such as credit default swaps and traditional asset securitisation products (Table 4). While positions in credit default swaps – which are mainly part of banks' trading books – represent the bulk of the total notional positions, the importance of this instrument is smaller when transactions of buying and selling credit protection are netted. In terms of net credit risk transfer, transactions in traditional securitisation instruments are indeed more important. As the latter are mainly used to buy credit protection, Belgian banks thus remained net buyers of credit risk protection for an amount of 10.4 billions of euro in 2004. Belgian insurance companies, whose reliance on the credit risk transfer market is much smaller, continued to be net sellers of protection for an amount of 3.8 billions of euro in 2004.

3.2 Interest rate and market risks

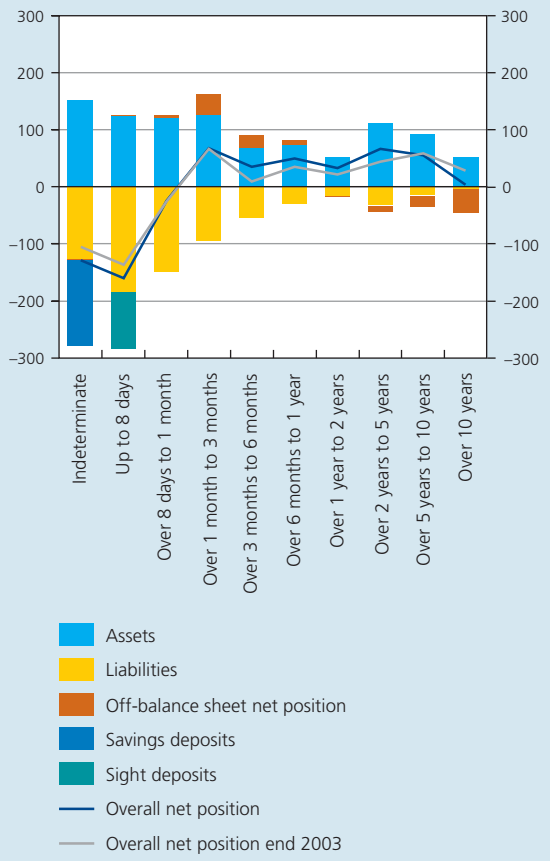
Interest rate risk has a dual character. When assumed as part of banks' trading operations, it is treated as market risk. The Basel I regulations have specific rules for this risk category which includes not only interest rate risk, but also equity risk and foreign exchange risk. Interest rate positions in the trading portfolio are frequently adjusted in reaction to variations in market rates, changes in the value of the underlying assets being the main source of income generated by this type of activity.

On the other hand, interest rate positions taken in the banking book are part of banks' asset and liability management. These positions are more closely associated with banks' deposit taking and lending activities. The remuneration, here, comes mainly in the form of interest margins.

The distinction between trading and banking activities and their associated risks is certainly not watertight. Belgian banks' reporting schemes, which provide information on the structure of banks' net maturity positions according to the residual term to the next interest rate review date, do not distinguish between banking and trading activities so that interest rate risk has to be broadly evaluated on the basis of the total of on- and off-balance sheet

CHART 21 INTEREST RATE MISMATCH (1)

(End 2004 unconsolidated figures, billions of euro)



Sources : CBFA, NBB.

(1) Data are classified according to the residual term to the next interest rate review date.

positions. Chart 21 illustrates the transformation activities of Belgian banks, which borrow at short-term maturities to lend at the long end of the maturity spectrum. Compared to the situation in December 2003, banks have increased their positions on the liabilities side in the indeterminate and 'up to 8 days' maturity buckets, reflecting the strong growth in sight and savings deposits. As a counterpart, banks have built up higher long positions with a maturity between three months and five years while they have, at the same time, significantly reduced their net position over ten years through a higher use of off-balance sheet products.

From a market value perspective, banks' typical maturity transformation activities, associated with a comparably longer duration of assets than liabilities, are making them vulnerable to upward changes in the yield curve. As short-term interest rates remained stable in 2004 and long-term interest rates declined during the second half of the year, the yield curve flattened towards the end of 2004, which positively influenced the market value of banks' net on- and off-balance sheet positions (Chart 22). (1)

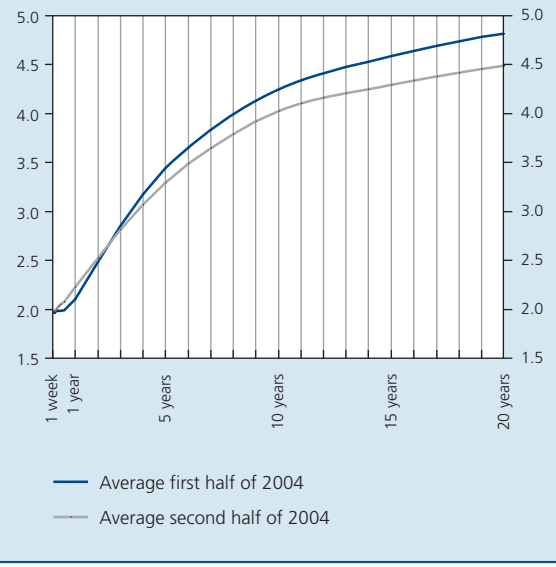
Sound interest rate risk management should not only enable banks to cope with small and gradual changes in the yield curve, but also help them to withstand more extreme and sudden interest rate changes. To that end, stress tests can be regularly performed to measure the instantaneous impact of a sudden shift in the yield curve on the value of banks' net interest rate positions.

Belgian banks' interest rate positions have been tested for a shock scenario consisting of a sudden upward shift of the yield curve of 2 p.c. The impact of this shift has been calculated according to the methods put forward in the Basel I regulations, by multiplying the net exposures in the different maturity buckets with risk weights that proxy for the price sensitivity to a given shock in interest rates, namely the approximated modified duration times the assumed interest rate shock.

(1) From a profitability point of view, the flattening of the yield curve in the second half of 2004 negatively influenced banks' interest margin and thus interest income (see Section 3.4).

CHART 22 YIELD CURVE IN EURO (1)

(Percentages)



Source : NBB.

(1) Based on monthly averages of yields on Belgian treasury certificates for maturities up to one year and government bonds for other maturities.

For Belgian banks, the results of those stress tests, and the ensuing judgement on the effectiveness of their interest rate risk management, depend largely on the treatment of non-maturity accounts. To the extent that savings and sight deposits are relatively stable bank resources in terms of both price and quantity, banks can use them to finance their longer-term assets. However, this stability cannot be taken for granted, as the contractual maturity of these deposits is zero. Banks thus have to make behavioural assumptions in order to estimate the effective duration of these liabilities. In banks' reporting schemes, sight deposits are allocated in the time bucket 'up to 8 days' and savings deposits are allocated in the indeterminate time bucket, as was illustrated in Chart 21. However, for the assessment of the interest rate risk, duration assumptions have to be introduced. One of the thematic articles of this FSR discusses in detail how the interest rate risk associated with regulated savings deposits can be measured.

Table 5 presents the results of a stress test where the non-maturity accounts have been reshuffled into various maturity buckets according to two different assumptions. The first one gives savings deposits a duration of nine months, by allocating the deposits in the time bucket 'between 6 and 12 months'. It assumes that savings deposits are a rather price sensitive source of funding. This corresponds with the conservative position that the Belgian supervisory authority takes in assessing the interest rate risk of Belgian banks. In the second assumption, savings deposits are spread out more towards the long end and are given a duration of 1.6 years by allocating 50 p.c. of the savings deposits in the bucket 'between 6 and 12 months', 25 p.c. in the bucket 'between 1 and 2 years' and another 25 p.c. in the bucket 'between 2 and 5 years'.

For sight deposits as well, two different assumptions are considered. In the first one, sight deposits are used to offset the longest positive net exposures for 75 p.c., the other 25 p.c. being kept in the 'up to 8 days' bucket. A strong argument for not keeping all sight deposits in this last bucket is that sight deposits are held for transaction purposes instead of investment purposes, which makes them far less sensitive to changes in interest rates. The second assumption is more prudent and considers only 50 p.c. of the sight deposits to offset the longest positive net exposures, the other 50 p.c. being kept in the 'up to 8 days' bucket.

Quite a different outcome results from the assumptions made on the maturity of savings and sight deposits. As can be expected, the impact of the shock on the value of banks' net positions is largest if savings deposits are allocated a duration of only nine months. In the scenario assuming sight deposits to offset the positive long-term exposures for 50 p.c., the 2 p.c. interest rate shock would have caused a loss equal to 9.9 p.c. of banks' regulatory own funds in December 2004. If we allow savings deposits to be spread out further towards the long end of the maturity spectrum through the assumption of a duration of 1.6 years, the impact would correspond to 5.5 p.c. of regulatory own funds.

The results are also significantly influenced by the assumption on the duration of sight deposits. If sight deposits are used to offset the long positive net exposures for 75 p.c., and if one considers savings deposits to have a duration of 1.6 years, banks would only lose an amount equal to 1.5 p.c. of regulatory own funds in the event of a 2 p.c. upward shift in the yield curve. Finally, results also differ over time. Compared to the situation in 2000, Belgian banks seem to have become more resilient to interest rate changes.

TABLE 5 IMPACT OF A 2 P.C. PARALLEL UPWARD SHIFT OF THE YIELD CURVE

(End of year unconsolidated figures, billions of euro, unless otherwise stated)

Sight deposits duration assumptions	75 p.c. offset		50 p.c. offset	
Savings deposits duration assumptions	9 months	1.6 years	9 months	1.6 years
2000	–3.7	–2.2	–6.0	–4.6
in p.c. of regulatory own funds	–7.5	–4.6	–12.3	–9.3
2003	–4.5	–2.4	–7.3	–5.3
in p.c. of regulatory own funds	–8.8	–4.7	–14.4	–10.3
2004	–3.1	–0.8	–5.2	–2.9
in p.c. of regulatory own funds	–5.9	–1.5	–9.9	–5.5

Sources : CBFA, NBB.

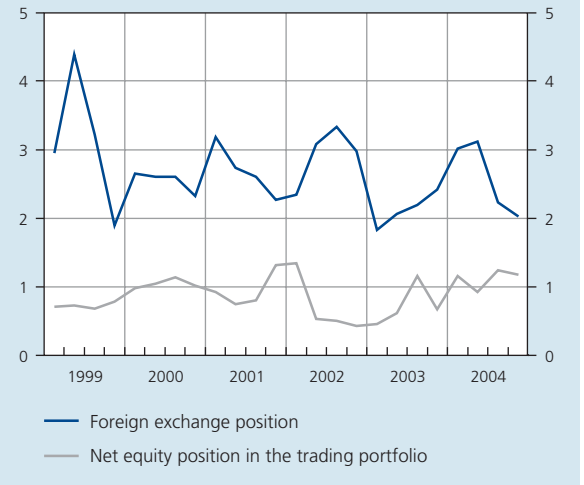
With regard to market risks, Belgian banks have rather low market exposures to equity risk, as shares in the trading portfolio accounted for only 1 p.c. of total assets at the end of 2004. These low gross exposures to equities in banks' trading portfolios result in even smaller net positions when short positions in equities and derivatives are taken into account. Chart 23 shows the development of net positions in shares in Belgian banks' trading portfolio. At the end of 2004, this net position amounted to 1,174 millions of euro, representing only 2 p.c. of regulatory own funds.

Foreign exchange positions are another source of market risk. As Belgian banks are very active in international markets, a rather large proportion of their assets and liabilities is denominated in foreign currency. This percentage, which amounted to about half of the unconsolidated balance sheet total before the introduction of the euro, has since been reduced to about 30 p.c. Most of the present positions are in US dollars, British pounds and Swiss francs.

Although Belgian banks have rather large gross exposures in foreign currency, their net on- and off-balance sheet exposures are small. These net positions are reported in supervisory schemes according to the Basel I regulations. These regulations require banks to calculate the net on- and off-balance sheet position for each currency. Then, all short positions and all long positions in individual foreign currencies are added up separately. The highest of these two amounts, in absolute value, has to be reported to the supervisory authority as the total foreign exchange position. Chart 23 shows the development of this position for the period 1999-2004, which confirms that Belgian banks hold relatively small positions in foreign currency. At the end of 2004, these positions amounted to 2,025 millions of euro, equal to 4 p.c. of regulatory own funds.

CHART 23 BELGIAN BANKS' POSITIONS IN EQUITIES AND FOREIGN EXCHANGE

(Consolidated figures, billions of euro, on- and off-balance sheet positions)



Sources: CBFA, NBB.

TABLE 6 IMPACT OF A 15 P.C. DECLINE IN SHARE PRICES AND A 20 P.C. APPRECIATION OF THE EURO

(End of 2004 consolidated figures, millions of euro, unless otherwise stated)

Net equity position in the trading portfolio	1,174
Impact of a 15 p.c. decline in share prices	–176
in p.c. of regulatory own funds	–0.3
Foreign exchange position	2,025
Impact of a 20 p.c. appreciation of the euro	–405
in p.c. of regulatory own funds	–0.8

Sources: CBFA, NBB.

While, indirectly, abrupt changes in equity or foreign exchange markets could significantly affect banks by reducing their trading income or by hurting the financial strength of some of their borrowers, the direct effect of such shocks would be quite limited due to banks' relatively small net positions in these two markets.

The first part of Table 6 shows the results of a stress test simulating a 15 p.c. decline in share prices. The impact is effectively small, representing a loss equivalent to 0.3 p.c. of regulatory own funds at the end of 2004. Moreover, during the period 1999-2004, this direct loss would never have exceeded 1 p.c. of regulatory own funds.

Another stress test was conducted to estimate the impact of a 20 p.c. appreciation of the euro against all other currencies in which Belgian banks hold positions (second part of Table 6). Again, as Belgian banks' net positions in foreign currency are small, this appreciation of the euro would result in a loss representing only 0.8 p.c. of regulatory own funds at the end of 2004. Moreover, the loss would never have exceeded 2 p.c. of regulatory own funds during the period 1999-2004. However, it should be noted that an analysis performed at the level of the total banking sector does not exclude any larger foreign exchange positions at individual banks.

3.3 Liquidity risk

The maturity transformation activities of banks lead them to assume important liquidity risks, i.e. to face situations where they would not be able any more to accommodate decreases in liabilities or to fund increases in assets. This risk is quite difficult to assess as the conditions in which banks have to manage their liquidity positions can change quickly.

Traditionally, Belgian banks have had a comfortable liquidity position, as they have, on their balance sheets, a substantial portfolio of easily realisable securities, such as government bonds. Liquid securities accounted, on an unconsolidated basis, for 22 p.c. of Belgian banks' total assets at the end of 2004. Banks are using these securities as collateral to support a wide range of operations in the interbank as well as the foreign exchange markets, for payment as well as securities settlement systems. This active use is, in itself, modifying the environment in which banks have to manage their securities portfolios and monitor their liquidity risks.

The overall liquidity of a bank depends upon the combined structure of its assets and liabilities. To provide a first crude view of the general framework in which Belgian banks manage their liquidity, Table 7 divides banks' assets and liabilities into a few key components.

Belgian banks are net borrowers in the interbank market and vis-à-vis their customers. In the former segment, Belgian banks' borrowing exceeded lending to other credit institutions by 69 billions of euro, while funds collected from customers in the form of deposits or bank bonds surpassed the total amount of loans to non-bank customers by more than 130 billions of euro at the end of 2004.

TABLE 7 LIQUIDITY STRUCTURE OF BELGIAN BANKS' ASSETS AND LIABILITIES

(End of 2004 consolidated figures, billions of euro)

	Assets	Liabilities	Net position
Interbank positions	212.6	281.6	–69.0
Customer loans and deposits (1)	482.9	614.7	–131.8
Securities and debt instruments	323.1	73.6	249.5
Other assets and liabilities	124.6	173.3	–48.7
Total	**1,143.2**	**1,143.2**	**0.0**

Sources : CBFA, NBB.

(1) Customer deposits comprise deposits, other non-securitised debt and bank bonds.

An important dimension of these two net sources of finance, which are often referred to as the funding axis of liquidity, is the degree of concentration. Interbank liabilities and customer deposits are relatively well diversified. Single creditors – excluding affiliated parties and central banks – which provided funds in excess of 20 p.c. of banks' regulatory capital accounted, at the end of 2004, for 10 p.c. of total interbank debt and 8 p.c. of total deposits on an unconsolidated basis.

In addition to funding liquidity, banks also rely on market liquidity. Belgian banks are net lenders in the securities market, for a total amount of 250 billions of euro at the end of 2004. The potential use of these securities in order to obtain additional funds will depend upon the liquidity conditions in the various markets.

Market and funding liquidity are closely intertwined. On the one hand, securitisation allows banks to convert illiquid assets into instruments that can easily be traded. On the other hand, securities can be used indirectly to guarantee borrowings in the money market. Here, too, market conditions will play an important role as larger haircuts might be applied in case of abrupt changes in liquidity conditions.

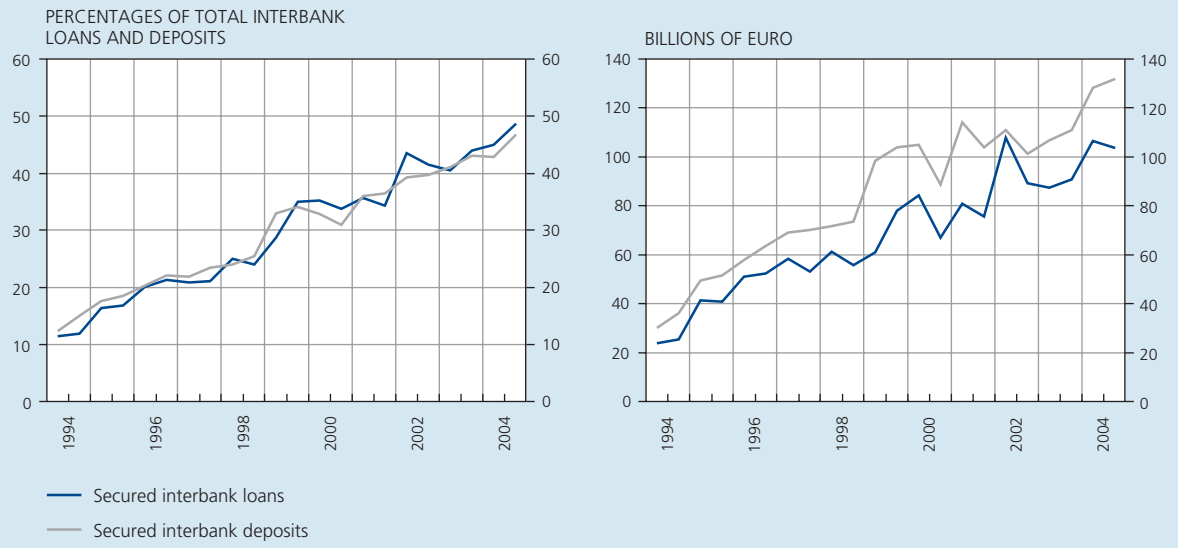
To the extent that part of the securities portfolio has been transferred to third parties to secure borrowing, the relevant securities are no longer available to get additional liquidity. However, banks also get collateral as a guarantee for their own lending operations, collateral that they can then potentially reuse. This shows that it is important for a credit institution to closely monitor collateral operations on both sides of its balance sheet. Chart 24 illustrates the development of collateralised operations in the Belgian interbank market. It turns out that, in this market, the outgoing and incoming flows of collateral largely compensate each other, at least on an aggregate level.

Secured interbank loans accounted for 104 billions of euro at the end of 2004, equal to 49 p.c. of total interbank lending, whereas in the early 1990s, secured loans represented only about 10 p.c. of the total. Similarly, secured interbank borrowing accounted for 47 p.c. of total interbank deposits at the end of 2004 (132 billions of euro), compared to about 10 p.c. in the early 1990s. (1)

(1) These figures would still be higher, would they include reverse repo transactions concluded with an important non-bank financial corporation, to settle and net cross-border securities transactions.

CHART 24 SECURED INTERBANK LENDING AND BORROWING

(Consolidated figures)

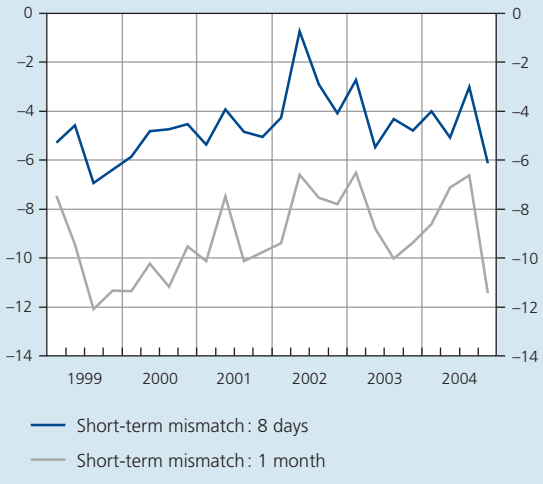


Sources: CBFA, NBB.

When viewed more operationally, in their daily liquidity management, banks' treasurers will aim at financing short-term maturity mismatches that are expected to result from cash in- and outflows during a given time period. On the basis of end of quarter situations, which, due to a lack of data, only refer to unconsolidated positions, Chart 25 illustrates the recent development of these net cash excesses or deficits over periods of eight days and one month, respectively. Changes in assets, liabilities and off-balance sheet items with indeterminate maturities such as sight and savings deposits, overdrafts, committed credit lines or option contracts were not taken into account. Belgian banks' maturity mismatches over a period of eight days accounted for an average 5 p.c. of total liabilities over the period 1999-2004. The cumulative mismatch over a period of one month amounted to an average 9 p.c. of total liabilities. Although a decrease in Belgian banks' short-term maturity mismatches can be observed since 1999, this situation was reversed towards the end of 2004, with Belgian banks' maturity mismatches amounting to 6 and 11 p.c., respectively, of total liabilities over a period of eight days and one month. As those positions are unconsolidated, they can be significantly influenced by loans that the parent companies of some major Belgian banks have granted to their foreign subsidiaries within the framework of centralisation of the group's liquidity management.

CHART 25 BELGIAN BANKS' CUMULATIVE MATURITY MISMATCHES (1)

(Unconsolidated figures, percentages of total liabilities)



Sources: CBFA, NBB.

(1) The cumulative maturity mismatch is a bank's net position on- and off-balance sheet within the specified time frame, but excluding items with indeterminate maturities. As positions in foreign currencies have all been converted into euro and have been added up, this calculation implicitly assumes perfect convertibility between all currencies.

TABLE 8 IMPACT OF A GENERAL LIQUIDITY STRESS SCENARIO

(End of year unconsolidated figures, billions of euro, unless otherwise stated)

	2000	2003	2004
Cumulative net cash flows within 1 month	–74.1	–83.3	–111.0
15 p.c. withdrawal of sight and savings deposits (–)	26.7	34.9	38.8
25 p.c. use of available margin on extended credit lines (–)	36.4	29.4	32.9
90 p.c. of liquid assets with remaining maturity over 1 month (+)	153.8	188.7	194.9
Total liquidity excess (+) / shortage (–)	16.5	41.1	12.1
in p.c. of regulatory own funds	33.6	80.5	22.9

Sources : CBFA, NBB.

The assumption of no changes in items with indeterminate maturities is obviously a crucial one. In case of a liquidity crisis, these items could become quite unstable and their variations will most probably result in a cash drain for the affected credit institutions. Such scenarios can be analysed through liquidity stress tests.

Table 8 illustrates the potential consequences of a rather extreme occurrence. It is assumed that 15 p.c. of banks' deposits are withdrawn during a one-month period, and that bank customers draw 25 p.c. of the available margin on committed credit lines. Furthermore, the assumption is made that it is impossible for banks to draw upon credit lines that were extended to them without posting liquid assets as collateral.

The deposit and credit line withdrawals are deducted from banks' net short-term cash outflows. The resulting mismatch can be financed by banks' liquid assets, which we assume to have dropped 10 p.c. in value following the general confidence crisis, so that the ultimate net liquidity position will be obtained by adding 90 p.c. of total liquid assets.

The results show that, at the end of 2004, Belgian banks would have been able to withstand a 15 p.c. withdrawal of sight and savings deposits as they keep a liquidity excess equal to 22.9 p.c. of banks' regulatory own funds. This compares to a liquidity excess equal to 80.5 p.c. of regulatory own funds in 2003 and 33.6 p.c. in 2000, which illustrates that banks' liquidity positions can change substantially over time.

3.4 Profitability and solvency

Following an increase of 15.3 p.c. in 2003, Belgian banks' net operating profit further improved by 41.5 p.c. in 2004 (Table 9). Unlike in the preceding year, this result was not only achieved through lower value corrections, but was

TABLE 9 MAJOR COMPONENTS OF THE INCOME STATEMENT OF BELGIAN CREDIT INSTITUTIONS (1)

(Consolidated figures, percentage changes compared to the previous year)

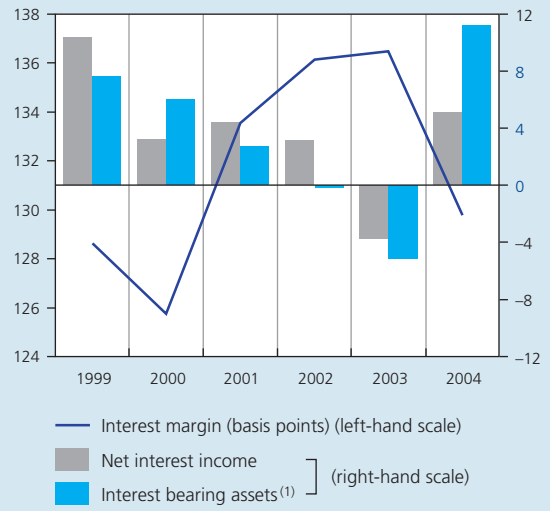
	2000	2001	2002	2003	2004
Banking income	15.3	1.4	–4.6	–1.2	5.9
Net interest income	3.0	4.6	3.2	0.0	5.2
Net non-interest income	28.5	–1.2	–11.7	–2.6	6.7
Operating costs	19.0	4.1	–3.8	–1.8	3.1
Staff costs	11.7	6.7	–0.5	0.8	1.4
Other operating costs	24.9	2.3	–6.3	–4.1	4.5
Gross operating result	6.8	–5.6	–6.9	0.1	13.8
Value corrections	–9.6	4.6	36.2	–31.3	–69.2
Net operating result	12.3	–8.3	–20.2	15.3	41.5

Sources : CBFA, NBB.

(1) In order to avoid the major impact, on the income statement, of the transfer of the participating interest in Dexia Banque Internationale de Luxembourg (BIL) from Dexia Bank Belgium to Dexia Group, 2003 percentage changes have been calculated using published figures from Dexia Group instead of supervisory data on Dexia Bank Belgium.

CHART 26 COMPONENTS OF BELGIAN BANKS' INTEREST MARGIN

(Consolidated figures, percentage changes compared to the previous year, unless otherwise stated)



Sources: CBFA, NBB.

(1) Interest bearing assets are calculated as the average of the outstanding amount of interest bearing assets at the end of each quarter during the year considered.

also due to a rise in banking income. This contrasts sharply with the period 2002-2003, in which banking income had decreased by almost 6 p.c.

This growth in banking income was driven by the interest as well as the non-interest component. The rise of the former was essentially the result of a larger volume of interest bearing assets and liabilities as banks' interest margin went down (Chart 26). These two developments were in fact connected. The volume of assets was swelled by a rise in interbank-like repo transactions, which are low-margin activities.

The main drivers of the increase in non-interest income were trading results and fee income (Table 10). Banks' fee income, in particular, went up thanks to price increases for a number of banking services and higher commissions from asset management, private banking and the sale of investment funds.

On the other hand, banks' results from the realisation of capital gains on securities in the investment portfolio decreased by 25.9 p.c. in 2004. The upper panel of Chart 27 shows that capital gains are often used to smoothen variations in overall profitability. As banks recorded much better results in 2004, they chose not to realise substantial capital gains.

At the same time, the outstanding amount of unrealised capital gains in banks' investment bond portfolios went up thanks to the decline in interest rates (Chart 27, lower panel). At the end of 2004, these unrealised capital gains amounted to more than 7 billions of euro.

The improvement of Belgian banks' profits was not only the result of higher interest and non-interest income, but also reflected Belgian banks' continued efforts to save on operating costs. These grew by only 3.1 p.c. in 2004. Cost saving measures were particularly apparent in personnel costs, as banks continued to restructure their distribution networks.

TABLE 10 NET NON-INTEREST INCOME OF BELGIAN CREDIT INSTITUTIONS (1)

(Consolidated figures, percentage changes compared to the previous year, unless otherwise stated)

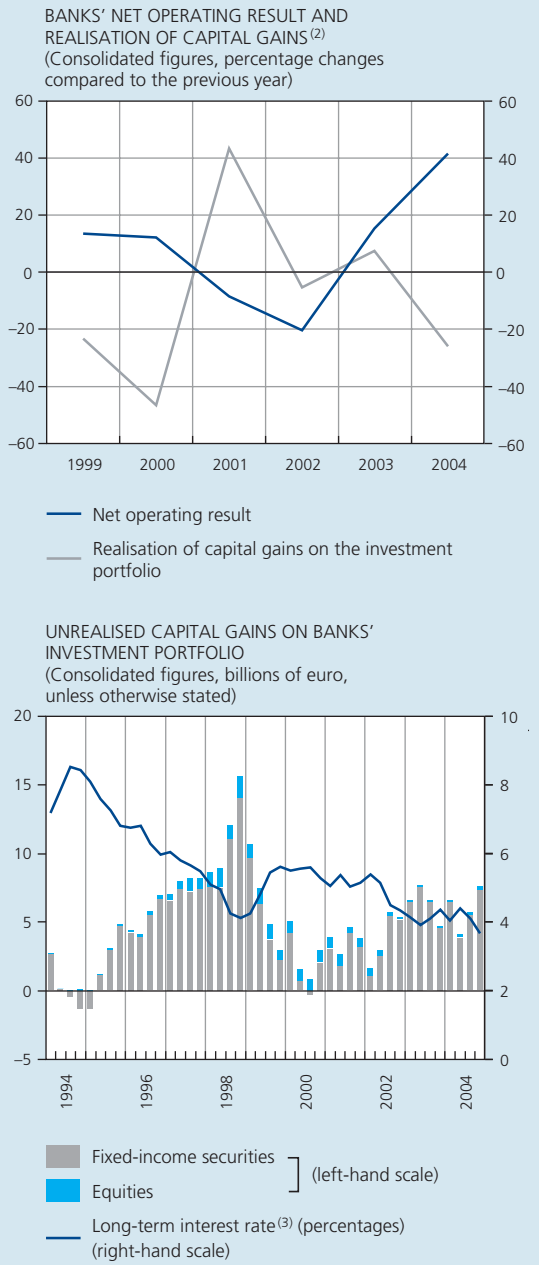
	2000	2001	2002	2003	2004	*p.m. Billions of euro 2004*
Fee income	41.0	–4.0	–9.0	–1.5	10.2	*7.22*
Trading result (2)	181.6	–8.3	–40.0	1.5	15.8	*1.17*
Realisation of capital gains on the investment portfolio	–46.6	43.5	–5.4	7.5	–25.9	*0.86*
Other	4.8	–2.2	–3.1	–6.6	9.2	*2.13*
Total net non-interest income	28.5	–1.2	–11.7	–2.6	6.7	*11.38*

Sources: CBFA, NBB.

(1) In order to avoid the major impact, on the income statement, of the transfer of the participating interest in Dexia Banque Internationale de Luxembourg (BIL) from Dexia Bank Belgium to Dexia Group, 2003 percentage changes have been calculated using published figures from Dexia Group instead of supervisory data on Dexia Bank Belgium.

(2) Including foreign exchange results.

CHART 27 CAPITAL GAINS ON SECURITIES HELD IN BELGIAN BANKS' INVESTMENT PORTFOLIO (1)



Sources: CBFA, NBB.

(1) Capital gains are defined as the difference between the market value and the book value of quoted long-term securities (initial maturity over one year) in credit institutions' investment portfolio.

(2) In order to avoid the major impact, on the income statement, of the transfer of the participating interest in Dexia Banque Internationale de Luxembourg (BIL) from Dexia Bank Belgium to Dexia Group, 2003 percentage changes have been calculated using published figures from Dexia Group instead of supervisory data on Dexia Bank Belgium.

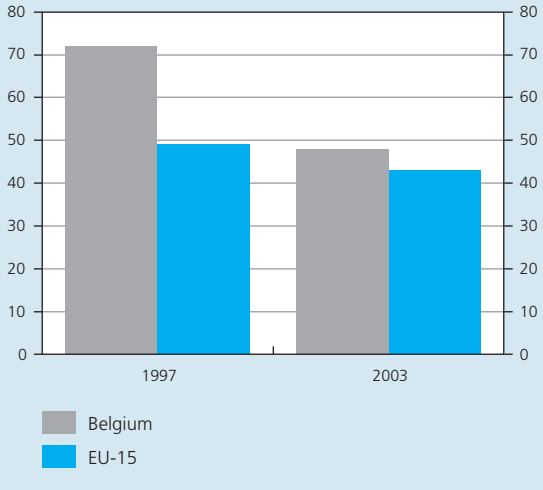
(3) Ten-year Belgian government bond yield.

Indeed, the consolidation wave in the Belgian banking sector at the end of the 1990s has resulted in a significant reduction in the number of distribution points, which has been falling at an annual average rate of 9 p.c. since 1998. Besides cost considerations, this also reflects a shift towards other types of distribution channels. In this vein, banks are developing an increasing number of so-called 'self-banks'. In such self-service banking units, customers can execute simple banking transactions themselves, also outside business hours and without the intervention of bank personnel. Since 1995, the number of branches with a self-banking unit has increased by more than 70 p.c. Internet banking is another distribution channel which banks have been developing strongly over the last few years.

Compared to the other countries in the EU-15, Belgium had long been characterised by a relatively high density of bank branches. In 1997, the Belgian banking sector had 72 branches per 100,000 inhabitants, compared to an average of 49 in the EU-15 (Chart 28). Due to Belgian banks' efforts to cut their distribution costs, the number of branches has fallen to a level in line with the EU average. In 2003, the number of bank branches in Belgium had declined to 48 per 100,000 inhabitants compared to an average of 43 in the EU-15.

CHART 28 BANKS' DISTRIBUTION CHANNELS IN BELGIUM AND THE EU-15

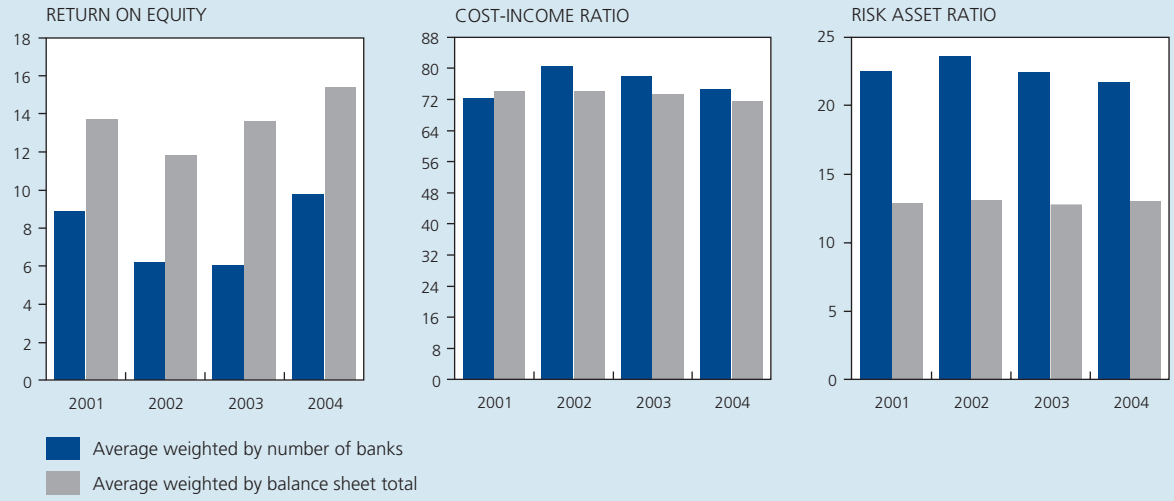
(Number of bank branches per 100,000 inhabitants)



Sources: BBA, ECB.

CHART 29 KEY SOUNDNESS INDICATORS OF CREDIT INSTITUTIONS GOVERNED BY BELGIAN LAW

(Consolidated figures, percentages)



Sources: CBFA, NBB.

The combination of higher income and cost savings resulted in an improvement of 13.8 p.c. of Belgian banks' gross operating result. Net operating results increased even more (41.5 p.c.) as a further sharp reduction in value corrections was recorded (see Section 3.1).

These better results were reflected in the banking sector's main profitability indicators. For the credit institutions governed by Belgian law, the return on average equity (ROE) went up from 13.6 p.c. in 2003 to 15.8 p.c. in 2004, while the cost-income ratio decreased from 73.5 p.c. to 71.7 p.c. Obviously, these figures mainly reflect the situation of the major banking groups. When the average is not weighted by the balance sheet total but by the number of banks, the indicators are less favourable, being depressed by the weaker performance of smaller banks in terms of profitability and cost control (Chart 29).

While less profitable, smaller banks have, on average, a higher risk asset ratio. This ratio amounted, at the end of 2004, to 13 p.c. when weighted by the balance sheet total and to 21.7 p.c. when weighted by the number of banks.

The major drivers of the increase in the ROE can be analysed in more detail by a further decomposition of this ratio. In the following equation, the first two terms relate to the profitability and riskiness of banks' activities and the last two concern the level and quality of capital.

$$ROE = \frac{after\ tax\ profit}{risk\ weighted\ assets} \times \frac{risk\ weighted\ assets}{total\ assets} \times \frac{total\ assets}{regulatory\ capital} \times \frac{regulatory\ capital}{accounting\ capital}$$

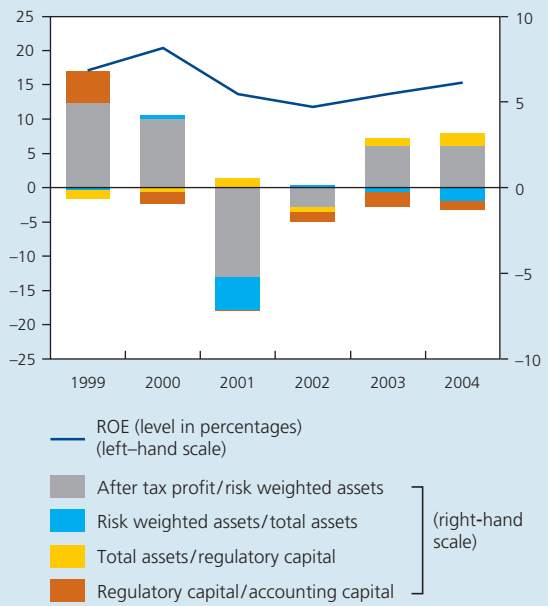
Chart 30 illustrates the contribution of each of these factors to changes in the ROE for the period 1999-2004.

The first term in the above equation corresponds to the return on assets adjusted for risk and appears to be by far the main contributor to changes in the ROE. This was again the case in 2004.

The second term, dividing the banking sector's risk weighted assets by total assets, is an indicator of the risk profile of Belgian banks. However, as the weighting still corresponds to the Basel I framework, this ratio only imperfectly reflects banks' risk taking. The changes introduced by Basel II will align much more closely the calculation of risk weights with the effective risk exposure of banks. In recent years, changes in the riskiness of activities have mostly had a neutral effect, except in 2001 and 2004 when this effect has been negative. This development towards a lower risk profile could be associated with the recent shift, within banks' loans to the private sector,

CHART 30 DECOMPOSITION OF THE RETURN ON EQUITY OF CREDIT INSTITUTIONS GOVERNED BY BELGIAN LAW

(Consolidated figures, percentage contributions to changes in the return on equity, unless otherwise stated)



Sources : CBFA, NBB.

from corporate loans to mortgage loans which have a lower risk weight.

The third term, dividing total assets by regulatory capital, is an indicator of banks' regulatory leverage. Banks' increased recourse to leverage during the last two years had a positive effect on the ROE.

The last term, comparing regulatory and accounting capital, gives an indication of the importance of Tier II components in banks' regulatory capital. Indeed, regulatory capital includes subordinated debt and preference shares which are not in the accounting concept of equity. Since 2002, banks have, through repayment of subordinated debts, lowered the proportion of Tier II capital in their regulatory capital which has weighed down their return on equity.

4. Insurance companies

4.1 Links with the banking sector

Through their financial market operations, insurance companies are increasingly tied to banks. They do not only influence the prices of a wide range of financial instruments which are also actively traded by banks, but they are increasingly operating on the credit risk transfer market, most often as sellers of credit risk protection to banks. This implies that systemic problems in one sector could spread to the other.

Furthermore, in Belgium, the relationships between the two sectors are often institutionalised within bancassurance groups. The four major financial groups, which hold a share of over 80 p.c. of the banking market, also account for approximately 50 p.c. of the total insurance market. This combination of activities strongly influences the structure and supervision of the main financial groups active in the Belgian market, as is shown in Box 5.

Box 5 – Structure, supervision and activities of the major Belgian financial groups

The major banks and insurance companies in the Belgian market are part of cross-border bancassurance groups. These groups differ in legal structure, in the degree of integration between banking and insurance activities, in the relative importance of both activities and in the respective role of the CBFA and foreign authorities as regards their supervision. Nevertheless, each of them is headed by a holding company, with banking and insurance activities being performed by different subsidiaries of the holding company. The approach to integrating banking and insurance varies from one group to another. There is, however, a tendency to centralise key risk monitoring and control functions at the holding level of the groups. In addition, operational integration is realised by using the branch network for joint distribution of bancassurance and investment products.

The CBFA supervises the Belgian insurance companies of these bancassurance groups on a company basis (i.e. excluding the activities of foreign subsidiaries), and their Belgian banking and other financial subsidiaries on a consolidated basis. In addition, the CBFA is the consolidating supervisor for the financial holdings heading the Dexia and KBC financial groups as well as the co-ordinating supervisor for the Fortis group, to supplement the sectoral supervision of Fortis' banking and insurance activities.

Various Memoranda of Understanding (MoUs) have been concluded between home and host supervisors to facilitate the consolidated supervision of the banking activities of bancassurance groups as well as the consolidated supervision of these groups at holding level. Worth mentioning is the formal agreement between the Dutch and Belgian prudential banking and insurance supervisors (De Nederlandsche Bank and the CBFA) concerning

MAIN CHARACTERISTICS OF BANCASSURANCE GROUPS ACTIVE IN THE BELGIAN MARKET

Group	Legal structure	Integration of banking and insurance activities	Supervision		
			Banking and other financial subsidiaries	Insurance subsidiaries	Holding level
Dexia	Belgo-French group with predominantly banking activities organised via its subsidiaries in BE, FR and LU and an important insurance entity specialised in credit enhancement in the US	Managerial integration : Key risk monitoring and control functions are centralised at the holding level Operational integration : The group's branch network is exploited to jointly distribute bank, investment and insurance products	CBFA consolidating supervisor of the Belgian subsidiary Dexia Bank Belgium	CBFA supervises the Belgian companies	CBFA consolidating supervisor of the Dexia financial holding (in close collaboration with the FR and LU authorities)
Fortis	Belgo-Dutch group with a Belgian banking and a Dutch insurance arm		CBFA consolidating supervisor of the entire banking arm		CBFA co-ordinating supervisor of the Fortis financial conglomerate (in close collaboration with the NL authorities)
KBC	Belgian group with bank, asset management and insurance subsidiaries		CBFA consolidating supervisor of bank and asset management subsidiaries (covering KBC's activities in Central and Eastern Europe)		CBFA consolidating supervisor of the KBC financial holding
ING Belgium	ING Bank Belgium and ING Insurance Belgium are distinct Belgian subsidiaries of the Dutch ING Group	In Belgium : Operational integration only	CBFA consolidating supervisor of ING Bank Belgium (covering ING's activities in South-Western Europe)		

Sources : CBFA, NBB.

group-wide supervision of the Fortis Group. This MoU was drawn up ahead of the legal framework introduced by the EU Financial Conglomerates Directive and designated the CBFA as the co-ordinating supervisor for the Fortis group.

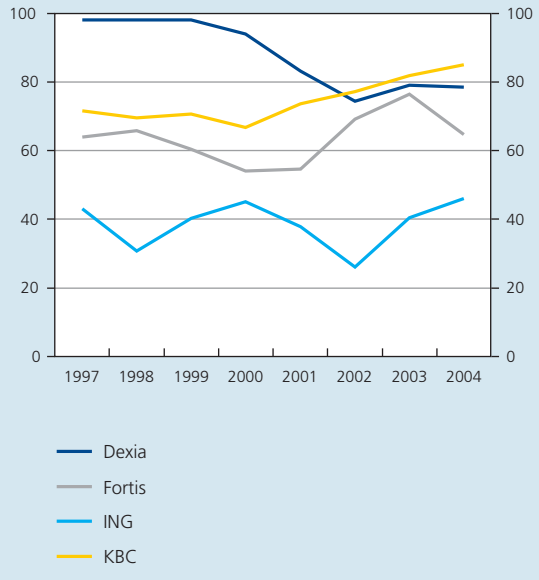
While the four groups are all to some extent conceived around the bancassurance concept, they differ in the balance they have struck between banking and insurance, in the geographical areas in which they are active and in the market segments they concentrate on.

Except for ING, which derived around 54 p.c. of its result from its insurance activities in 2004, net operating profits of all groups are mostly generated by their banking activities (Chart 1). However, the data for ING reflect the situation of the Dutch parent company, while ING's profits in Belgium also stem mainly from banking. For the three other groups, the relative contribution of banking and insurance to net operating profit has converged over the last few years. While Dexia was originally predominantly a banking group, this changed following the acquisition in 2000 of Financial Security Assurance (FSA), a US insurance company specialised in credit enhancement. The retail life and non-life insurance activities of the Dexia Group nevertheless remain limited.

All groups have important retail banking and/or insurance, corporate banking, asset management, and financial market activities in the Benelux, whose relative weights are difficult to compare between the groups due to differences in the criteria used to classify these activities. Each of these groups has also, to some extent, entered one or more specific market segments, as can be seen in Chart 2, which provides the breakdown of the groups' net operating profit per business line in 2004.

CHART 1 CONTRIBUTION OF BANKING ACTIVITIES TO BANCASSURANCE GROUPS' NET OPERATING PROFIT (1)

(Consolidated figures, percentages)



Sources : Groups' published annual accounts and NBB's own calculations.

(1) Net operating profit before taxes. For the Dexia Group, the contribution of insurance activities includes the FSA results.

In the case of Dexia, more than half of the group's profit stems from public and project finance and credit enhancement. While the largest part of these activities is performed in Belgium and France, in the form of lending to local authorities, the group has also become active in the US following its acquisition of FSA in 2000. FSA specialises in providing financial guarantee insurance for asset-backed securities, municipal bonds and other structured finance instruments. FSA accounted for 14 p.c. of the group's net operating profit in 2004.

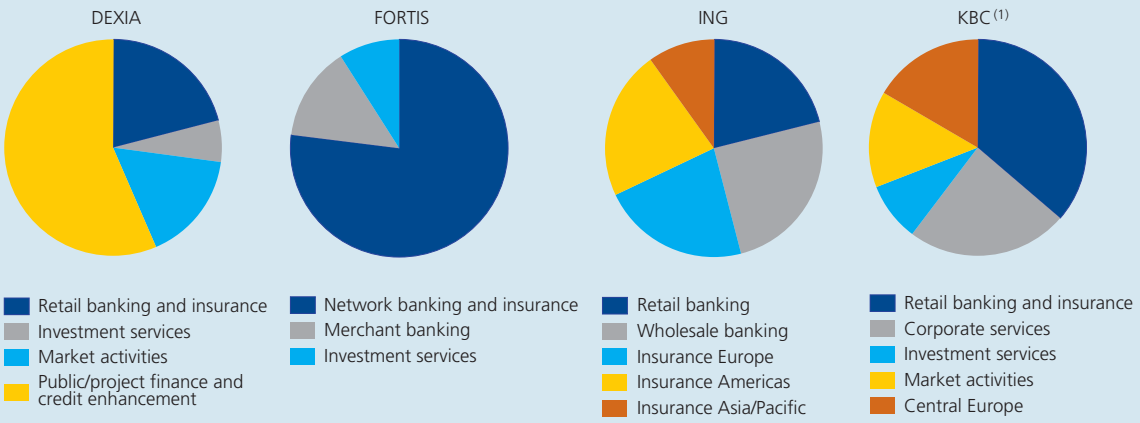
In addition to its banking and insurance activities in Europe, ING Group has developed sizeable insurance operations in Asia and America. A few years ago, it also launched an internet bank, ING Direct, which is currently active in several countries all over the world. All banking activities in South-Western Europe have been consolidated within ING Belgium, which accounted for around 11 p.c. of ING Group's net result in 2004. ING Belgium's main foreign subsidiaries are ING Bank France and ING Luxembourg, which in turn has a subsidiary in Switzerland. Together, they accounted for about 22 p.c. of ING Belgium's net result in 2004.

KBC still derives the vast majority of its net profit from its banking and insurance activities in the Benelux. However, in 2004, 16 p.c. of its profit was generated by the group's banking and insurance activities in Central and Eastern Europe, which had still recorded a loss in 2003. In addition, KBC has also considerably developed its financial market activities, which contributed about 14 p.c. to net profit last year.

Fortis also continues to focus mainly on banking and insurance in the Benelux. These activities still generated around 85 p.c. of the group's profit in 2004. However, the group has to some extent diversified into insurance in a number of other European countries, such as Portugal, and outside Europe, for instance in China, Malaysia and Thailand. Also as regards its banking activities, Fortis is gradually developing markets outside the Benelux. In this connection, the group recently announced the takeover of a Turkish retail bank.

CHART 2 BREAKDOWN OF BANCASSURANCE GROUPS' NET OPERATING PROFIT PER BUSINESS LINE

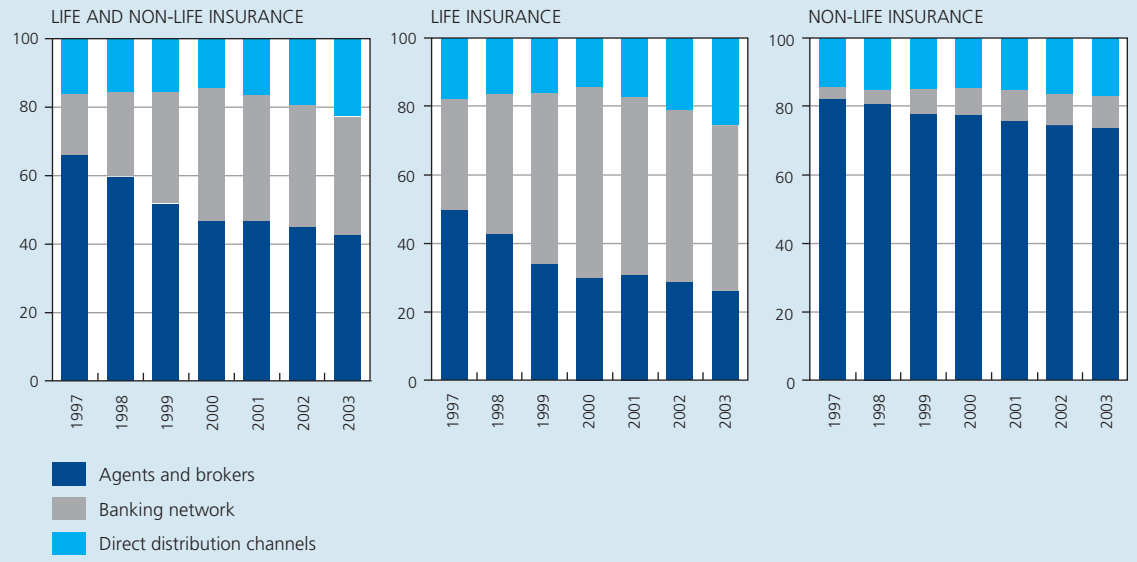
(Consolidated figures over 2004, percentages of total)



Sources: Groups' published annual accounts and NBB's own calculations.
(1) Net profit in the case of KBC.

CHART 31 DISTRIBUTION CHANNELS IN THE BELGIAN INSURANCE SECTOR (1)

(Percentages of total collected premiums)



Source : Assuralia.

(1) An estimate had to be made for the market share of the banking network in 2003 as a consequence of a change in the classification of distribution channels made by Assuralia in that year.

At a more operational level, the creation of bancassurance groups increased the market share of banks' branch networks in the distribution of insurance products. This share accounted, in 2003, for 35 p.c. of total collected insurance premiums, compared to only 18 p.c. in 1997 (Chart 31, left panel). While this caused a decline in the role of the classic distributors from around 66 p.c. in 1997 to 43 p.c. in 2003, these distributors are still the most important sellers of insurance products. They comprise agents who, as in the banking sector, are tied to one single insurance company, and brokers who may distribute products from different companies. The market share of the classic distributors has also suffered from the increased use being made of direct channels.

However, there are important differences between the various distribution channels as regards their market share in the life and non-life sector. In life insurance, where synergies between banking and insurance products are greatest, the distribution through financial groups' branch networks has strongly gained in importance, to the detriment of the classic distribution network. The latter still dominates in the non-life sector, notwithstanding a decrease in market share over the last few years.

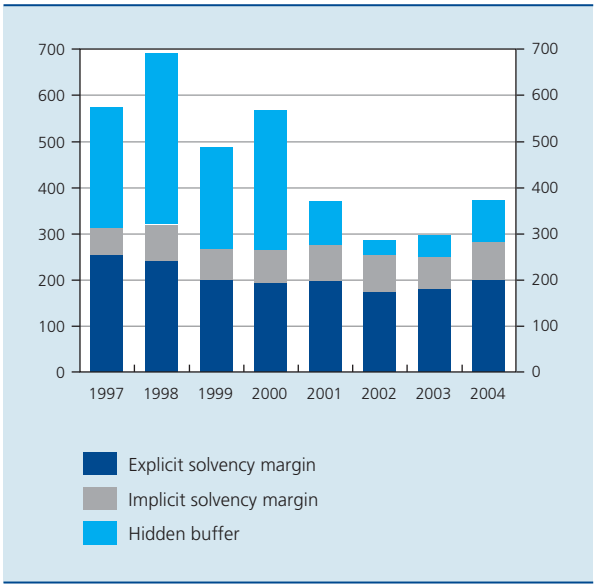
4.2 Solvency and profitability

The regulatory available solvency margin of Belgian insurance companies rose from 248 p.c. of the required minimum at the end of 2003 to 281 p.c. at the end of last year, which is the highest level since 1998 (Chart 32). The available solvency margin consists of two elements. The explicit margin, which mainly comprises insurance companies' own funds, went up from 179 to 199 p.c. of the required margin on the back of the sector's profit recorded last year. The implicit margin includes, at request of the company and after agreement of the CBFA, a proportion of expected future profits in life insurance and unrecorded unrealised capital gains.

The expected future life insurance profits that are incorporated in the implicit solvency margin declined as a result of a fall in interest rates as well as a change in regulation. Indeed, pending the introduction of a more radical transformation of insurance companies' solvency rules under the European Solvency II Directive, the currently applicable Solvency I rules are phasing out the possibility, for insurance companies, to include in their solvency margin a proportion of expected future profits from their life insurance activities.

CHART 32 AVAILABLE SOLVENCY MARGIN OF BELGIAN INSURANCE COMPANIES

(Percentages of the minimum required solvency margin)



Sources: CBFA, NBB.

However, this decline was more than offset by a rise in unrecorded unrealised capital gains included in the implicit solvency margin. The existence of these capital gains is linked to the accounting rules for the valuation of insurance companies' investments.[1] According to these rules, most unrealised capital gains and losses generated by changes in interest rates or share prices are not incorporated in the book value of insurance companies' investment portfolios and therefore do not entail a change in the explicit solvency margin. However, if authorised by the CBFA, part of the latent capital gains may be incorporated in the implicit margin.

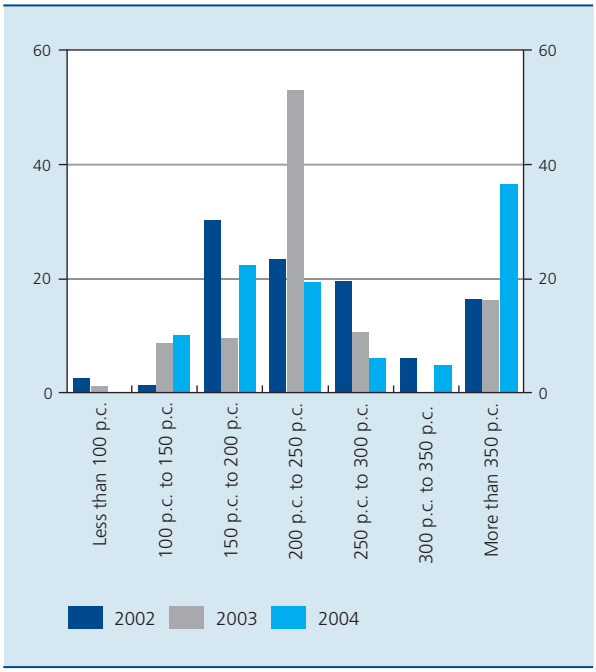
The remaining part of these capital gains constitutes a "hidden buffer", which has in fact been the main shock absorber for the sharp fall in equity prices between 2000 and 2002, declining from 304 p.c. of the required solvency margin at the end of 2000 to 33 p.c. at the end of 2002. The buffer has subsequently been restored thanks to the recent rise in bond and equity prices, reaching 92 p.c. at the end of 2004. Note however that the hidden buffer only includes unrealised capital gains and losses that result from the under- or overvaluation of insurance companies' assets and does not incorporate unrecorded capital gains or losses on liabilities, linked for example to the use of a fixed discount rate to calculate the present value of insurance liabilities.

The effectiveness of the protection provided by these high solvency margins depends on the adequacy of the minimum required margin. In this connection, a major shortcoming of current solvency regulation is that it only looks at insurance companies' underwriting activities, measuring the required capital mainly on the basis of the premiums received and the level of provisions. This calculation may not only put higher capital requirements on companies that, for a given level of risk, adopt a more prudent behaviour by setting higher premiums and making higher provisions, it also takes no account of investment risks. The new European Solvency II Directive, currently under discussion, intends to remedy these shortcomings by introducing a solvency regime more in line with the full range of risks incurred by insurance companies.

Looking at the distribution of insurance companies' available solvency margin, weighted by the relative importance of the individual institutions' assets in the sector's total assets, there were no companies in 2004 with an available solvency margin lower than the regulatory requirement, compared to 1 p.c. in 2003 and 3 p.c. in 2002 (Chart 33). At the other end of the scale, assets held by companies

CHART 33 WEIGHTED DISTRIBUTION OF BELGIAN INSURANCE COMPANIES' AVAILABLE SOLVENCY MARGIN

(Percentages of the sector's total assets)



Sources: CBFA, NBB.

(1) These rules have been described in detail in the Financial Stability Review of 2004. See Financial Stability Overview, Box 5, pp.56-58.

with a solvency margin of over 350 p.c. of the required margin increased to more than 35 p.c. in 2004, compared to around 18 p.c. in 2002 and 2003.

The main driver of the improvement in insurance companies' solvency was the increase in profitability. While not all companies' supervisory schemes are available as yet, the data for a sample of 13 companies, which accounted for around 82 p.c. of total life and 47 p.c. of total non-life insurance premiums in 2003, can be used to analyse the sector's profitability in 2004. (1)

The net result of this sample of companies amounted to 5.7 p.c. of net premiums in 2004 compared to 2.6 p.c. in 2003, which was already considerably higher than in 2002, when the sector incurred a loss corresponding to 3.6 p.c. of net premiums. Nevertheless, these results are still far below those recorded at the end of the 1990s (Chart 34).

This net result includes three main components. The technical result of non-life insurance activities consists of the underwriting result and the investment result realised by or attributed to this activity. The technical result of life insurance is made up of the same two elements. The non-technical result corresponds to the financial results that have not been attributed to life or non-life insurance, plus exceptional items and taxes.

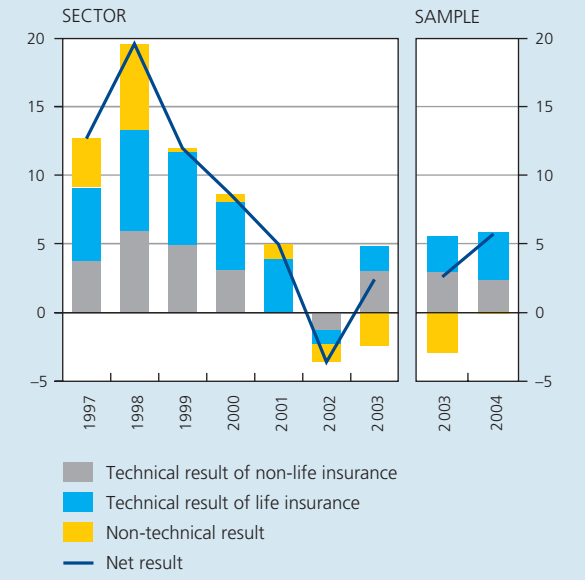
The main source of the profitability improvement in 2004 was the return to balance of the non-technical result. In 2003, the latter had been adversely affected by large unallocated financial costs that were partly associated with the hedging operations of two large insurance companies against further adverse equity price developments. In addition, the technical result, expressed as a percentage of total net premiums, has slightly improved from 2.6 to 3.5 p.c. in life insurance, but has declined from 2.9 p.c. to 2.3 p.c. in non-life insurance.

While both technical results have an underwriting and an investment component, underwriting risks are more prominent in non-life insurance while investment risks are specifically challenging in life insurance. This broad distinction will be adopted for the analysis of insurance companies' main risks in Sections 4.3 and 4.4.

(1) A comparison of the figures for 2002 and 2003 for the entire sector and for the sample of 13 companies shows that the sample provides a reasonably accurate approximation of the developments of the entire sector. It has to be noted that all supervisory data on insurance companies are on an unconsolidated basis.

CHART 34 LIFE, NON-LIFE AND NON-TECHNICAL RESULTS OF BELGIAN INSURANCE COMPANIES

(Percentages of total net premiums)



Sources: CBFA, NBB.

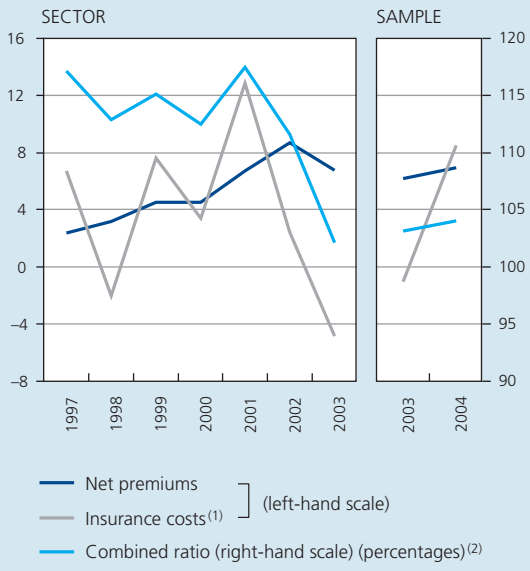
4.3 Underwriting risk in non-life insurance

Although net collected premiums in non-life insurance continued to grow by around 7 p.c., the upward premium cycle which started in 2001 seems to gradually come to an end. This development was accompanied by increasing or continuously high claims in some types of policies, such as hospitalisation and industrial accidents insurance, as indicated by the rise, in 2004, of insurance costs by 8.5 p.c. As a consequence, the combined ratio, which is an indicator of underwriting activities' profitability as it expresses insurance and operating costs in percentages of net premiums, slightly deteriorated in 2004. After an improvement from over 115 p.c. in the late 1990s to 102 p.c. in 2003, thanks to the realignment of premiums with costs during that period, the combined ratio went slightly up again to 104 p.c. in 2004 (Chart 35).

A further easing of underwriting standards could be harmful for the sector, especially as the financial income from non-life activities, which amounted to 16.1 p.c. of premiums in 2003, has slightly declined to 14.4 p.c. in 2004. Consequently, profitability in non-life insurance will be highly dependent on underwriting policy. In this perspective, the introduction of a new European Directive (2002/92/EC), which allows insurance intermediaries established in a European country to provide their services in all other member countries, might lead to

CHART 35 DEVELOPMENTS IN BELGIAN INSURANCE COMPANIES' NON-LIFE UNDERWRITING RESULT

(Percentage changes compared to the previous year, unless otherwise stated)



Sources: CBFA, NBB.

(1) Amounts paid out and changes in provisions as the result of non-life insurance claims.

(2) Insurance and operating costs as a percentage of net received premiums in non-life insurance.

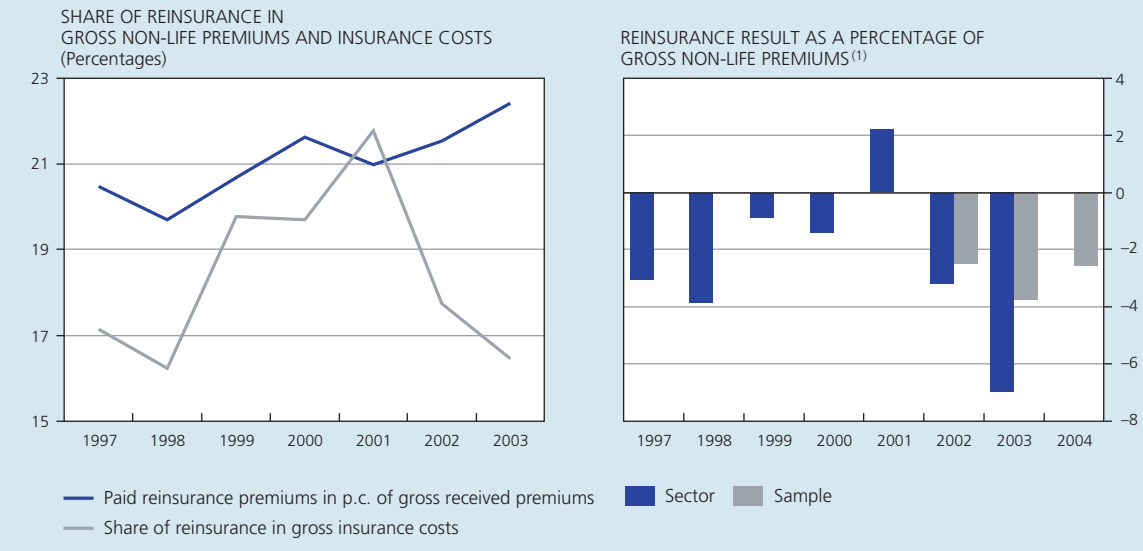
further pressure on premiums, as several foreign companies are showing an interest in the Belgian market.

In addition to pricing policy, reinsurance policy is also a key variable in the management of underwriting risks. The left panel of Chart 36 shows that, in 2002 and 2003, paid reinsurance premiums became more important relative to gross received premiums, while, on the other hand, the benefits from reinsurance, calculated as the percentage of gross insurance costs borne by reinsurance companies, declined. This might be explained by two different developments.

On the one hand, reinsurance might have become more expensive for a given coverage as the result of a general hardening of the reinsurance market since 2001. The rise in the ratio of paid reinsurance premiums to gross received premiums would then indicate that insurance companies have not been able to fully pass on the rise in reinsurance costs to their policyholders.

On the other hand, as the percentage of insurance costs borne by reinsurance companies declined, while, at the same time, paid reinsurance premiums relative to gross received premiums rose, it could be inferred that reinsurance companies had to pay out less in the context of the improvement of the gross underwriting result in 2002 and 2003. As reinsurance cover is generally triggered in cases where claims exceed a certain threshold, lower claims might have limited reinsurance intervention.

CHART 36 IMPACT OF REINSURANCE ON BELGIAN INSURANCE COMPANIES' NON-LIFE UNDERWRITING RESULT



Sources: CBFA, NBB.

(1) The reinsurance result is the difference between the amounts received from and the premiums paid to reinsurance companies.

Whether these developments continued in 2004 is difficult to say. There are signs, however, that premiums in the European reinsurance market remained stable and those in other regions declined slightly, indicating that reinsurance markets have not hardened further. This information is corroborated by the developments observed for the sample of 13 Belgian insurance companies, which saw their reinsurance results improve from –3.7 to –2.6 p.c. of gross premiums in 2004 (Chart 36, right panel).

4.4 Investment risk in life insurance

In 2004, net premium income in life insurance increased by around 13 p.c., significantly more than that in non-life insurance. As has been shown in Section 2.2, life insurance products are an increasingly important part of households' financial asset portfolios.

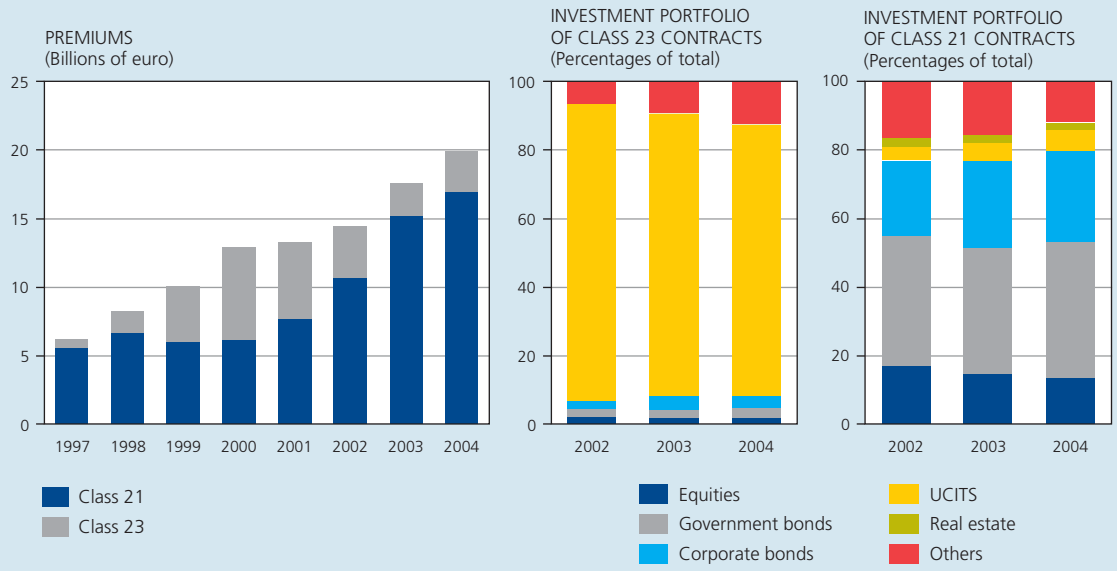
The bulk of life premiums still comes from guaranteed return (class 21) contracts, where the insurer takes on the investment risk. However, in 2004, premiums for contracts linked to investment funds (class 23), where the investment risk is transferred to the policyholder, grew by 26 p.c., compared to only 11 p.c. for class 21 products (Chart 37).

There are significant differences in the structure of investment portfolios covering the two categories of contracts. A large proportion of investments covering class 23 contracts is placed with UCITS guaranteeing the initial capital or limiting losses (and gains). For their portfolios of class 21 contracts, insurance companies invest primarily in bonds which represented 66 p.c. of total assets at the end of 2004. Within this category, the relative importance of corporate bonds has gradually increased.

Insurance companies further reduced their equity holdings, which have decreased from 17 p.c. of the total portfolio covering class 21 contracts in 2002 to around 14 p.c. in 2004. This resulted mainly from net sales by insurance companies in reaction to the significant losses they had suffered after the bursting of the stock market bubble. At the same time, insurance companies hedged part of their remaining equity portfolio. While the reduction in the exposure to equities significantly limited investment risk, it also prevented companies to fully benefit from the recent rebound in stock prices.

Given the high proportion of bonds in their financial asset portfolios, insurance companies are especially sensitive to long-term interest rate developments. Contrary to what is the case for banks, declining interest rates will adversely affect the market value of insurance companies' own funds as the duration of their assets is lower than that

CHART 37 NET PREMIUMS AND INVESTMENT PORTFOLIOS OF CLASS 21 AND CLASS 23 LIFE INSURANCE CONTRACTS



Sources : Assuralia, CBFA, NBB.

of their liabilities. In addition, a decline in rates also has a negative impact on their income statements as it will reduce the recurrent stream of interest income earned on the bond portfolio, which is used as a basis to service guaranteed returns on class 21 life insurance contracts. Similar constraints will be faced by pension funds as discussed in Box 6.

Box 6 – Update on the financial position of Belgian pension funds

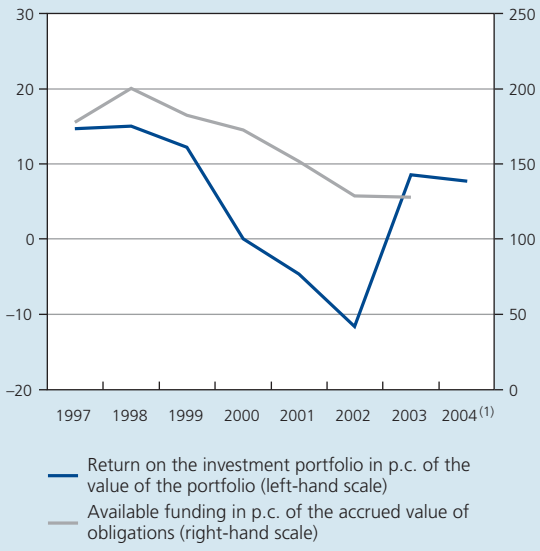
In 2003, the available funding of Belgian pension funds remained stable at around 128 p.c. of the accrued value of their liabilities, notwithstanding a sharp increase in the total return on the investment portfolio from –11.6 p.c. in 2002 to around 8 p.c. (see Chart below).

This outwardly inconsistent development is due to the fact that funding percentages at the end of 2002 are not comparable with those at the end of 2003 because of the transfer, in 2003, of the Belgacom pension fund to the government. As this pension fund had a better capital position than the market average, its exclusion at the end of 2003 led to a lower funding position at the aggregate level. If we eliminate the Belgacom effect, the sharp increase in the yield of the investment portfolio indeed led to an improvement in the funding of pension funds.

In 2004, the return on investments stabilised at around 8 p.c., which should have contributed to a further improvement in funding, provided that pension plan sponsors kept their contributions at the levels observed over the last few years. In addition to the fact that pension funds' financial positions are still considerably less rosy than at the end of the 1990s, when funding amounted to over 200 p.c. of the accrued value of liabilities, a further sustained level of contributions is also warranted for the following reasons.

INDICATORS OF PENSION FUNDS' RESILIENCE

(Percentages)



Sources: CBFA, Mercer Oliver Wyman, NBB.

(1) Estimate based on a study of Mercer Oliver Wyman.

Firstly, pension funds are heavily exposed to interest rate risk. At the end of 2003, around 41 p.c. of financial assets were invested in bonds, either directly or through UCITS. However, the impact of changes in interest rates is not fully reflected in pension funds' funding figures mentioned above. While the decrease in interest rates over the last few years enabled pension funds to accumulate unrealised capital gains on their bond portfolios, which are marked to market, it did not lead to a simultaneous increase in the accrued value of pension funds' obligations, which are still discounted at a fixed rate of 6 p.c., notwithstanding the fall in long-term market interest rates to below 4 p.c. If obligations would be valued according to market rates, pension funds' funding surpluses would shrink considerably and might, for some funds, even turn into funding gaps. In the same vein, a rise in interest rates would, under current accounting rules, lead to a deterioration of pension funds' financial positions, while such a development would in fact be beneficial, assuming that the duration of pension funds' obligations is longer than that of their assets. Under IAS/IFRS, the accounting treatment of pension liabilities on the sponsoring companies' books will require the use of market valuation, both for assets and liabilities (see Box 1).

Secondly, pension funds also invest a large part of their assets in equities. At the end of 2003, investments on stock markets and in UCITS specialising in equities amounted to around 42 p.c. of total financial assets, compared to 38 p.c. in 2002. This growth is mainly due to the increase in stock prices. However, a market downturn could quickly lead to a fall in funding surpluses. While shares are well suited to cover long-term pension obligations, stock market volatility exposes companies to larger swings in the coverage of their pension obligations in the short run, which under IAS/IFRS will become apparent in sponsoring companies' accounts.

Lastly, the law on additional pensions requires pension funds to guarantee a return of 3.25 p.c. on employers' contributions and 3.75 p.c. on employees' contributions in the case of defined contribution contracts. As a result, both defined contribution and defined benefit pension plans expose sponsoring companies to investment risk. Especially in a low interest rate environment, it will be difficult for pension funds to obtain the required returns, as a result of which additional contributions might be needed.

The guaranteed return on class 21 contracts, which has to be covered by insurance companies' financial revenues, traditionally equalled its legal ceiling of 4.75 p.c. until 1999, when the ceiling was lowered to 3.75 p.c. Although, in recent years, insurance companies have further lowered these guarantees on their own initiative, Chart 38 shows that the average guaranteed return on the outstanding stock of contracts has decreased rather slowly. At the end of 2004, the average rate was still around 4 p.c., considerably above market rates.

Given this important gap, it is, at first glance, rather surprising that insurance companies keep distributing profits to policyholders. While no figures are as yet available for 2004, distributed profits in 2003 added around 0.4 p.c. to the guaranteed return. Various factors could explain this. Firstly, not all contracts guarantee the same return. While insurance companies may not longer distribute profits on the oldest contracts with the highest guarantees, they are still able to pay out bonuses on the more recent contracts with lower guaranteed rates. Secondly, a considerable part of insurance companies' bond portfolios, bought before 1998 and in the period 2000-2002, still carries interest rates above the guaranteed return. It is to be expected that reinvestment risk will gradually emerge as these bonds mature in the coming years. Lastly, the pick-up of share prices since 2003, especially in the Belgian stock market, led to an improvement in financial income in recent years, which partially compensated for the lower interest rates.

Nevertheless, it is increasingly difficult for insurance companies to keep their class 21 portfolio profitable. While in 1999 the difference between the return on the investment portfolio and the total return distributed to policyholders (gross margin) still exceeded 3 p.c. for most companies, mainly thanks to considerable capital gains on the equity portfolio, more than half of the contracts was loss-making in 2002 (Chart 39). In 2003, the situation improved somewhat, with only around 25 p.c. of contracts remaining unprofitable.

In order to improve the profitability of their portfolio covering class 21 products, insurance companies are adapting their investment strategies. They are taking on more credit risk, which is reflected in the higher proportion

CHART 38 LONG-TERM INTEREST RATE, GUARANTEED AND TOTAL RETURN ON CLASS 21 LIFE INSURANCE CONTRACTS

(Percentages)

Sources : CBFA, NBB.
(1) Ten-year Belgian government bond yield.
(2) Estimate for 2004 on the basis of a linear extrapolation of past developments.
(3) Including distributed profits.

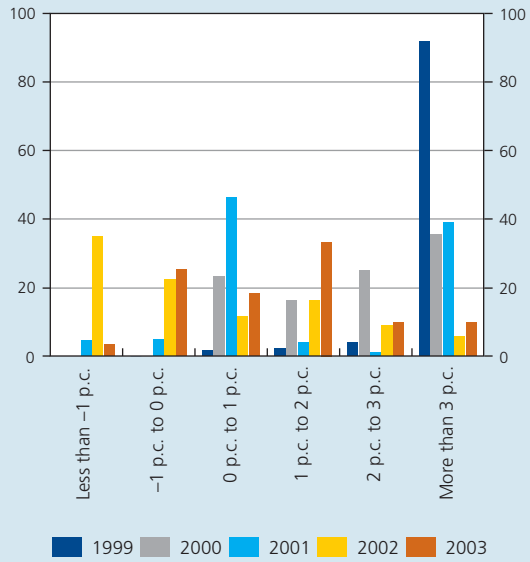
of corporate bonds in the bond portfolio, their share rising from 22 p.c. in 2002 to 27 p.c. in 2004 (Chart 37). They are also slightly stepping up the realisation of capital gains on bonds. However, this might expose insurance companies to reinvestment risk, as the proceeds will have to be reinvested at current – i.e. lower – rates which could in the future aggravate the profitability problem of class 21 contracts.

Insurance companies have also introduced some structural changes in their class 21 contracts, in order to prevent new policies from adding to the already existing burden. While most contracts concluded until the end of the 1990s applied the guaranteed return valid at the time of conclusion of the contract to all future premiums, this is no longer the case because a large proportion of new contracts only guarantees the rate valid at the time of receipt of the premium, which may thus be adapted if market conditions require.

However, most of these new contracts also provide more flexibility to policyholders, enabling them to surrender their policies more easily and without incurring major costs. As a consequence, the additional protection gained by insurance companies against further pressures from low or declining interest rates might only be obtained at the cost of a higher sensitivity to a rise in interest rates. In such cases, companies might be forced to increase the remuneration of their contracts much more quickly in order to discourage surrenders. On the one hand, this would continue to exercise major pressure on profitability as investment income would increase more gradually with the progressive reinvestment of the asset portfolio at higher rates. On the other hand, any postponement in the adaptation of the contracts' remuneration would, by increasing the surrender rate, force companies to sell part of their investment portfolio, and so realise capital losses on their bonds.

CHART 39 WEIGHTED DISTRIBUTION OF THE GROSS MARGIN (1) ON CLASS 21 LIFE INSURANCE CONTRACTS

(Percentages of the sector's total class 21 technical provisions)



Sources : CBFA, NBB.
(1) Return on insurance companies' class 21 investment portfolios minus the total return distributed to policyholders.

Statistical annex

List of tables

Tables relating to credit institutions

Tables relating to insurance companies

Tables relating to investment services and the securities market

TABLE 1 NUMBER OF BELGIAN CREDIT INSTITUTIONS

	1998	1999	2000	2001	2002	2003	2004
Credit institutions governed by Belgian law with Belgian majority shareholding	54	48	45	38	36	34	33
Credit institutions governed by Belgian law with foreign majority shareholding	27	27	27	29	29	27	26
– EU Member States	17	21	21	22	21	21	20
– other States	10	6	6	7	8	6	6
Belgian branches of foreign credit institutions	39	44	47	46	46	48	45
– EU Member States	25	30	34	35	36	38	36
– other States	14	14	13	11	10	10	9
Total	**120**	**119**	**119**	**113**	**111**	**109**	**104**

Source : CBFA.

TABLE 2 BREAKDOWN OF CREDIT INSTITUTIONS GOVERNED BY BELGIAN LAW ACCORDING TO THEIR SHAREHOLDERS' STRUCTURE

	1998	1999	2000	2001	2002	2003	2004
Large credit institutions (including their subsidiaries)	18	17	15	14	12	11	12
Belgian financial groups	6	5	7	5	5	3	3
Financial groups from other EU Member States	18	21	19	18	19	18	16
Financial groups from third countries	8	5	6	7	5	6	6
Belgian or foreign non-financial groups	4	3	3	3	4	2	2
Family structure	14	13	10	8	9	10	9
Professional credit associations	11	9	9	9 (1)	9 (1)	9 (1)	9 (2)
Public authorities	2	2	1	1	1	1	1
Consortium structure	–	–	2	2	1	1	1
Limited partnerships	–	–	–	–	–	–	–
Co-operative companies	–	–	–	–	–	–	–
Total	**81**	**75**	**72**	**67**	**65**	**61**	**59**

Source : CBFA.
(1) Of which 2 are owned by a French bank.
(2) Of which 3 are owned by a French bank.

TABLE 3 KEY FIGURES FOR THE BELGIAN BANKING SECTOR (1)

(Data on a consolidated basis)

	1998	1999	2000	2001	2002	2003	2004
A. Large banking groups							
Balance sheet total (billions of euro)	699.1	797.9	840.6	940.7	907.5	913.2	1,010.7
Customers' holdings (billions of euro)	380.5	415.2	440.5	477.0	465.4	453.9	482.1
Loans and advances to customers (billions of euro)	267.4	306.7	352.4	374.8	381.2	384.9	433.2
Off-balance-sheet forward operations (billions of euro)	1,870.9	2,377.3	2,451.7	3,113.6	3,639.3	4,484.4	6,003.7
Assets and deposits in trust (billions of euro)	586.2	647.7	927.6	961.7	932.7	739.0	838.8
Risk asset ratio (p.c.)	11.1	11.8	11.7	12.7	12.8	12.4	12.6
Net after tax results (billions of euro)	2.0	3.2	4.7	3.4	2.9	3.6	4.6
Return on average assets (p.c.)	0.3	0.5	0.6	0.4	0.4	0.4	0.5
Return on average equity (p.c.)	11.7	18.7	22.7	15.0	12.6	14.2	17.3
Cost-income ratio (p.c.)	64.5	69.3	71.5	72.9	73.2	72.8	70.6
Average yield on assets (p.c.)	5.6	5.7	5.9	5.8	5.0	4.0	4.0
Average cost of funding (p.c.)	4.3	4.3	4.7	4.5	3.5	2.6	2.6
Interest margin (p.c.)	1.3	1.4	1.3	1.4	1.5	1.4	1.3
B. Total of Belgian credit institutions							
Balance sheet total (billions of euro)	854.6	926.7	971.3	1,063.7	1,024.6	1,033.0	1,143.2
Customers' holdings (billions of euro)	444.2	477.4	504.2	545.0	535.3	531.9	570.1
Loans and advances to customers (billions of euro)	303.8	342.9	392.7	416.3	421.3	428.8	482.9
Off-balance-sheet forward operations (billions of euro)	2,116.3	2,507.2	2,611.5	3,237.5	4,297.7	4,625.7	6,121.5
Assets and deposits in trust (billions of euro)	3,063.3	4,197.2	5,429.7	9,478.0	12,020.3	12,881.5	14,310.0
Risk asset ratio (p.c.) (2)	11.3	11.9	11.9	12.9	13.1	12.8	13.0
Net after tax results (billions of euro)	2.6	3.7	5.5	3.8	3.2	4.0	5.2
Return on average assets (p.c.)	0.3	0.4	0.6	0.4	0.4	0.4	0.5
Return on average equity (p.c.) (2)	11.0	17.1	20.4	13.7	11.8	13.6	15.8
Cost-income ratio (p.c.)	65.8	69.9	72.2	74.1	74.7	73.9	72.0
Average yield on assets (p.c.)	5.6	5.6	5.9	5.8	4.9	4.0	3.9
Average cost of funding (p.c.)	4.4	4.2	4.6	4.4	3.4	2.6	2.6
Interest margin (p.c.)	1.3	1.4	1.3	1.4	1.5	1.4	1.3

Source : CBFA.

(1) Credit institutions governed by Belgian law and branches of foreign credit institutions.

(2) Only for credit institutions governed by Belgian law.

TABLE 4 MAIN BALANCE-SHEET ITEMS OF BELGIAN CREDIT INSTITUTIONS[1]

(Data on a consolidated basis, billions of euro)

	1998	1999	2000	2001	2002	2003	2004
Assets							
Interbank assets	232.6	222.5	198.4	219.9	214.8	206.1	212.6
Loans and advances to customers	303.8	342.9	392.7	416.3	421.3	428.8	482.9
Securities and other negotiable instruments	264.6	294.9	296.5	316.9	291.6	301.0	323.1
Fixed assets	12.0	14.1	15.8	18.8	18.2	17.5	18.9
Other	41.7	52.4	68.0	91.8	78.6	79.7	105.7
Liabilities							
Interbank liabilities	289.6	304.9	286.8	284.8	254.9	257.3	281.6
Customers' holdings	444.2	477.4	504.2	545.0	535.3	531.9	570.1
– deposits	327.1	350.7	369.0	411.8	406.6	416.7	456.1
– bank bonds and other debt securities	117.1	126.7	135.3	133.2	128.8	115.2	113.9
Subordinated debts	16.8	20.4	24.0	27.5	25.8	23.9	23.7
Own funds	22.7	23.1	26.9	28.9	30.5	32.2	35.0
Other	81.4	100.9	129.4	177.5	178.0	187.7	232.9
Balance sheet total	**854.6**	**926.7**	**971.3**	**1,063.7**	**1,024.6**	**1,033.0**	**1,143.2**

Source : CBFA.

(1) Credit institutions governed by Belgian law and branches of foreign credit institutions.

TABLE 5 BELGIAN CREDIT INSTITUTIONS' LIABILITIES TOWARDS DOMESTIC CUSTOMERS[1]

(Data on a consolidated basis, billions of euro)

	1998	1999	2000	2001	2002	2003	2004
Liabilities with an original maturity of more than one year							
Term deposits	9.5	10.3	10.5	11.2	10.5	11.4	13.5
Bank bonds	65.4	60.0	57.5	53.0	51.9	44.3	38.8
Other customers' holdings[2]	8.8	8.7	5.6	5.2	4.8	6.4	4.5
Sub-total	*83.6*	*79.0*	*73.5*	*69.4*	*67.3*	*62.1*	*56.8*
Liabilities with an original maturity of up to one year							
Savings deposits	93.7	98.4	92.5	98.5	110.5	129.0	146.9
Sight deposits	48.0	52.9	57.0	60.1	61.9	68.0	77.5
Deposits with a term							
of up to one month	20.6	20.1	18.2	21.9	22.5	19.8	19.8
of more than one month up to one year	24.8	28.8	30.4	33.3	29.8	28.1	28.5
Bank bonds with a term of one year	1.6	1.5	1.5	1.9	1.0	0.7	0.4
Other customers' holdings[2]	5.6	8.2	10.6	7.8	8.1	9.7	8.4
Sub-total	*194.2*	*209.9*	*210.3*	*223.6*	*233.9*	*255.3*	*281.5*
Total liabilities collected in Belgium	**277.9**	**288.8**	**283.8**	**293.0**	**301.2**	**317.4**	**338.3**

Source : CBFA.

(1) Credit institutions governed by Belgian law and branches of foreign credit institutions.

(2) Other customers' holdings include inter alia debt securities and certificates of deposit, special accounts, deposits related to mortgage loans and the deposit protection scheme.

TABLE 6 BELGIAN CREDIT INSTITUTIONS' LOANS AND ADVANCES TO CUSTOMERS[1]

(Data on a consolidated basis, billions of euro)

	1998	1999	2000	2001	2002	2003	2004
Installment loans	12.0	13.4	13.7	13.9	14.3	13.5	12.7
Mortgage loans[2]	63.1	74.4	79.5	85.0	93.6	117.4	132.0
Term loans	162.7	182.4	209.7	233.0	242.2	230.1	258.3
Current account advances	32.4	35.7	40.6	36.4	34.0	29.6	31.3
Trade bills and acceptance credits	27.8	29.2	38.2	34.5	26.5	24.8	38.3
Other	5.8	7.9	11.0	13.5	10.7	13.4	10.3
Total	**303.8**	**342.9**	**392.7**	**416.3**	**421.3**	**428.8**	**482.9**
of which on Belgium	**192.6**	**209.1**	**218.0**	**220.5**	**219.3**	**224.3**	**234.2**
of which on foreign countries	**111.2**	**133.7**	**174.7**	**195.8**	**201.9**	**204.5**	**248.7**

Source : CBFA.

(1) Credit institutions governed by Belgian law and branches of foreign credit institutions.

(2) After deduction of deposits related to mortgage loans.

TABLE 7 STRUCTURE OF THE SECURITIES PORTFOLIO OF BELGIAN CREDIT INSTITUTIONS[1]

(Data on a consolidated basis, billions of euro)

	1998	1999	2000	2001	2002	2003	2004
Total investment portfolio	**243**	**268**	**254**	**265**	**239**	**237**	**243**
Government securities portfolio	*168*	*175*	*154*	*168*	*149*	*156*	*154*
Long-term Belgian government securities	111	101	86	76	67	64	59
Short-term Belgian government securities	20	11	7	7	8	4	1
Long-term foreign government securities	34	48	54	79	72	86	93
Short-term foreign government securities	2	15	7	6	3	2	2
Securities of credit institutions	*29*	*43*	*44*	*41*	*34*	*34*	*40*
Securities of other companies	*42*	*45*	*49*	*50*	*50*	*43*	*46*
Non-interest-bearing securities	*4*	*5*	*6*	*6*	*5*	*3*	*3*
Total trading portfolio	**22**	**27**	**43**	**52**	**52**	**64**	**79**
Government securities portfolio	*13*	*16*	*21*	*23*	*23*	*23*	*28*
Long-term Belgian government securities	6	5	5	4	5	5	6
Short-term Belgian government securities	2	4	5	4	3	3	3
Long-term foreign government securities	4	6	11	14	11	12	15
Short-term foreign government securities	0	0	1	2	3	2	3
Securities of credit institutions	*2*	*2*	*2*	*6*	*8*	*11*	*9*
Securities of other companies	*3*	*4*	*8*	*10*	*13*	*14*	*14*
Non-interest-bearing securities	*3*	*6*	*11*	*12*	*8*	*15*	*28*
Total portfolio	**265**	**295**	**296**	**317**	**291**	**301**	**322**

Source : CBFA.

(1) Credit institutions governed by Belgian law and branches of foreign credit institutions.

TABLE 8 BREAKDOWN OF OFF-BALANCE-SHEET FORWARD OPERATIONS OF BELGIAN CREDIT INSTITUTIONS[1]

(Data on a consolidated basis, billions of euro)

	1998	1999	2000	2001	2002	2003	2004
Foreign exchange							
Forward exchange operations	536	328	268	266	297	311	360
Currency futures	1	1	1	1	0	0	0
Forward exchange rate contracts	12	0	0	3	6	9	2
Interest and currency swaps	46	47	51	57	61	58	63
Currency options	31	26	38	41	69	91	79
Sub-total	*626*	*402*	*358*	*368*	*432*	*468*	*503*
Interest rates							
Interest rate contracts	170	230	134	131	268	194	170
Interest rate futures	71	76	52	74	86	82	91
Deposit contracts	5	2	3	5	1	5	4
Interest rate swaps	1,010	1,525	1,507	1,880	2,528	2,742	4,171
Interest rate options	120	174	375	550	743	889	983
Sub-total	*1,376*	*2,006*	*2,071*	*2,640*	*3,627*	*3,912*	*5,419*
Others							
Other forward contracts, futures and swaps	55	25	25	29	23	22	25
Other options	60	73	157	200	215	223	174
Sub-total	*114*	*98*	*181*	*229*	*238*	*245*	*199*
Total	**2,116**	**2,507**	**2,611**	**3,237**	**4,297**	**4,625**	**6,121**

Source : CBFA.

(1) Credit institutions governed by Belgian law and branches of foreign credit institutions.

TABLE 9 OWN FUNDS COMPONENTS OF CREDIT INSTITUTIONS GOVERNED BY BELGIAN LAW

(Data on a consolidated basis, billions of euro, unless otherwise stated)

	1998	1999	2000	2001	2002	2003	2004
Own funds sensu stricto ("tier 1 capital") (1)	25.7	28.6	30.6	33.2	34.2	34.3	37.9
of which hybrid instruments	0.0	1.7	1.7	2.8	2.7	2.4	3.1
Additional items of own funds for credit and market risks ("tier 2 capital")	13.7	18.1	20.8	22.3	20.5	18.4	17.5
of which upper tier 2 (2)	3.7	6.3	7.0	7.2	5.9	5.4	5.0
of which lower tier 2 (3)	10.0	11.9	13.9	15.1	14.6	12.9	12.5
Deduction of participations	–1.6	–2.7	–3.8	–3.9	–3.7	–3.9	–4.2
Total	*37.9*	*44.0*	*47.7*	*51.6*	*50.9*	*48.8*	*51.2*
Additional items of own funds for market risks only ("tier 3 capital") (4)	1.0	1.0	1.6	2.6	1.9	2.1	2.1
Risk asset ratio (p.c.)	**11.3**	**11.9**	**11.9**	**12.9**	**13.1**	**12.8**	**13.0**

Source : CBFA.

(1) Includes i.a. paid-up capital, reserves, the fund for general banking risks and third-party interests. Positive consolidation differences have to be deducted.

(2) Includes the revaluation reserves, the internal security fund, the perpetuals and other instruments with a subordinated nature and for which the principal or interest payments may be suspended in case of losses.

(3) Includes long-term subordinated debts (minimum initial maturity of 5 years).

(4) Includes the trading portfolios' net result and short term subordinated debts, after application of the regulatory limitations.

TABLE 10 COMPONENTS OF THE INCOME STATEMENT OF BELGIAN CREDIT INSTITUTIONS [1]

(Data on a consolidated basis, billions of euro)

	1998	1999	2000	2001	2002	2003	2004
Net interest income	10.31	11.40	11.73	12.26	12.67	12.17	12.80
Investment income other than net interest income [2]	3.50	2.97	3.30	3.52	2.73	2.44	2.39
Other income [3]	5.58	7.73	10.44	10.01	9.19	8.23	8.99
Banking income	19.39	22.10	25.47	25.79	24.59	22.84	24.18
Operating expenses (–) [4]	12.76	15.46	18.38	19.09	18.36	16.89	17.41
(of which personnel expenses)	(5.95)	(6.88)	(7.68)	(8.17)	(8.13)	(7.68)	(7.79)
Gross operating results	6.63	6.64	7.09	6.70	6.24	5.95	6.77
Value adjustments (–)	2.29	1.67	1.51	1.57	2.17	1.49	0.46
Exceptional results	–0.18	0.06	1.97	0.15	0.54	0.49	0.11
Income taxes and transfers (–)	1.43	1.24	1.98	1.47	1.07	1.12	1.56
Portion of the result of undertakings included in the consolidated accounts according to the equity method	0.05	0.19	0.38	0.34	0.01	0.32	0.54
Third-party interest in the result of consolidated subsidiaries (–)	0.22	0.30	0.40	0.38	0.35	0.16	0.22
Consolidated results [5]	**2.56**	**3.68**	**5.55**	**3.77**	**3.19**	**3.98**	**5.19**

Source : CBFA.

(1) Credit institutions governed by Belgian law and branches of foreign credit institutions.

(2) Income from equities and other variable-interest securities, income from financial fixed assets, result on the realisation of securities and investment instruments and net profits or losses on trading and foreign exchange operations.

(3) Fee income and other operating income.

(4) Including depreciation / amortisation on intangible and tangible fixed assets.

(5) Group share.

TABLE 11 NUMBER OF BELGIAN INSURANCE COMPANIES

	1998	1999	2000	2001	2002	2003	2004
A. By the location of their registered office							
Belgium (1)	150	137	130	125	123	118	118
European Economic Area (2)	77	79	73	71	73	66	60
Rest of the world (3)	7	6	6	6	6	5	3
Total	**234**	**222**	**209**	**202**	**202**	**189**	**181**
Free service provision (4)	525	556	589	613	629	670	681
B. By specialisation (5)							
Life insurance	34	31	29	28	30	31	31
Non-life insurance	160	154	145	140	140	127	122
Life and non-life insurance	40	37	35	34	32	31	28
Total	**234**	**222**	**209**	**202**	**202**	**189**	**181**

Source : CBFA.
(1) Companies with their registered office in Belgium comprise the Belgian subsidiaries of foreign companies.
(2) Belgian branches of companies with their registered office in another E.E.A. country.
(3) Belgian branches of companies with their registered office outside the E.E.A.
(4) Provision of insurance services without an establishment in Belgium.
(5) Including the Belgian branches of foreign insurance companies.

TABLE 12 MAIN COMPONENTS OF BELGIAN INSURANCE COMPANIES' ASSETS[1]

(Data on a company basis, billions of euro)

	1998	1999	2000	2001	2002	2003
Investments	75.0	86.0	94.9	104.1	110.3	126.1
All activities with the exception of class 23	*71.8*	*77.5*	*81.7*	*87.6*	*94.6*	*108.8*
Shares[2]	11.8	13.9	15.7	18.1	15.8	13.9
Debt securities	43.1	48.8	51.1	53.9	58.9	72.9
Land and buildings	2.3	2.0	1.9	2.0	2.4	2.4
Mortgage loans	5.3	5.0	5.0	5.3	5.9	5.7
Investments in affiliated undertakings	6.5	4.8	4.9	5.1	7.4	8.0
Others	2.8	2.9	3.1	3.2	4.2	5.8
Class 23	*3.2*	*8.5*	*13.2*	*16.4*	*15.8*	*17.3*
Shares[2]	2.3	7.5	11.9	14.5	13.1	13.4
Debt securities	0.6	0.6	1.0	1.5	2.1	2.6
Others	0.3	0.4	0.3	0.4	0.6	1.3
Reinsured part of technical provisions	4.1	4.5	4.8	5.7	6.0	6.2
Claims and other assets	7.5	8.3	8.6	9.0	9.8	11.1
Total	**86.6**	**98.8**	**108.3**	**118.7**	**126.1**	**143.3**

Source : CBFA.

(1) Insurance companies supervised by the CBFA.

(2) Including shares in UCITS.

TABLE 13 MAIN COMPONENTS OF BELGIAN INSURANCE COMPANIES' LIABILITIES (1)

(Data on a company basis, billions of euro)

	1998	1999	2000	2001	2002	2003
Own funds	8.5	7.5	8.1	8.6	7.9	8.8
Technical provisions	69.1	81.5	89.9	99.9	107.8	122.6
Life insurance (with the exception of class 23)	44.7	50.3	52.5	57.0	64.8	77.1
Class 23	3.2	8.5	13.2	16.6	16.0	17.5
Non-life insurance	17.4	18.7	20.1	21.7	22.4	23.1
Others	3.8	3.9	4.1	4.5	4.6	5.0
Reinsurance companies' deposits	2.1	2.0	2.0	2.3	2.3	2.4
Creditors' claims	5.7	6.3	6.9	6.7	6.9	8.2
Other liabilities	1.2	1.5	1.4	1.2	1.2	1.3
Total	**86.6**	**98.8**	**108.3**	**118.7**	**126.1**	**143.3**

Source : CBFA.

(1) Insurance companies supervised by the CBFA.

TABLE 14 COMPONENTS OF THE INCOME STATEMENT OF BELGIAN INSURANCE COMPANIES[1]

(Data on a company basis, billions of euro, unless otherwise stated)

	1998	1999	2000	2001	2002	2003
A. Technical account in life insurance						
Net premiums written	8.2	10.0	12.8	13.1	14.4	17.7
Claims paid (–)	3.8	4.3	4.8	5.4	6.9	7.9
Change in the provisions for claims (–)	7.2	8.3	9.1	7.8	6.4	12.9
Premiums after insurance costs	**–2.8**	**–2.7**	**–1.1**	**–0.1**	**1.2**	**–3.1**
Net operating expenses (–)	0.9	1.0	1.0	1.1	1.1	1.2
Result before investment income	**–3.6**	**–3.7**	**–2.2**	**–1.2**	**0.0**	**–4.3**
Net investment income	4.7	4.8	3.2	2.0	–0.3	4.8
Technical result life insurance	**1.1**	**1.2**	**1.0**	**0.8**	**–0.2**	**0.5**
B. Technical account in non-life insurance						
Net premiums written	6.7	7.0	7.3	7.8	8.5	9.1
Claims paid (–)	4.6	5.0	5.3	5.8	5.9	5.7
Change in the provisions for claims (–)	0.7	0.7	0.6	0.9	0.9	0.8
Premiums after insurance costs	**1.4**	**1.3**	**1.4**	**1.2**	**1.7**	**2.6**
Net operating expenses (–)	2.3	2.4	2.3	2.5	2.7	2.8
Result before investment income	**–0.9**	**–1.1**	**–0.9**	**–1.4**	**–1.0**	**–0.2**
Net investment income	1.7	1.9	1.5	1.4	0.7	1.0
Technical result non-life insurance	**0.9**	**0.8**	**0.6**	**0.0**	**–0.3**	**0.8**
C. Non-technical account						
Total technical result life and non-life insurance	2.0	2.0	1.6	0.8	–0.5	1.3
Residual net investment income	1.8	0.6	0.5	0.6	0.1	–0.2
Other and exceptional results and taxes	–0.9	–0.5	–0.3	–0.4	–0.4	–0.4
Net result	**2.9**	**2.0**	**1.7**	**1.0**	**–0.8**	**0.6**
p.m. Return on equity (in p.c.)	*34.2*	*26.9*	*21.5*	*12.1*	*–10.4*	*7.3*

Source : CBFA.

(1) Insurance companies supervised by the CBFA.

TABLE 15 LEVEL AND COMPOSITION OF BELGIAN INSURANCE COMPANIES' AVAILABLE SOLVENCY MARGIN[1]

(Data on a company basis, millions of euro, unless otherwise stated)

	1998	1999	2000	2001	2002	2003	2004
Explicit margin	8,361	7,717	7,953	8,555	8,238	9,467	11,324
p.c. of required margin	*242*	*200*	*194*	*197*	*173*	*179*	*199*
Implicit margin	2,664	2,585	2,894	3,454	3,853	3,634	4,674
Future profits of life insurance activities	933	1,423	1,667	1,968	1,855	1,874	1,104
Unrealised capital gains	1,731	1,162	1,227	1,486	1,998	1,761	3,570
p.c. of required margin	*77*	*67*	*71*	*79*	*81*	*69*	*82*
Total margin	11,025	10,302	10,847	12,008	12,091	13,101	15,999
p.c. of required margin	*319*	*267*	*265*	*276*	*254*	*248*	*281*

Source : CBFA.

(1) Insurance companies supervised by the CBFA.

TABLE 16 COMPOSITION OF BELGIAN INSURANCE COMPANIES' COVERING ASSETS FOR ALL TYPES OF ACTIVITIES[1] [2]

(Data on a company basis, percentages of total covering assets, unless otherwise stated)

	1998	1999	2000	2001	2002	2003	2004
Bonds	52.5	49.9	48.4	48.1	50.0	52.7	55.8
Equities	25.0	27.3	25.8	24.1	14.6	12.9	12.7
Real estate	4.3	3.3	3.0	2.8	3.1	2.8	2.4
Loans	7.1	5.7	5.6	5.6	5.6	4.7	3.6
UCITS	1.5	4.5	8.0	10.2	15.6	15.6	15.1
Others	9.7	9.3	9.2	9.3	11.1	11.3	10.3
Total (billions of euro)	**70.0**	**83.7**	**87.9**	**98.0**	**110.5**	**127.6**	**147.3**

Source : CBFA.

(1) Assets allocated to a specific insurance activity as a cover for the liabilities resulting from that activity. Covering assets are valued at "affection value", which corresponds to the market value for most assets, but is related to the historical cost for bonds emitted by government bodies.

(2) Insurance companies supervised by the CBFA.

TABLE 17 KEY FIGURES OF STOCKBROKING FIRMS

(Data on a company basis)

	1998	1999	2000	2001	2002	2003	2004
Number of companies	52	49	46	43	40	37	36
of which with a majority of institutional shareholders	9	10	12	11	12	10	10
Securities portfolio for own account (billions of euro) (1) (3)	1.21	7.61	7.71	10.95	12.00	18.60	1.89
– equity	0.65	1.91	2.47	1.96	1.67	3.42	0.13
– debt securities	0.40	0.28	0.46	1.55	1.80	1.79	0.38
– other financial instruments (2)	0.16	5.42	4.78	7.44	8.53	13.39	1.38
Balance sheet total (billions of euro) (3)	2.73	6.59	6.94	9.71	9.88	15.48	3.11
Deposits in trust (billions of euro) (4)	0.82	0.99	1.16	1.17	0.90	0.71	0.94
Securities in trust (billions of euro)	10.00	15.53	16.15	20.70	19.73	32.79	28.40
Regulatory own funds (billions of euro)	0.17	0.34	0.45	0.38	0.33	0.23	0.26
Risk asset ratio (p.c.)	24.3	20.8	31.4	22.0	17.7	16.2	36.0
Income (billions of euro) (3)	0.33	0.50	0.50	0.28	0.34	0.31	0.19
– fees and commissions	0.18	0.18	0.23	0.12	0.10	0.09	0.12
– on trading for own account	0.09	0.26	0.23	0.11	0.19	0.15	–0.01
Operating expenses (billions of euro) (3)	0.19	0.21	0.27	0.29	0.35	0.32	0.18
Net after tax results (billions of euro) (3)	0.12	0.28	0.23	0.02	0.00	0.02	0.05
Return on average equity (p.c.) (5)	60.8	58.6	31.8	2.9	0.6	2.7	11.9

Source : CBFA.

(1) The securities portfolio consists of the long positions (financial instruments held by stockbroking firms for their own account, with the exclusion of participations) and the short positions (uncovered sales of financial instruments).

(2) Mainly composed of options.

(3) Figures from the quarterly financial statements in which positions are marked to market.

(4) Funds (cash) held by stockbroking firms for their customers' account must be deposited on a global or individualised customer account opened with an authorised institution, in accordance with the regulations on segregation of customers' funds.

(5) Ratio of the net result after taxes to the accounting own funds. The latter have been established on the basis of the quarterly financial statements and are composed of the capital, share premiums, capital gains, reserves, results brought forward, and subordinated debt.

TABLE 18 KEY FIGURES OF PORTFOLIO MANAGEMENT COMPANIES

(Data on a company basis)

	1998	1999	2000	2001	2002	2003	2004
Number of companies	23	27	31	34	33	30	30
of which with a majority of institutional shareholders	8	10	13	17	16	15	14
Assets under management (billions of euro)	58.36	99.64	174.09	144.19	135.63	183.27	191.70
Balance sheet total (billions of euro)	0.08	0.37	0.66	0.67	0.77	1.08	1.21
Own funds (billions of euro)	0.03	0.25	0.40	0.42	0.43	0.65	0.70
Income (billions of euro)	0.07	0.20	0.50	0.55	0.58	0.77	0.88
Operating expenses (billions of euro)	0.04	0.11	0.33	0.37	0.27	0.48	0.54
Net after tax results (billions of euro)	0.02	0.05	0.12	0.13	0.22	0.21	0.26
Return on average equity (p.c.)	79.1	21.5	30.0	31.5	50.2	32.9	37.8

Source : CBFA.

TABLE 19 GROSS PUBLIC ISSUES OF SECURITIES IN BELGIUM

(Billions of euro)

	1998	1999	2000	2001	2002	2003	2004
1. Shares							
Belgian companies	1.05	2.01	7.03	0.19	0.35	0.35	3.56
Foreign companies	0.10	0.17	0.78	0.06	0.12	0.03	0.09
Total	*1.15*	*2.18*	*7.81*	*0.25*	*0.47*	*0.38*	*3.65*
2. Fixed income securities							
2.1 Bonds	*1.66*	*2.49*	*0.18*	*0.06*	*0.38*	*1.23*	*5.52*
Belgian companies	0.66	0.28	0.11	0.00	0.01	0.05	0.23
Foreign companies	1.00	2.21	0.07	0.06	0.37	1.18	5.29
2.2 Fixed income securities with capital at risk (1)	*n.a.*	*n.a.*	*3.19*	*1.34*	*1.50*	*0.34*	*0.27*
Belgian companies	n.a.	n.a.	0.14	0.11	0.00	0.00	0.00
Foreign companies	n.a.	n.a.	3.06	1.23	1.50	0.34	0.27
2.3 Total	*1.66*	*2.49*	*3.37*	*1.40*	*1.88*	*1.57*	*5.78*
3. Subordinated debt issued by credit institutions	**0.57**	**2.20**	**1.79**	**1.16**	**0.05**	**0.66**	**0.96**
4. Government debt							
4.1 Linear bonds (OLOs)	23.30	28.30	32.10	26.00	26.10	23.28	22.36
4.2 Other bonds and notes	1.59	1.05	1.22	1.04	1.30	1.28	0.88
4.3 Treasury certificates (2)	–5.83	–6.81	–3.48	1.38	0.06	–0.84	–0.14

Sources : Belgian Debt Agency, CBFA, NBB.

(1) Mainly reverse convertible bonds, being interest-bearing financial securities that give the choice, at maturity, of returning the invested capital by making a payment in cash (at face value) or by transferring the corporate security (or a number of corporate securities) specified in the contract. The attractive investment yield of these financial securities is the premium for the put option that the investor writes on a corporate security.

(2) Net issues.

TABLE 20 BELGIAN UNDERTAKINGS FOR COLLECTIVE INVESTMENT

	1998	1999	2000	2001	2002	2003	2004
A. Number per legal form (end of period)							
Investment companies	90	96	103	108	108	105	108
Number of compartments	*1,139*	*1,499*	*1,851*	*1,951*	*1,987*	*1,252* (5)	*1,365*
Investment funds	12	12	14	16	16	16	18
Pension savings funds (1)	12	12	11	10	10	11	12
Real estate UCITS (2)	8	13	13	12	11	11	11
Undertakings for investment in receivables (3)	9	9	9	9	10	10	9
Venture capital UCITS (4)	1	1	1	2	2	2	2
Total	**132**	**143**	**151**	**157**	**157**	**155**	**160**
B. Assets (billions of euro)							
1. Net asset value end of preceding year	33.13	51.80	70.34	83.51	88.32	78.26	85.05
2. Subscriptions	19.92	24.28	33.65	26.43	18.31	20.32	23.15
3. Redemptions	8.45	11.34	16.58	14.53	14.87	16.86	17.58
4. Net amounts invested (4 = 2 – 3)	**11.47**	**12.94**	**17.08**	**11.90**	**3.44**	**3.47**	**5.57**
5. Costs	0.55	0.73	1.08	1.06	0.99	0.99	1.14
6. Capital gains or losses	7.76	6.32	–2.82	–6.03	–12.51	4.31	5.86
7. Net asset value end of period (7 = 1 + 4 – 5 + 6)	**51.80**	**70.34**	**83.51**	**88.32**	**78.26**	**85.05**	**95.34**

Source : CBFA.

(1) Pension savings funds, authorised by application of the Royal Decree of 22 December 1986.

(2) Investment companies investing in real estate, authorised by application of the Royal Decree of 10 April 1995.

(3) Undertakings for investment in receivables, authorised by application of the Royal Decree of 29 November 1993.

(4) Investment companies investing in unlisted companies and in growth companies, authorised by application of the Royal Decree of 18 April 1997.

(5) Since 2003, this series no longer covers the legally existing, but not commercialised compartments. This explains the sharp drop between 2002 and 2003.

TABLE 21 FOREIGN UNDERTAKINGS FOR COLLECTIVE INVESTMENT DISTRIBUTED IN BELGIUM

	1998	1999	2000	2001	2002	2003	2004
A. Number of undertakings (end of period)							
Per legal form							
Investment companies	177	178	188	198	194	197	184
Number of compartments	*1,487*	*1,721*	*1,901*	*2,029*	*2,036*	*2,067*	*2,030*
Investment funds	73	79	76	76	70	70	61
Total	**250**	**257**	**264**	**274**	**264**	**267**	**245**
Per category							
Undertakings with UCITS-passport	206	219	227	239	230	218	206
Number of compartments	*1,282*	*1,530*	*1,732*	*1,880*	*1,891*	*1,925*	*1,918*
Undertakings without UCITS-passport	44	38	37	35	34	49	39
Number of compartments	*205*	*191*	*169*	*149*	*145*	*142*	*112*
Total	**250**	**257**	**264**	**274**	**264**	**267**	**245**
B. Net amounts invested (billions of euro)							
Subscriptions in Belgium							
Investment companies	10.69	12.95	14.47	11.08	12.08	12.14	11.21
Investment funds	0.11	0.19	0.12	0.05	0.32	0.03	1.02
Total	**10.80**	**13.14**	**14.59**	**11.13**	**12.39**	**12.17**	**12.23**
Redemptions in Belgium							
Investment companies	9.15	9.66	15.35	11.26	11.41	11.89	11.98
Investment funds	0.09	0.11	0.10	0.04	0.17	0.05	0.13
Total	**9.24**	**9.78**	**15.45**	**11.30**	**11.58**	**11.94**	**12.11**
Net amounts invested in Belgium							
Investment companies	1.54	3.29	–0.88	–0.18	0.67	0.26	–0.77
Investment funds	0.02	0.07	0.01	0.01	0.14	–0.02	0.89
Total	**1.56**	**3.36**	**–0.86**	**–0.17**	**0.81**	**0.24**	**0.12**

Source : CBFA.

TABLE 22 BREAKDOWN OF UNDERTAKINGS FOR COLLECTIVE INVESTMENT DISTRIBUTED IN BELGIUM ACCORDING TO INVESTMENT STRATEGY

(Billions of euro)

	1998	1999	2000	2001	2002	2003	2004
Bond funds	30.63	30.25	29.88	32.83	31.22	31.73	35.33
Medium-term funds	1.41	1.34	1.04	1.44	1.75	1.89	1.83
Money market funds	4.86	4.56	3.80	5.03	6.29	5.71	6.16
Equity funds	18.55	31.98	40.26	37.36	24.71	26.72	27.86
Funds with capital protection	19.77	27.01	27.63	29.20	31.77	35.90	41.40
Balanced funds	12.30	17.76	24.65	27.00	21.95	22.85	23.42
Pension-savings funds	7.98	7.95	7.68	7.41	6.40	7.42	8.69
Real estate funds	2.35	3.14	3.05	3.27	3.39	3.85	4.42
Private equity funds	0.06	0.05	0.13	0.13	0.07	0.08	0.09
Miscellaneous	0.03	0.04	0.10	0.03	0.02	0.02	0.10
Total	97.94	124.08	138.22	143.70	127.57	136.17	149.28

Source : BEAMA.

Resilience of Financial Infrastructure

Cooperative oversight of Euroclear and SWIFT

1. General principles for the cooperative oversight of cross-border infrastructures

Financial markets are underpinned by a variety of infrastructures providing facilities for the settlement of transactions. For financial markets to perform efficiently, it is of paramount importance that this settlement infrastructure functions smoothly. Central banks have long recognised this, and have declared the safety and efficiency of payment and settlement systems to be one of their major public policy objectives [1].

The central banks' interest in the smooth functioning of the payment and settlement infrastructures derives from their responsibilities relating to the effective implementation of monetary policy, as well as from their broader concern with the security and the stability of the financial system in general. A stable and efficient financial system in which the systemic risk is kept to a minimum naturally assists a central bank in achieving the timely and transparent implementation of monetary policy. Furthermore, as lender of last resort for credit institutions, a central bank is directly involved once a systemic risk threatens to materialise, since it will be called upon to provide liquidity in crisis situations.

Over the last decade, this central bank interest in the smooth functioning of payment and settlement systems has crystallised in the development of a more distinct central bank activity, called oversight of payment and settlement systems. Oversight of payment and settlement systems can be defined as the activity of monitoring existing and planned systems, in order to assess them against the central banks' standards (which reflect safety and efficiency objectives), with the aim of enforcing changes when necessary. Central banks have, over the last few years, devoted considerable efforts to setting up standards for overseeing systems: besides the already mentioned Core Principles for Systemically Important Payment Systems, the CPSS has cooperated to produce the Recommendations for Securities Settlement Systems (in 2001) and Recommendations for Central Counterparties (in 2004). The focus of the central banking community is now gradually shifting to issues related to the implementation and enforcement of these standards.

As financial markets have become increasingly international, the number of infrastructures with a cross-border dimension has increased in recent years. The international payment and settlement infrastructures can be divided into various types:

- some infrastructures have specifically been set up to serve cross-border, international markets. The best examples here are SWIFT and CLS, which from the outset were industry initiatives meant to underpin international banking activities (messaging services for correspondent banking, and payment versus payment settlement of foreign exchange transactions respectively);
- in some cases, the domestic infrastructures of different countries were merged into a new cross-border infrastructure. Examples here are Clearnet and Euroclear. Clearnet is the result of the merger of the Central Counterparties (CCP) of the French, Dutch and Belgian stock exchanges. It is a credit institution incorporated in France, which acts as CCP for the Euronext markets. In 2004, it merged with London Clearing House, the UK CCP, by bringing both CCPs under one holding company. Euroclear, an International Central Securities

(1) See for instance Committee on Payment and Settlement Systems (CPSS), Core principles for Systemically Important Payment Systems, 2001, where these public policy objectives were reaffirmed.

Depository (ICSD), established in Belgium, has merged with the Central Securities Depositories (CSDs) of France, the Netherlands, and the UK, in order to provide an integrated settlement solution for these securities markets;
– some infrastructures have developed functional links with similar infrastructures in other countries, in order to enable their users to access the other infrastructures as well. Typically, this has happened in securities settlement infrastructures, where many CSDs have developed links with each other. Also, ICSDs such as Euroclear and Clearstream have established links with a range of CSDs, in order to enable the ICSD's participants to settle the securities registered in these linked CSDs.

When a payment and settlement infrastructure provides services in more than one jurisdiction or handles several currencies, consultation and cooperation among all the relevant central banks is essential to avoid both conflicting requirements and regulatory/oversight gaps or duplications. Such cooperation is essential to support a coherent and comprehensive approach aiming at enhancing the overall reliability of the assessment process by involving all the central banks having a direct interest in, and legal responsibilities for, the proper functioning of the payment and settlement infrastructures delivering services in their markets or handling their currency.

The need for cooperation amongst central banks in overseeing cross-border systems has already been recognised in the 1990 *Report of the Committee on interbank netting schemes of the central banks of the Group of Ten countries* (Lamfalussy Report). This report contains principles for cooperative oversight designed to "provide a mechanism for mutual assistance for central banks in pursuit of their shared objectives for the efficiency and stability of interbank and settlement arrangements". Although initially set up to cover specifically cross-border multi-currency netting schemes, these principles, as listed in Box 1, have developed into a general benchmark for international cooperation between overseers, regardless of the type of system. They centre on:
– the delegation to, and the acceptance by, one central bank of primary responsibility for the oversight of a system, the presumption being that the central bank of the country where the system is established[1] will bear this primary responsibility;
– consultation with other interested central banks by the central bank with primary responsibility on matters concerning the design and operation of the system as a whole;
– special arrangements in crisis situations.

According to these principles, the assessment would be conducted by the overseer with the primary responsibility in close cooperation with the other interested authorities. The overseer having primary responsibility would act as the single entry point to the system, thereby centralising the information requests from other authorities, and would play a leading role in the joint assessment process and in the effective implementation of the recommendations that are addressed to the system as the result of this assessment.

(1) In terms of incorporation, management and operation.

Box 1 – Lamfalussy principles[1]

The following principles for the oversight of cross-border and multi-currency netting and settlement systems specify procedures which the Committee recommends for use by central banks in cooperating with one another and with other authorities.

1. Each central bank that has identified the actual or proposed operation of a cross-border or multi-currency netting or settlement system, outside of the country of issue of the relevant currency or currencies, should inform other central banks that may have an interest in the prudent design and management of the system.

2. Cross-border and multi-currency netting and settlement systems should be subject to oversight by a central bank which accepts primary responsibility for such oversight and there should be a presumption that the host-country central bank will have this primary responsibility.

(1) Extract from the 1990 Report of the Committee on interbank netting schemes of the central banks of the Group of Ten countries (http://www.bis.org/publ/cpss04.pdf)

3. In its oversight of a system, the authority with primary responsibility should review the design and operation of the system as a whole and consult with other relevant authorities on its conclusions both in the first instance and, from time to time, with respect to developments in the system's status.

4. The determination of the adequacy of a system's settlement and failure-to-settle procedures should be the joint responsibility of the central bank of issue and the authority with primary responsibility for the system.

5. In the absence of confidence in the soundness of the design or management of any cross-border or multi-currency netting or settlement system, a central bank should discourage the use of the system by institutions subject to its authority and, if necessary, identify the use of, or the provision of, services to such a system as constituting an unsafe and unsound banking practice.

These principles have proved to be very robust and effective, and have served as basic guidelines for setting up the cooperative oversight of a variety of international systems, ranging from service providers, such as SWIFT, to payment systems such as CLS, and securities settlement systems such as those operated by the Euroclear group. In its recent report "Central Bank Oversight of Payment and Settlement Systems" [1], the CPSS has revisited these principles, and has reaffirmed their general validity, the only substantial change being the extension of their scope to cover all types of cross-border payment infrastructures.

We shall now review the cooperative oversight arrangements for Euroclear, followed by those for SWIFT.

2. The co-operative oversight of Euroclear SA

2.1 Corporate restructuring of the Euroclear group

The introduction of the euro combined with the deregulation of the financial markets has permitted significant growth in cross-border activity on the European capital market.

With the objective of creating a pan-European infrastructure for the cross-border and domestic settlement of securities, Euroclear has initiated a consolidation process with several domestic infrastructures and has merged with CSDs from France, the Netherlands and the UK. In order to implement the operational integration of the domestic CSDs it has acquired, Euroclear has developed a business model in which the CSDs will continue to operate under their national legislation, but will be technically integrated through the use of a common settlement platform operating for all the entities of the group.

The corporate restructuring, finalised at the beginning of 2005, is basically intended to support the new business model developed by the Euroclear group. The key objectives of this restructuring are:

– to centralise the ownership of the common systems of the group;
– to increase efficiency by centralising a number of services that were previously spread within the group;
– to maximise client protection against systemic risk in terms of ownership/operation of the settlement platform;
– to improve transparency in inter-company service delivery and cost allocations;
– to increase the flexibility of the corporate structure, facilitating further possible alliances or mergers with CSDs outside the group.

As part of the restructuring process, Euroclear Bank [2] ceased to be the parent company of the CSDs, and became a sister company of each CSD. A new holding company, called Euroclear SA/NV ("ESA"), has been set up as parent company of the ICSD and the CSDs. ESA is incorporated in Belgium, with branch offices in Amsterdam, London and Paris. Euroclear plc remains the ultimate holding company of the Euroclear group [3]. It is further envisaged that CIK, the Belgian CSD, will also become a sister company of the other Euroclear depositories later this year [4].

(1) Available on the website of the Bank for International Settlements: www.bis.org.

(2) Euroclear Bank is the operator of the Euroclear system (the ICSD system). The NBB has assessed the Euroclear system against the CPSS-IOSCO Recommendations. See the subsequent article in this FSR.

(3) Euroclear Investments SA ("EI"), a wholly owned subsidiary of Euroclear plc, acts as parent company of ESA. Its principal responsibility is to arrange the group insurance policies and group real estate management.

(4) The final completion of the purchase agreement is planned for later in 2005.

ESA will own and operate the future consolidated IT infrastructure of the Euroclear Group. It will provide its subsidiaries (the CSDs and the ICSD) with IT production and development services, together with other supporting services such as audit, financial and risk management, legal, human resources and product management.

ESA serves only group companies, which makes the service arrangement different from one with a third-party outsourcing structure. The (I)CSDs of the group remain separate legal entities subject to their existing regulatory environment. They continue to offer direct services to their customers who maintain accounts with them. ESA will not open accounts for (I)CSD participants. For the CSDs, the settlement of the cash leg will, as today, be organised through the national central banks. The ICSD will be able to choose between commercial bank money (in the books of Euroclear bank) and central bank money (at the NBB).

This corporate restructuring is not intended to have a material impact on the way the group is governed today. The strategic direction of the group and the monitoring of its management and operations at ESA level will still be effected by a user-led board.

2.2 Oversight and supervision of ESA by the Belgian authorities – update of the Belgian legal framework

Oversight of Securities Settlement Systems (SSSs) by central banks is typically conducted alongside regulation and supervision by securities commissions (and, in some cases, by banking supervisors). The division of responsibilities for supervision and oversight varies from country to country depending on the legal and institutional framework, eg on whether or not the central bank is responsible for the supervision of banks and/or securities markets. Compared with the situation prevailing in the payment system area, cooperative oversight of an SSS could be more complicated to organise due to the fact that, besides central banks, other authorities such as securities regulators also have responsibility for regulating the SSS. The various authorities involved need to work together to determine the appropriate scope of application of the oversight standards and to develop an action plan for implementation. Within the European Union, cooperation agreements have generally been put in place between the different types of supervisors involved in supervision and oversight of the local systems.

In Belgium, the NBB and the Belgian supervisory authority (CBFA) have different but complementary roles to play in the framework of securities settlement systems: the NBB has been assigned the task of overseer of securities settlement systems, while the CBFA is responsible for prudential supervision over the entities operating such systems (see box 9).

The Belgian legal framework has been updated in order to extend the oversight and supervisory responsibilities of the Belgian authorities to ESA, and to keep the regulatory environment equivalent to the one that was applicable to Euroclear Bank.

The legal basis for the NBB's oversight of CSDs and SSSs is more specifically established by Article 23 of the Law of 2 August 2002 on the supervision of the financial sector and of financial services. These responsibilities, that apply to the Euroclear system as a whole, irrespective of the institutions operating the system, have been reaffirmed in an amendment to this law, where the NBB has been given the responsibility to oversee systems operated either by settlement institutions (such as Euroclear bank) or by institutions assimilated to such settlement institutions (such as ESA).

The CBFA is in charge of the prudential supervision of settlement institutions recognised as central depositories within the framework of the same law. ESA has been assimilated to a settlement institution in order to bring it within the prudential supervision powers of the CBFA. It has also been given the status of a financial holding company within the meaning of the European banking directive.

Box 2 – Royal Decree implementing Article 118 of the Law of 2 August 2002 on the supervision of the financial sector and of financial services (art. 5)

§ 1. As regards the powers of the NBB concerning the functioning of clearing and payment systems, and the supervisory powers of the CBFA, including those relating to institutions that operate clearing and settlement systems, both institutions shall cooperate closely in performing their respective tasks, in order to achieve the optimum results in the performance of those tasks and to ensure the more efficient use of the resources entailed.

To this end, both institutions shall examine in close cooperation to what extent each of them can make use of the assessments carried out by the other in conducting their own assessment, taking into account the differences of scope, monitoring methods and responsibilities.

In order to implement their cooperation, the CBFA and the NBB shall organise both ad hoc meetings and half-yearly meetings of officers from the departments concerned, to evaluate the progress made in this cooperation and to identify any new domain for cooperation. This cooperation shall also apply to the supervisory responsibilities of the CBFA with regard to the Belgian regulated markets, particularly as regards the observance of the legal requirements whereby, for the clearing and settlement of transactions in financial instruments, every regulated market must use clearing and settlement systems providing sufficient guarantees for the protection of the interests of participants and investors, as well as for the smooth functioning of the market.

§ 2. More specifically, in the case of Euroclear Bank, the cooperation referred to in § 1, concerns the following domains:

1° the CBFA and the NBB shall consult each other when drawing up the annual control plan, which they shall coordinate as far as possible, and they may suggest priorities to each other;

2° as regards the relationship with Euroclear Bank, the NBB and the CBFA shall harmonise as far as possible the reporting of incidents by Euroclear Bank and coordinate or conduct jointly their contacts with the internal and external audit, and the assessment of the functioning of those audits;

3° as regards the follow-up of the findings, the NBB and the CBFA shall mutually exchange and discuss the results of the inspections and of the oversight missions, and examine the possibility of pooling all or part of their database on Euroclear Bank;

4° as regards the coordination of the contacts with foreign authorities, the NBB and the CBFA shall jointly prepare the meetings to be held with foreign authorities pursuant to cooperation agreements, and shall also share the administrative tasks relating to the preparation of the minutes of those meetings or of any other working documents. The NBB and the CBFA shall also consult each other on their respective activities in the framework of the Committee of European Securities Regulators (CESR) and of the European System of Central Banks (ESCB), and on any regulatory issues addressed by international fora.

2.3 New cooperative oversight framework

Before the actual restructuring was initiated, four Memoranda of Understanding (MoU) had already been signed in recent years between the Belgian authorities (NBB and CBFA) and the authorities of the countries where the national CSD is directly involved in the Euroclear group consolidation process.

The reorganisation and concentration of supporting services for the settlement activities within the Euroclear Group brings with it a need for enhanced arrangements for cooperation between the authorities. This has resulted in the setting up of a new cooperation framework which is intended to allow each relevant authority to fulfil its own responsibilities effectively and efficiently, and which has been laid down in a new multilateral MoU ("the MoU").

The relationship between the NBB and the other authorities involved in the cooperative oversight of ESA has been set up in accordance with the Lamfalussy principles.

The MoU was signed recently by the Belgian authorities and the authorities of the countries where the domestic CSD is part of the Euroclear group (France : *Banque de France*, *Autorité des Marchés Financiers* ; The Netherlands : *De Nederlandsche Bank, Autoriteit Financiële Markten* ; United Kingdom : *Bank of England, Financial Services Authority*)[1]. The current composition of this group of overseers/regulators could change in the event of further consolidation.

SCOPE

The MoU basically concerns :

- the exchange of information relevant for the coordination and the cooperation between the authorities in the area of supervision/oversight ;
- the coordinated assessment, of the common services that are provided by ESA for supporting the activities of the (I)CSDs of the group.

The ESA functions and services which are not common to all (I)CSDs of the Euroclear group, but instead are specific to one of the (I)CSDs, are not covered by the cooperation framework and remain overseen/supervised by each relevant national authority[2].

BASIC COOPERATION PRINCIPLES

The arrangements for the coordinated oversight/supervision of ESA's common services include the setting up of a central regulatory access point. This results in ESA having, for its common services, a coordinating regulator. Since ESA is a regulated entity under Belgian law, with its headquarters established in Belgium, the authorities agreed to designate the NBB and the CBFA as coordinators.

The main functions of the coordinators are :

- to act as the central entry point for the collection and distribution of all relevant information related to the common services delivered by ESA to the (I)CSDs of the Euroclear Group. For information on issues of common interest, this central entry point will be the normal channel for communication with ESA. Bilateral procedures between the relevant authorities and the (I)CSDs of the Euroclear Group will still apply for the collection of information relating to matters of exclusively domestic interest ;
- to undertake and to coordinate the assessment of the common services delivered by ESA. To this end, the issues to be assessed, the supervisory/oversight activities, and the procedures and standards applicable will be mutually agreed. The relevant CPSS-IOSCO Recommendations (to be superseded by the ESCB-CESR standards when available) will be used as benchmark for the joint assessment of the ESA services ;
- to play a coordinating role between the authorities and ESA in crisis situations.

These roles assigned to the coordinator coincide with the concept of lead overseer (central bank with the primary responsibility for the oversight of the system) as defined by the Lamfalussy principles.

DIVISION OF RESPONSIBILITIES BETWEEN THE AUTHORITIES

Each national authority remains responsible for the oversight and the supervision of its domestic (I)CSD and the SSSs which it manages. The specific regulatory environments that still apply to the (I)CSDs of the Group imply, in particular, that these will need to assure their regulators that the 'intra-group arrangements' for the provision of the common services will not adversely affect their ability to control or manage their delivery of regulated services or functions.

As direct overseer/supervisor of ESA, the Belgian authorities are responsible for :

- the enforcement of the Belgian regulatory framework applicable to ESA ;
- the enforcement, follow-up and coordination of the implementation of the commonly agreed recommendations that will be addressed to ESA as a result of the coordinated assessment of the common services. These recommendations are to be elaborated on a consensus basis. This consensus building approach will be actively supported by the coordinator.

PRACTICAL ARRANGEMENTS

Two Committees are in charge of the implementation of the cooperation framework :

- a *High Level Committee (HLC),* co-chaired by the Belgian authorities (NBB and CBFA) and composed of senior representatives of the signatory authorities. The mandate of this senior level steering body is to pursue agreement on and implementation of the policies and priorities arising from the coordinated assessment, and

(1) The CBFSAI (Ireland) has been accorded the status of observer, considering the interest of the Irish authorities in ESA matters resulting from the outsourcing of the settlement function for Irish government bonds to Euroclear Bank. A bilateral MoU between NBB and CBFSAI still covers the cooperation concerning Euroclear Bank.

(2) As an example, the assessment of the credit risk policy of Euroclear Bank will remain the exclusive responsibility of the Belgian authorities.

to communicate to and discuss with ESA's board and management the recommendations resulting from the aforementioned assessment, as well as the strategy concerning ESA's common services and other issues;
- a *Technical Committee (TC)*, co-chaired by the Belgian authorities, and composed of all the signatory authorities assists the implementation of the agreed policies regarding the coordinated assessment of ESA's common services as defined by the HLC. The TC supports the coordinated assessment of all common functionalities and services of ESA.

In the absence of a consensus between the overseers/supervisors on matters of common interest, the HLC is in charge of drawing up the final compromise. Ad hoc working parties may be put in place by the TC in order to address those issues for which specific expertise is required. A permanent secretariat, managed by the Belgian authorities, provides the administrative support to both committees.

3. The cooperative oversight of SWIFT

3.1 A short description of SWIFT

SWIFT s.c.r.l., the Society for Worldwide Interbank Financial Telecommunication ("SWIFT"), is a limited liability cooperative company, registered in Belgium, that supplies secure messaging services in 202 countries. Under SWIFT's company set-up, the liability of any member of the cooperative is limited to the amount of capital brought into the company. Flexible arrangements bound to the cooperative statute make it easy for members to join or leave the company.

SWIFT is owned and controlled by its members. It has an ongoing dialogue with its users through national member groups, user groups and dedicated working groups. These discussions relate, for example, to SWIFT's activities such as proposals for new or revised standards, providing industry comments on proposed corporate or business service changes, and comments on timeframes for new technology or service implementation. Each member has a number of shares proportional to its usage of SWIFT's message transmission services. Every three years, a share reallocation is implemented to reflect changes in each members' use of SWIFT.

Countries or country constituencies can recommend directors to the board according to the number of shares owned by all members in each country. SWIFT has a board of up to 25 directors, which governs the organisation and directs its executive group of senior managers headed by a Chief Executive Officer. The board has 6 committees: Audit and Finance, Technology and Production, Banking and Payments, Securities, Compensation, Standards. The Audit and Finance Committee (AFC) is the governance and surveillance body for systems security, internal control and financial policy. The internal and external auditors report to the AFC on their reviews of systems security, accounting policy, reporting, auditing and control matters, as well as on the balance sheet and financial projections.

SWIFT provides messaging services to more than 7,500 financial institutions, including banks, broker/dealers, investment managers, and over 100 market infrastructures in payments, treasury, securities and trade. Many other types of financial institutions also hook into the SWIFT network, including among others, fund administrators, trading institutions, treasury counterparties or trusts.

The bulk of SWIFT messaging activity is related to the exchange of payment information between banks involved in correspondent banking arrangements. SWIFT also provides messaging and connectivity services to a growing number of market infrastructures. Over the last decade, most countries have set up large-value payment systems (LVPS) to help limit settlement risks in the interbank payments process. Many of these systems have chosen SWIFT as service provider for the messaging to and from its participants. SWIFT also provides messaging services to CLS (Continuous Linked Settlement), a settlement system that eliminates settlement risk for foreign exchange transactions between the world's major currencies.

While large-value payment systems have contributed significantly to the growth in messaging via SWIFT in recent years, the growth in securities traffic has been even greater. Securities messaging now accounts for nearly one third of SWIFT's total traffic. These messages flow between participants in stock exchanges, central securities depositories (CSDs) and international central securities depositories (ICSDs), and to central counterparties (CCPs).

SWIFT is also an active promoter of message standardisation in the financial sector. In close cooperation with its user community, SWIFT refines existing message types and defines message standards for new types of transactions or other financial information needs. This standardisation process contributes to straight-through processing, reducing industry inefficiencies and potential errors.

3.2 Oversight of SWIFT: Rationale

Central banks generally have the explicit objective of fostering financial stability and promoting the soundness of payment and settlement systems. While SWIFT is not itself a payment or settlement system and, as such, is not regulated by central banks or bank supervisors, a large and growing number of systemically important payment systems have become dependent on SWIFT, which has thus acquired a systemic character. If SWIFT were insufficiently protected against risk, disruption in financial messaging could trigger or transmit further disruption amongst its users.

Because of this, the central banks of the Group of Ten countries (G10) were of the opinion that SWIFT should be subject to cooperative oversight by central banks. The issue was first discussed at the (CPSS), and meetings with SWIFT started in 1987. The oversight of SWIFT in its current form dates from 1998, and the practical arrangements have gradually evolved since then. The oversight activity has intensified over the years, and the most recent strengthening of the practical arrangements took place in 2004. The next chapter presents the revised oversight arrangements in detail. The current arrangements may continue to evolve, as a periodic assessment of their effectiveness is taking place.

Throughout this evolution in the practical oversight arrangements, two core concepts in the set-up for the oversight of SWIFT have remained valid, i.e. the concept of cooperative oversight with the NBB as lead overseer, and the concept of moral suasion.

The oversight framework for SWIFT has drawn on the cooperative framework laid down in the 1990 the so-called Lamfalussy report (see box 1). That framework recognises that several central banks might have a legitimate interest in infrastructures operating on a cross-border basis, and that it would be inefficient, and could lead to inconsistent actions, if central banks acted independently. It provides for a cooperative approach to coordinate those interests, but it relies on achieving consensus to be fully effective. The cooperative arrangement increases central banks' influence, compared with acting on a solo basis, by enabling central banks to give a clear common message. In the case of SWIFT, the NBB is lead overseer, as SWIFT is incorporated in Belgium. Other central banks also have a legitimate interest in or responsibility for the oversight of SWIFT, given SWIFT's role in their domestic systems.

As is generally the case in payments systems oversight, the major instrument for the oversight of SWIFT is moral suasion. Overseers place great importance on the constructive and open dialogues conducted on a basis of mutual trust with the SWIFT board and senior management. During these dialogues, overseers formulate their recommendations to SWIFT.

No G10 central bank currently has direct statutory instruments (such as sanctions, fines or formal prior approval of changes) to formally enforce decisions upon SWIFT. This has never proven to be a drawback. Overseers can still exercise influence via a series of mechanisms to ensure that SWIFT takes account of their recommendations, including informing SWIFT users and their supervisors about oversight concerns related to SWIFT.

The common understanding of overseers and SWIFT about the oversight objectives, and the activities that will be undertaken to achieve those objectives, is laid down in a protocol. The protocol arrangement was signed between the NBB, as the lead overseer, and SWIFT. It can be revised periodically to reflect the evolving oversight arrangements.

3.3 Oversight of SWIFT: Current arrangements

The SWIFT oversight arrangements were reviewed in 2004. To that end, the NBB and SWIFT revised the existing protocol arrangement between them. The NBB also concluded bilateral Memoranda of Understanding (MoUs) with each of the other central banks participating in the oversight of SWIFT.

OVERSIGHT OBJECTIVES, AREAS OF INTEREST AND LIMITATIONS

The objectives of oversight of SWIFT centre on the security, operational reliability, business continuity and resilience of the SWIFT infrastructure.

To review whether SWIFT is pursuing these objectives, overseers want reassurance that SWIFT has put in place appropriate governance arrangements, structures, processes, risk management procedures and controls that enable it to effectively manage the potential risks to financial stability and to the soundness of financial infrastructures.

Overseers review SWIFT's identification and mitigation of operational risks, and may also review legal risks, transparency of arrangements and customer access policies. SWIFT's strategic direction may also be discussed with the board and senior management.

This list of oversight fields is indicative, not exhaustive. In short, overseers will undertake those activities that provide them comfort that SWIFT is paying proper attention to the objectives described above. Nevertheless, SWIFT continues to bear the responsibility for the security and reliability of its systems, products and services. It should be understood that the oversight of SWIFT does not grant SWIFT any certification, approval or authorisation.

INTERNATIONAL COOPERATIVE OVERSIGHT

As lead overseer, the NBB conducts the oversight of SWIFT in cooperation with the other G10 central banks i.e. Bank of Canada, Deutsche Bundesbank, European Central Bank, Banque de France, Banca d'Italia, Bank of Japan, De Nederlandsche Bank, Sveriges Riksbank, Swiss National Bank, Bank of England and the Federal Reserve System (USA), represented by the Federal Reserve Bank of New York and the Board of Governors of the Federal Reserve System. The relationship between the NBB and those other cooperating central banks has been laid down in bilateral MoUs.

Other central banks, beyond the G10, may have a legitimate interest in the oversight of SWIFT to the extent that financial institutions or market infrastructures located in their countries are important users of SWIFT services. To meet these information needs, while ensuring that the group involved in the cooperative oversight of SWIFT does not become too large and unwieldy, regular exchange of information on SWIFT oversight activities could be arranged on a need-to-know basis with the central banks concerned.

OVERSIGHT STRUCTURE – OVERSIGHT MEETINGS

The NBB monitors SWIFT developments on an on-going basis. It identifies relevant issues through the analysis of documents provided by SWIFT and through discussions with the management. It maintains a continuous relationship with SWIFT, with ad hoc meetings on a regular basis, and serves as the G10 central banks' entry point for the cooperative oversight of SWIFT. In that capacity, the NBB chairs the senior policy and technical groups that facilitate the cooperative oversight, provides the secretariat and monitors the follow-up of the decisions taken. The various SWIFT oversight groups are structured as follows:

- the SWIFT Cooperative Oversight Group (OG), composed of all G10 central banks, the ECB and the chairman of the G10 CPSS, the forum through which central banks conduct cooperative oversight of SWIFT, and in particular discuss oversight strategy and policies related to SWIFT. It meets twice a year;
- within the OG, the Executive Group (EG), which meets about four times a year, discusses with SWIFT's board and management the central banks' oversight policy, issues of concern, SWIFT's strategy regarding oversight objectives and conclusions. The EG supports the NBB in preparing for discussions within the broader OG and represents the OG in discussions with SWIFT. The EG can communicate recommendations to SWIFT on behalf of the OG. At one of the EG meetings, the annual reporting by SWIFT's external security auditor is discussed. The EG includes the Bank of Japan, the Federal Reserve Board, the Bank of England, the ECB and the NBB;
- at the technical level, the Technical Oversight Group (TG) has five full-day meetings a year with SWIFT management, internal audit and staff to carry out the groundwork of the oversight. Specialised knowledge is needed to understand SWIFT's use of computer technology and the associated risks. The TG draws its expertise from the pool of staff available at the cooperating central banks. It reports its findings and recommendations to the OG.

ACCESS TO INFORMATION

In order to achieve their oversight objectives, the overseers need to have timely access to all information they judge relevant for the purpose of the oversight. Typical sources of information are SWIFT board papers, security audit reports, incident reports and incident review reports. Another important channel for gathering information is through presentations by SWIFT staff and management. Finally, SWIFT also assists overseers in identifying internal SWIFT documents that might be relevant to address specific oversight questions.

Provisions on the confidential treatment of non-public information are included both in the protocol between the NBB and SWIFT and in each of the bilateral MoUs between the NBB and each (of the other) cooperative central banks.

Assessment of the Euroclear system against CPSS-IOSCO recommendations for securities settlement systems

1. The CPSS-IOSCO Recommendations

In November 2001, the Committee on Payment and Settlement Systems (CPSS) of the central banks of the Group of Ten countries and the Technical Committee of the International Organisation of Securities Commissions (IOSCO)[1] published a set of standards: the *Recommendations for Securities Settlement Systems*[2]. The objective of the 19 CPSS-IOSCO Recommendations is to contribute to financial stability by strengthening the securities settlement systems (SSS) that are an important component of the global financial infrastructure. The CPSS-IOSCO also developed an assessment methodology[3] for the Recommendations which aims at providing a clear and comprehensive framework for the assessments made on the basis of the Recommendations. For each of them, the methodology proposes four possible assessment categories ("Observed", "Broadly observed", "Partly observed" and "Non-observed") depending on the compliance level, and provides assessors with precise rating criteria.

2. Assessment of the Euroclear system

Euroclear Bank, a Belgian credit institution, with its registered office in Brussels, operates the Euroclear system which provides international central securities depository and securities services (ICSD), including new issues distribution to major financial institutions located in more than 80 countries; in addition, it offers other services such as custody, securities lending and money transfers. The participants can settle trades by book-entry in more than 30 currencies on a delivery-versus-payment basis. There are over 208,000 different issues of securities accepted in the Euroclear system which are issued by entities from over 110 countries and cover a broad range of internationally traded fixed and floating rate debt instruments, convertibles, warrants and equities.

In 2004, in the framework of its oversight of the Euroclear system, the NBB assessed this system against the CPSS-IOSCO Recommendations[4]. This assessment was based upon the information made available by Euroclear for this purpose. The results of this assessment, which are summarised in the table below, show that the Euroclear system is fully compliant with fifteen of the Recommendations. For two other Recommendations (Recommendations 9 and 19), an action plan to improve compliance is in the process of being implemented. Finally, two Recommendations are considered not relevant for Euroclear, as they deal with aspects (trade confirmation, settlement cycle) for which Euroclear bears no responsibility. The results of the assessment are presented with more details in the remainder of this section.

There are various reasons why the NBB wishes to disclose the outcome of its assessment of the Euroclear system against the CPSS-IOSCO Recommendations. First of all, the CPSS-IOSCO Methodology itself foresees that the results of the assessment should be made public.

(1) IOSCO is a worldwide organization of securities commissions; it has over 100 members.

(2) "Recommendations for Securities Settlement Systems", CPSS-IOSCO, November 2001 (available on the website of the Bank for International Settlements: www.bis.org in the CPSS publications section)

(3) "Assessment Methodology for the Recommendations for SSSs", CPSS-IOSCO, November 2002 (available on the web site of the Bank for International Settlements: www.bis.org in the Committee Publications, section CPSS).

(4) It should be clear that this assessment covers only the Euroclear system, operated by Euroclear Bank. The systems operated by the different national CSDs of the Euroclear group (Euroclear France, Euroclear Nederland, CRESTCo Ltd) are outside the scope of this assessment, as they are not overseen by the NBB. See also the previous article.

Also, in disclosing this assessment, the NBB intends to promote its accountability as overseer of the Euroclear system, even if it should be understood that oversight goes beyond this general framework. Disclosing the outcome of this assessment should contribute to increasing the transparency of the NBB's role for the participants of the system. Another important reason for disclosing these results relates to the international dimension of the Euroclear system, which makes it impractical to set up cooperative arrangements with all the interested central banks for the ICSD activities[1]. Therefore, a valid alternative is to disclose the results of the assessment. Finally, it should be noted that, to ensure a level playing field, the results of the CPSS-IOSCO assessments for the major international systems, which are competing with each other, are normally expected to be disclosed.

(1) See, on this matter, the article in "Cooperative Oversight of Euroclear and SWIFT" in this FSR.

Box 1 – The CPSS-IOSCO Recommendations for SSS

I. Legal risk

1. LEGAL FRAMEWORK

Securities settlement systems should have a well founded, clear and transparent legal basis in the relevant jurisdictions.

II. Pre-settlement risk

2. TRADE CONFIRMATION

Confirmation of trades between direct market participants should occur as soon as possible after trade execution, but no later than trade date (T+0). Where confirmation of trades by indirect market participants (such as institutional investors) is required, it should occur as soon as possible after trade execution, preferably on T+0, but no later than T+1.

3. SETTLEMENT CYCLES

Rolling settlement should be adopted in all securities markets. Final settlement should occur no later than T+3. The benefits and costs of a settlement cycle shorter than T+3 should be evaluated.

4. CENTRAL COUNTERPARTIES (CCPs)

The benefits and costs of a CCP should be evaluated. Where such a mechanism is introduced, the CCP should rigorously control the risks it assumes.

5. SECURITIES LENDING

Securities lending and borrowing (or repurchase agreements and other economically equivalent transactions) should be encouraged as a method for expediting the settlement of securities transactions. Barriers that inhibit the practice of lending securities for this purpose should be removed.

III. Settlement risk

6. CENTRAL SECURITIES DEPOSITORIES (CSDs)

Securities should be immobilised or dematerialised and transferred by book entry in CSDs to the greatest extent possible.

7. DELIVERY VERSUS PAYMENT (DVP)
CSDs should eliminate principal risk by linking securities transfers to funds transfers in a way that achieves delivery versus payment.

8. TIMING OF SETTLEMENT FINALITY
Final settlement should occur no later than the end of the settlement day. Intraday or real-time finality should be provided where necessary to reduce risks.

9. CSD RISK CONTROLS TO ADDRESS PARTICIPANTS' FAILURES TO SETTLE
CSDs that extend intraday credit to participants, including CSDs that operate net settlement systems, should institute risk controls that, at a minimum, ensure timely settlement in the event that the participant with the largest payment obligation is unable to settle. The most reliable set of controls is a combination of collateral requirements and limits.

10. CASH SETTLEMENT ASSETS
Assets used to settle the ultimate payment obligations arising from securities transactions should carry little or no credit or liquidity risk. If central bank money is not used, steps must be taken to protect CSD members from potential losses and liquidity pressures arising from the failure of the cash settlement agent whose assets are used for that purpose.

IV. Operational risk

11. OPERATIONAL RELIABILITY
Sources of operational risk arising in the clearing and settlement process should be identified and minimized through the development of appropriate systems, controls and procedures. Systems should be reliable and secure, and have adequate, scalable capacity. Contingency plans and backup facilities should be established to allow for timely recovery of operations and completion of the settlement process.

V. Custody risk

12. PROTECTION OF CUSTOMERS' SECURITIES
Entities holding securities in custody should employ accounting practices and safekeeping procedures that fully protect customers' securities. It is essential that customers' securities be protected against the claims of a custodian's creditors.

VI. Other issues

13. GOVERNANCE
Governance arrangements for CSDs and CCPs should be designed to fulfil public interest requirements and to promote the objectives of owners and users.

14. ACCESS
CSDs and CCPs should have objective and publicly disclosed criteria for participation that permit fair and open access.

15. EFFICIENCY
While maintaining safe and secure operations, securities settlement systems should be cost-effective in meeting the requirements of users.

16. COMMUNICATION PROCEDURES AND STANDARDS
Securities settlement systems should use or accommodate the relevant international communication procedures and standards in order to facilitate efficient settlement of cross-border transactions.

17. TRANSPARENCY
CSDs and CCPs should provide market participants with sufficient information for them to identify and evaluate accurately the risks and costs associated with using the CSD or CCP services.

18. REGULATION AND OVERSIGHT
Securities settlement systems should be subject to transparent and effective regulation and oversight. Central banks and securities regulators should cooperate with each other and with other relevant authorities.

19. RISKS IN CROSS-BORDER LINKS
CSDs that establish links to settle cross-border trades should design and operate such links to reduce effectively the risks associated with cross-border settlements.

Legal risk

The legal framework applicable to a Securities Settlement System's (SSS) operation is highly important for its reliability and predictability. The settlement and custody activities of the Euroclear system are governed by consistent, clear and solid laws, rules and procedures. In particular, they support the enforceability of transactions and the protection of Euroclear participants' assets, and provide an adequate legal basis for the holding of securities, immobilization, securities lending and delivery-versus-payment (DVP) with finality. These rules also address the event of a participant's default, including the effective use of collateral, and are legally enforceable. The legal framework of Euroclear is therefore compliant with Recommendation 1.

Pre-settlement risk

Pre-settlement risk refers to the risk that an outstanding transaction for completion at a future date will not be settled because one of the counterparties fails to perform on the contract or agreement during the life cycle of the transaction before settlement. The resulting exposure is the cost of replacing the original transaction at current market prices. This risk can be mitigated by trade confirmation mechanisms, shorter settlement cycles, the use of a Central Counterparty (CCP) and the possibility of lending securities.

The Euroclear system settles stock exchange and over-the-counter trades concluded on various domestic and international markets. Rules and practices regarding aspects such as trade confirmation, settlement cycles or the use of a CCP are defined by these markets themselves. Euroclear has no responsibility for these rules and practices, neither as an International Central Securities Depository nor as a Securities Settlement System. Recommendations 2 and 3 are therefore not relevant in the framework of the assessment of the Euroclear system. Recommendation 4 has been assessed as observed, considering that concrete experiences at Euroclear tend to confirm the lack of a business case for introducing a CCP mechanism for eurobonds.

Euroclear provides its participants with the *Securities Lending and Borrowing Program*, a securities lending facility that is fully automated and integrated in the settlement process. This facility is designed and used as a method to expedite settlement of securities transactions and thereby reduce pre-settlement risk. Recommendation 5 on securities lending is "Observed" by the Euroclear system.

SUMMARY OF RESULTS OF THE ASSESSMENT OF THE EUROCLEAR SYSTEM AGAINST CPSS-IOSCO RECOMMENDATIONS

Recommendation		Assessment category
I. Legal Risk		
Recommendation 1	Legal Framework	Observed
II. Pre-settlement Risk		
Recommendation 2	Trade confirmation	Not relevant
Recommendation 3	Settlement cycles	Not relevant
Recommendation 4	Central Counterparties (CCPs)	Observed
Recommendation 5	Securities lending	Observed
III. Settlement Risk		
Recommendation 6	Central securities depositories (CSDs)	Observed
Recommendation 7	Delivery versus payment (DVP)	Observed
Recommendation 8	Timing of settlement finality	Observed
Recommendation 9	CSD risk controls to address participants' failures to settle	Broadly observed
Recommendation 10	Cash settlement assets	Observed
IV. Operational Risk		
Recommendation 11	Operational reliability	Observed
V. Custody Risk		
Recommendation 12	Protection of customers' securities	Observed
VI. Other Issues		
Recommendation 13	Governance	Observed
Recommendation 14	Access	Observed
Recommendation 15	Efficiency	Observed
Recommendation 16	Communication procedures and standards	Observed
Recommendation 17	Transparency	Observed
Recommendation 18	Regulation and oversight	Observed
Recommendation 19	Risks in cross-border links	Broadly observed to Non-observed

Settlement risk

Settlement risk is a general term used to designate the risk that settlement in an SSS will not take place as expected, e.g. because a party will default on one or more settlement obligations to its counterparties or to a settlement agent.

The CPSS-IOSCO Recommendations tackle settlement risk issues by requesting SSSs to provide for immobilisation or dematerialisation of securities, to have effective DVP mechanisms with intraday and real time settlement finality in place, to be clear and transparent about the timing of settlement finality, and to use cash settlement assets which are as safe as possible (i.e. carrying little credit risk). The Euroclear system is fully compliant with these recommendations

Recommendation 9 on system risk controls to address participants' failure to settle relates to the credit policy of the system operator. Although Euroclear Bank applies credit and liquidity risk control measures in line with the requirements made in the Recommendation, full compliance is not achieved because debit balances on the securities accounts of the participants are possible, even if potentially occurring only in extreme circumstances and for a limited period of time. Euroclear has committed itself to identifying possible alternatives to such exceptional accounting practice.

Operational risk

Operational risk is the risk of human error or a breakdown or deficiencies in some components of the hardware, software or communications systems that are crucial to the settlement process. It covers operational reliability, business continuity/contingency and internal control issues.

Euroclear has an operational risk policy aimed at effectively identifying, and minimizing, managing and controlling operational risks. The Board of Directors has the overall responsibility for arranging adequate operational management, it approves operational risk policy developments and changes, and reviews on a regular basis reports on the nature and level of operational risk exposure. An Audit Committee and a Risk Policy Committee support the Board in these fields. The technical incidents reported so far by Euroclear have not had any significant impact on the system's participants. Contingency plans and back-up facilities are in place in order to handle different contingency scenarios. These plans and the infrastructure are tested several times a year. External audits of these procedures and arrangements for disaster recovery and business continuity are carried out.

The current IT infrastructure of Euroclear is composed of a primary and a secondary data centre. In order to comply with the new contingency practices that emerged after the September-11 terrorist attacks, Euroclear has plans to further improve its disaster recovery and business continuity capacities. First, Euroclear has implemented a dual office model in which the company's staff is divided between two different buildings, the current Euroclear headquarters and another distant location, in such a way that if one of the two office facilities should become unavailable, the operation of the Euroclear system could continue from the remaining one. Secondly, in the framework of its new business model, Euroclear is putting in place a new data centre infrastructure at Group level, which will in particular enable it to cope better with unforseen events having a regional or metropolitan impact.

Custody risk

Custody risk is the risk of loss of securities held in custody occasioned by the insolvency, negligence or fraudulent action of the custodian or of a subcustodian.

In order to ensure the protection of the customers' securities deposited in the Euroclear system, different technical and institutional solutions are in place, such as the facility whereby participants can segregate their own securities from those of clients. Furthermore, Euroclear monitors all the securities movements with the depositories or local CSDs and reconciles its holdings with them on a regular basis. Euroclear requires its depositories and sub-depositories to be subject to an external audit, and may request the audit reports.

Euroclear has never experienced any case of insufficient securities to satisfy any customer claim.

In the event of Euroclear Bank's insolvency, the law protects participants against the claims of the Bank's creditors. Under Belgian law, the securities of participants do not form part of the assets of Euroclear Bank, so that the liquidator cannot exercise claims on them. Should the Bank become insolvent, participants can request the transfer of their securities to another system or intermediary. When selecting depositories outside Belgium, Euroclear uses specific depository agreements and requests legal opinions, to ensure that recovery of the underlying securities held through local depositories can be enforced by Euroclear on behalf of its clients, notwithstanding the insolvency of such local depositories or of the local CSD.

Other issues

The CPSS-IOSCO Recommendations also cover various other issues not directly related to a specific type of risk. In the case of Euroclear, the CPSS-IOSCO requirements relating to these issues, with the exception of the links, have been assessed as "Observed". These other issues are briefly described below:

GOVERNANCE

The governance arrangements of the Euroclear system, which is owned and governed by its participants, are clearly specified and transparent to users and owners. They promote the objectives of owners and users. Participants are regularly consulted by Euroclear, which invites them to express their views on major changes.

ACCESS

The Euroclear system accepts a heterogeneous range of participants. By the beginning of 2004, 1 538 institutions, from more than 80 different countries, were participating in the system. Clear and publicly disclosed admission criteria for the Euroclear system are defined in the admission policy. These criteria relate to the financial resources of the applicants, their technology capability, their need for and potential use of the Euroclear system, their reputation in the market and their *Anti Money Laundering Program*. The same criteria apply to all the systems' participants regardless of their identity, type and location.

EFFICIENCY

The Euroclear system has set in place procedures to lower and monitor its unit cost level, with the objective to remain cost effective and to review pricing levels whenever deemed appropriate. Service levels are also monitored by Euroclear (e.g. through a yearly customer satisfaction survey and benchmarks) and improved whenever appropriate.

COMMUNICATION PROCEDURES AND STANDARDS

In the Euroclear system, settlement instructions as well as instructions for other services, transmitted either by S.W.I.F.T. or by EUCLID (the proprietary communications system developed by Euroclear), are compliant with the ISO 15022 standard. Such compliance with international standards is requested by Recommendation 16.

TRANSPARENCY

Recommendation 17 states that the system should provide its participants with sufficient information in order to accurately evaluate risks and costs associated with their participation. This Recommendation is observed by Euroclear, which provides this information in its contractual documentation for signature by the participant, as well as in other documents available to participants on the Euroclear website. Transparency is also achieved by Euroclear's yearly publication of its answers to the questionnaire from the CPSS-IOSCO disclosure framework.

REGULATION AND OVERSIGHT

As a securities settlement system, the Euroclear system is overseen by the NBB. This system is operated by Euroclear Bank, which, both as a settlement institution and as a credit institution, is supervised by the CBFA, the Belgian supervisory authority. The roles and tasks of the NBB and of the CBFA are clearly defined in laws. Following the assessment, it was decided to make the cooperation between the NBB and the CBFA in the field of clearing and settlement more transparent to the supervised entities. (See also box 2 in the previous article)

RISKS IN CROSS-BORDER LINKS

Euroclear is linked with more than 30 (I)CSDs around the world. As these links are a key element of the Euroclear system activities, they will be subject to further in-depth review (see box 2) by the NBB, which goes beyond the CPSS-IOSCO requirements. For the purpose of the assessment against the CPSS-IOSCO Recommendations, the most important elements regarding the links are (i) the risk analysis made by the system for each link, (ii) the prohibition of provisional transfers (i.e. transfers of securities in a receiving system before final settlement in the delivering system) or at least prohibition of the retransfer between system participants of provisionally received securities and (iii) the full securitisation of credit granted between linked systems.

The main conclusion at this stage of the review relates to the need for Euroclear to further improve its risk assessment procedures for the links. A risk assessment is effectively conducted for each link, but procedures and organisation, including a regular update of the initial analysis, should be standardised. This has led to the overall rating of Recommendation 19 as "Broadly observed". The compliance of the Bridge, i.e. the link between Euroclear and Clearstream Banking Luxembourg, with the recommendation was rated as "Partly observed" because in some circumstances, unsecured credit may be granted between the two ICSDs. Lastly, for securities in some domestic markets, for which provisional transfers are received (i.e. before finality points in that local market have been reached)[1], provisional retransfers between Euroclear participants of the securities so received are not prohibited. Even though Euroclear has set up mitigating measures to cope with the effects of a possible unwind in these markets, the links with these markets are rated as "Non-observed", given the requirements of the assessment methodology on this point. Euroclear has been requested to examine how to improve compliance with this CPSS-IOSCO Recommendation.

(1) French, German, Spanish and US markets.

Box 2 – Assessment of Cross-Border Links

An (I)CSD (the "investor (I)CSD") may establish a link with another (I)CSD abroad[1] (the "issuer (I)CSD"), to enable its clients to settle securities registered in that latter (I)CSD. In practice, the investor (I)CSD, or the custodian acting on its behalf in the case of indirect links, will open an omnibus account[2] in the foreign (I)CSD. Transfers of securities across links can be either against payment (DVP) or free of payment (FOP).

Due to the different layers in the settlement chain and the possible intertwining of multiple jurisdictions, the settlement process for cross-border transactions is more complex than for domestic ones.

Several ad hoc regulatory and private initiatives have already been taken in order to address the specific risks stemming from such cross-border activity.

In the European Union, the European System of Central Banks (ESCB) has issued standards to assess the eligibility of the links between securities settlement systems for their use in ESCB credit operations. However, de facto the scope of this assessment is currently limited to direct links used for the FOP cross-border transfer of collateral.

In the context of investor protection rules, regulatory initiatives were taken in the US and the UK requiring an appropriate risk assessment of custodians and depositories. In 2001, the US Securities and Exchange Commission introduced Rule 17f-7 under the US Investment Company Act. This Rule allows mutual funds to maintain assets only with an eligible foreign securities depository. The custodian used by the mutual fund to hold assets abroad is to provide an analysis of the custody risks of using the eligible depository for maintaining foreign assets. In the same year, the UK's Financial Services Authority issued similar requirements in its Conduct of Business Sourcebook. In the wake of these regulations, a number of private initiatives were taken as well. In the US, the Association of Global Custodians[3] established a yearly questionnaire to support its members to meet regulatory compliance requirements under Rule 17f-7. Proprietary methodologies to assess settlement infrastructure risks in local markets have also been developed by custody consultancy firms and global custodians.

CPSS-IOSCO Recommendation 19 on risks in cross-border links[4] requests the (I)CSDs to conduct a risk analysis of the design of the link and of the financial and operational integrity of the linked (I)CSD. As no comprehensive indication is given on the detailed issues to be covered in such risk analysis, NBB has developed a specific framework to support its future assessments of links. This framework goes beyond the CPSS-IOSCO methodology for Recommendation 19. It covers all intermediaries engaged in cross-border transactions and applies to investor links operated by (I)CSDs.

The assessment methodology is built along several axes in accordance with various types of risks stemming from cross-border settlement: legal risk, settlement risk, intermediary risk and other risks.

Legal risk

For the assessment of the exactitude of any statement on any foreign law, legal opinions and analyses of local counsel play a prominent role in the application of the assessment of an (I)CSD's legal analysis of the linked (I)CSD. As a rule, the following legal issues should be covered by a legal opinion or analysis:

(1) Links can also be established between (I)CSDs within the same jurisdiction.

(2) An omnibus account is an account in which the securities held by a participant on behalf of all (or at least of several) of its customers are kept (CPSS Glossary, 2001).

(3) The Association of Global Custodians, established in 1997, is an informal group of 9 North American global custody banks.

(4) CPSS-IOSCO, Recommendations for Securities Settlement Systems, November 2001.

– the capacity of the custodian or linked (I)CSD to act lawfully as the (I)CSD's local intermediary;
– the validity and enforceability of the agreement between the (I)CSD and its local intermediary;
– the eligibility of the securities to be admitted within the (I)CSD's system;
– the legal nature of the holding of securities in the other country;
– the existence of local asset protection rules which should provide that – in the case of a bankruptcy or other insolvency event concerning the local intermediary – the (I)CSD would have undisputed and timely access to any assets deposited with its local intermediary without having to face legal or other challenges, and that in such case the assets deposited by the (I)CSD do not form part of the assets of the local intermediary;
– the question as to when finality is reached and the interaction with the existence of claw-back rules in the jurisdiction of the local depository which might lead to the reversal of transactions in the books of the (I)CSD;
– any private international law issues which might be relevant for the legal robustness of the legal framework of the link, and particularly concerning securities transfers and collateralisation of securities in the (I)CSD's system.

Settlement risk

An (I)CSD should analyse whether transactions can settle DVP in the local market to avoid principal risk. Depending on the DVP model applicable in the local market, an (I)CSD is to evaluate potential replacement cost and liquidity risks. In gross settlement systems (DVP Model 1), replacement cost and liquidity risks could materialise throughout the batch/day on an operation-by-operation basis. In net systems (DVP Models 2 & 3), however, replacement cost and liquidity risks are typically built up during the batch/day and could materialise on a net basis at the end of the batch/day. In the case of a participant's failure in a foreign (I)CSD, local default procedures (i.e. guarantee funds or loss-sharing arrangements) should enable participants to meet their obligations and the foreign (I)CSD to avoid further disruption. Settlement inefficiencies and procedures (e.g. inappropriate harmonisation of settlement cycles or possible unwinding of provisional transfers) may also lead to replacement cost and liquidity risks. The analysis of settlement risk should also take into account the settlement asset, i.e. whether transactions are settled in central or commercial bank money.

Intermediary risk

FINANCIAL RISKS

The intermediary's financial strength should protect the (I)CSD against risks arising from a local insolvency. This could be assessed by evaluating its ratings and BIS capital ratio or amount of paid-in capital/retained earnings. Insurance and indemnification arrangements cover possible breaches in the intermediary's liabilities. The ownership structure may also be relevant for ascertaining to what extent possible support might be granted if necessary.

OPERATIONAL RISKS

Interoperability between systems is essential in cross-border links. The methodology focuses on internal contingency procedures of the (I)CSD's intermediaries, such as business continuity plans, back-up sites and testing (frequency, expected recovery time, possible data losses). The recourse to external service providers is also analysed, where relevant.

CONTROL ENVIRONMENT

The intermediary should be adequately regulated and submitted to internal and external audits.

Other risks

The choice of specific functions to be delivered on the cross-border link may require additional risk impact analyses (eg participation in local lending and borrowing programs).

Thematic Articles

Liquidity risk in securities settlement

Johan Devriese
Janet Mitchell

Introduction

A viable capital market requires a well functioning transactions infrastructure. Securities settlement, which effects the legal transfer of the securities that are traded, is a critical element of this infrastructure. Settlement failures can increase the trading costs and risks for market participants, as well as hampering the efficient allocation of capital.

Disruptions in the settlement infrastructure, if serious enough, can also lead to an erosion of market liquidity, which may undermine financial stability. An extreme example of the potential severity of settlement failures was provided by the September–11 attacks. Settlement failures in the U.S. Treasury market jumped from 1.7 billion USD per day in the week ending September 5 to 190 billion USD per day in the week ending September 19 (see Flemming and Garbade, 2002). Failures rose initially because of the destruction of communication facilities, but remained high because the securities lending and borrowing program was ill-suited to absorb the massive shock.

This article considers the effect of a shock to securities settlement that is less extreme than that of September–11 but nevertheless serious; namely, the default of the largest participant in the system.[1] Although a number of previous studies have analysed the impacts of major disruptions to payment systems and the extent of resulting contagion, very little investigation of disruptions in securities settlement systems (SSSs) has been undertaken[2]. Such analysis may yield new insights, due to a number of differences between securities settlement and payment systems which could potentially lead to important differences in the impact of disruptions in the two types of systems.

A first key difference between payment systems and SSSs is that unlike payments, securities transactions involve a securities leg as well as a cash leg. This gives rise in securities settlement to principal risk, which is the risk that the seller of a security delivers the security but does not receive cash in return or that the buyer of a security makes the payment but does not receive delivery of the security. Although the response to this risk has been to implement delivery-versus-payment (DVP) systems – by which settlement finality of the securities and cash leg are at the same time, and thus principal risk is eliminated – default by a major participant can still have an impact on liquidity in the SSS, if unsettled trades of the defaulted participant are deleted from the system, leaving nondefaulting participants with unanticipated cash or securities positions.

Yet, contrary to payment systems, a disruption in securities settlement cannot be fully accommodated by providing liquidity. This is because after the initial default, participants may not only be short in cash, but also short in securities. In order to further eliminate the effects of a settlement disruption, it would also be necessary to have a broad, well functioning program of securities borrowing and lending.

A second difference between SSSs and payment systems is the presence of a settlement lag in SSSs. For example, settlement at time $t+2$ implies that the settlement of trades takes place two days after the trades have occurred.[3]

(1) Among the recommendations for securities settlement systems recently set forth by the Committee on Payment and Settlement Systems and the International Organization of Securities Commissions is that "CSDs that extend intraday credit to participants... should institute risk controls that, at a minimum, ensure timely settlement in the event that the participant with the largest payment obligation is unable to settle." See CPSS-IOSCO (2001).

(2) In this paper, the term securities settlement system (SSS) is used in a broader sense than the usual BIS definition. Here an SSS involves the participants and the overall financial infrastructure reporting the securities settlement process.

(3) A trade is a contract which establishes the price, volume and type of security that will be exchanged between two parties. Settlement accomplishes the legal transfer of the security as specified in the trade contract. Settlement at $t+0$, i.e. on the day of trade, is often technically infeasible, due, for example, to the time required to match the cash and securities legs in transactions involving multiple currencies, different time zones, or cross-border settlement.

The existence of a settlement lag suggests that a disruption in the settlement system may have impacts lasting longer than a single day. Indeed, the direct effect of a default by a major participant will continue to be observed for the number of days corresponding to the lag in settlement. In addition, the total disruption – which includes the indirect, or contagion, effects of default – may last even longer than the period of the lag. The reason is that although participants are assumed to know their counterparties and, thus, can calculate the direct effect of default, participants do not know the counterparties of their counterparties and cannot know which of the nondefaulting counterparties traded with the defaulting participant and thus will be unable to settle another trade as a consequence. Participants must thus form expectations about the indirect effects of default. The expected quantities of securities and cash upon which they base their trades after the default will reflect their expectations. If, ex post, actual settlement failures due to the default turn out to be higher than participants had expected, then additional post-default settlement failures may occur.

We report in this article results from simulations with a multi-period, multi-security model of securities settlement, designed to examine the direct and contagion effects of a disruption in settlement, where the disruption is triggered by the default of the largest participant.[1] The analysis addresses the following questions. What are the dynamic effects on settlement, both direct and contagion effects, of a major disruption in the market? Are the impacts different if the defaulting participant is a net buyer versus a net seller? Is the first-day impact larger or smaller than the impact in subsequent days? How many days does it take for settlement efficiency (the percentage of trades settled) to return to its normal level? Could central bank support of the SSS through credit provision prevent contagion?

The results show that the settlement lag causes the impact of a default to last for more than one day. This implies that in assessing the potential severity of a settlement disruption, policy makers need to look beyond the first-day impact. Indeed, the simulations illustrate that the impact on trade settlement may last even longer than the length of the settlement lag. A second result, deriving from the presence of a cash and a securities leg, is that when very little or no credit is provided by the SSS during the settlement process, the impact of a default and the degree of contagion are greater if the defaulting participant is a net buyer than if it is a net seller. This is due to the fact that cash is needed for every transaction, whereas securities are needed only in transactions involving those particular securities. When significant liquidity is available, the differential between net buyer and net seller disappears. However, even generous liquidity provision is not sufficient to completely eliminate settlement contagion. Finally, the results suggest a policy trade-off between liquidity provision by the SSS and conservative reactions (i.e. reduction of the volume of trades) by participants in response to a disruption. Whereas reduction of the average volume of trades by non-defaulting participants in response to the default of a participant will limit settlement failures, and therefore the need for liquidity, it can also significantly reduce market liquidity, with potentially negative repercussions for financial stability.

The remainder of the article is organised as follows. Section 1 briefly discusses the risks arising in SSSs. Section 2 provides a description of the model used in the simulations and the key assumptions. Section 3 presents the simulation results. The last section concludes.

1. Risks in SSSs

Three main financial risks in SSSs are principal risk, replacement cost risk, and liquidity risk. Principal risk has been defined above. Replacement cost risk is the risk that a counterparty may default prior to settlement, denying the non-defaulting party an unrealised gain on the trade. The reasoning is that if market prices have changed in the meantime, the new terms for a similar trade may be significantly less favourable. Liquidity risk is the risk that the seller of a security who does not receive payment when due (or a buyer of a security who does not receive the security) may have to borrow or liquidate assets in order to satisfy other trades.

As noted earlier, DVP systems largely eliminate principal risk. They do not, however, eliminate liquidity and replacement cost risk. Whereas replacement cost risk depends in part on the lag in settlement, the nature of liquidity risk will depend on whether the settlement system uses gross (trade by trade) settlement or net settlement.[2]

Gross settlement. In this type of system, delivery and payment occurs on a per-transaction basis during the settlement process. This implies that if participants are unable to adjust their money balances during the processing cycle, they will need to hold enough cash balances to cover the largest debit position arising during processing. This may require substantial intraday liquidity. If sufficient money balances are not available, high "fail" rates may result, implying substantial liquidity risk and replacement cost risk.

(1) Additional details and results may be found in Devriese and Mitchell (2005).

(2) Note that, apart from net and gross settlement, some systems settle the securities leg on a gross basis and the cash leg on a net basis.

Net settlement. In this type of system all deliveries and payments occur on a net basis at the end of the settlement process. Net settlement economises on the amount of intraday liquidity needed, thereby lowering liquidity risk; however, it increases replacement cost risk, as the settlement of any trade is only final at the end of the settlement process. In addition, default by a participant raises the possibility of costly trade unwinds, through which the settlement system deletes (or unwinds) some or all of the transfers involving the defaulting participant and then has to recalculate the settlement obligations of the other participants.

2. Description of model used in settlement simulations

Much of the empirical literature on contagion in payments systems and interbank markets makes use of simulations with relatively strong underlying assumptions, which are necessary, for example, due to the inability to obtain data on participants' bilateral positions. This is all the more true for simulations of SSSs, for which it is generally impossible to obtain any real data. Data relating to individual trades in SSSs are highly confidential. In addition, the amount of data required for an empirical study would be massive, due to the need for data not only on participants' trades but also their cash and securities holdings. Only the SSSs themselves are able to use real data in simulations or stress tests. Such exercises are for internal use only and often suffer from the shortcomings, when viewed from a financial stability perspective, that they estimate only the direct effects of default or only the first-day impact of a shock. The simulations reported here suggest that an extension of such an analysis may be desirable.

We model a SSS with DVP and gross settlement, where settlement occurs with a two-day lag. This implies that trades that are undertaken during day t will not be settled until day $t+2$. All securities prices are assumed to be fixed and normalized to one; hence, there is no replacement cost risk arising from changes in asset prices.[1] Liquidity risk is thus the major risk in the model. The disruption in settlement is caused by the default of the largest participant.

This section presents a nontechnical description of the model. Box 1 provides more detail on a number of important technical assumptions.[2]

Starting point: initial endowments of securities and cash

Simulations are run for several scenarios, which differ according to values of parameters such as the number of participants, the number of securities, the limit on intraday credit and the reactions of participants (in terms of expectations regarding the magnitude of indirect effects) following the default. One hundred simulations are run for each scenario. For each simulation involving a given scenario, participants are randomly allocated initial quantities of cash and all securities according to a truncated joint normal distribution.

Timing of events during a given day

Three "events" occur during each day t in the following order: (1) participants' determination of their expected holdings of cash and securities, which will form the budget constraints used for trading on day t; (2) trading; and (3) settlement at the end of day t of trades undertaken on day $t-2$ (which effects the legal transfer of cash and securities from day $t-2$ trades into participants' accounts).[3]

The two-day lag in settlement implies that at the beginning of day t participants do not know with certainty what their legal holdings of securities and cash from all past trades are, as trades from days $t-2$ and $t-1$ have not yet settled. (Trades from day $t-1$ will only be settled at the end of day $t+1$). However, if participants want to trade on day t, they need to have an idea of the amounts of cash and securities they will have to back these trades. Thus, the budget constraints that participants use for determining their trades during day t will be their "expected" budget constraints, or the amounts of securities and cash that participants expect to be deposited in their accounts after settlement of the trades from the previous two days.

Note that at the point when trades for day t are settled (i.e. at the end of day $t+2$), the holdings of securities and cash that participants have in their accounts will reflect the settlement of all trades undertaken up to day t (i.e. through day $t-1$). Therefore, whereas day-t trades are undertaken on the basis of expected holdings of cash and securities resulting from all trades undertaken through day $t-1$, settlement of day-t trades will use the actual (legal) holdings resulting from these trades.

(1) Cifuentes et al (2004) argue that market risk due to changing asset prices may be an important source of contagion in payments systems. The same argument could be made for securities settlement systems.

(2) Devriese and Mitchell (2005) provide a more technical discussion, as well as results of additional simulations not reported here.

(3) In practice, settlement of day-t trades will typically begin during day t+2; however, all trades will not usually be settled until the end of the day. For modeling purposes, we assume that settlement of all day-t trades occurs at the end of day t+2.

Determination of "expected" budget constraints

As mentioned above, if participants want to trade on day t, they must form expectations about the amount of cash and securities they have to back these trades.[1] We make the distinction between participants' expectations in "normal" times; i.e., before any default has occurred, and in "crisis" times, following default by a participant.

Expectations in normal times. We assume that as long as no defaults have occurred, participants expect that all of their previously committed trades will settle (which will actually turn out to be the case). Thus, participants' "expected" budget constraints at the beginning of day t (reflecting the expected results of settlement of all trades undertaken prior to day t) will be identical to the amounts of securities and cash that will actually be deposited in their accounts once settlement of all trades undertaken up to day t has occurred. This means, further, that the amounts of securities and cash actually in participants' accounts on day $t+2$ and used for settlement of day-t trades will be identical to the amounts that were reflected in the "expected" budget constraints used for determining day-t trades. Thus, no settlement failures will occur.

Expectations in crisis times. When a participant defaults, all of its unsettled trades are deleted from the system.[2] Thus, occurrence of a default implies that some of the non-defaulting participants' actual holdings of securities and cash after settlement of trades which are not yet settled at the time of default will differ from the expected budget constraints that were used to determine these trades. For example, if a participant defaults on day t, then all participants who were counterparties of the defaulting participant on day $t–2$ will find themselves with trades from day $t–2$ which do not settle (since these trades are now deleted) and, consequently, with amounts of securities and cash in their accounts available to settle day $t–1$ trades (and even other day $t–2$ trades) that will differ from the amounts that were in the expected budget constraint used for determining day $t–1$ trades. This effect is the direct effect of the default.

There may also be indirect, or contagion, effects of the default, whereby a counterparty of the defaulting participant is now unable to fulfill some of its previously committed trades with other, non-defaulting counterparties as a result of the unsettled trades with the defaulting participant. As noted in the Introduction, we assume that participants do not know the counterparties of their counterparties and, thus, cannot accurately estimate the indirect effects of default. Participants must form some expectations about these effects.

The simulations reported below use a mechanical rule for determining participants' expectations regarding indirect effects (see Box 1 for more detail): participants' expected holdings of all securities and cash are assumed to be some percentage of what they would have been if all trades conducted with non-defaulting counterparties had settled. This assumption allows for comparison of simulations with differing expected percentages of settled trades.

Trades

Trades on any given day are assumed to occur randomly, and trades are considered between all possible combinations of counterparties and securities. Once a pair of participants and a security have been randomly selected, the range of feasible trades between the two participants in that security is determined via the two participants' expected budget constraints. A trade is then randomly chosen from the set of feasible trades, and the expected budget constraints of the participants involved in the transaction are updated to reflect the trade. Selection of the trade is determined via a Beta distribution, which has the advantage that different parameter values can lead to more or less "extreme" trades (i.e., how close the trade is to the boundaries of participants' budget constraints). Simulations with conservative and "extreme" trading behavior can thus be compared.

The assumption of random trade behaviour is more realistic than might appear to be the case at first glance. Large securities firms are often dealers who trade on behalf of their clients. Trades are executed according to the demands of the clients; therefore, the trades may look random from the point of view of the security firm.

Settlement

A trade between two participants is considered to be settled when it is confirmed during the settlement process that the implied transfers of securities and cash are feasible given the amounts of securities and cash in the accounts of the two participants involved in the transaction. Settlement of trades is assumed to occur in the same order as the order in which the trades were undertaken. This maximises settlement efficiency (the percentage of trades that actually settle).[3]

(1) We assume that use of credit in settlement is costly; therefore, participants base their trading only on the cash and securities they expect to have available for settlement.

(2) This reflects real practice in many SSSs where the administrator or liquidator may block unsettled trades to protect the interests of creditors.

(3) In practice, SSSs do not know the actual order of trades; however, they use other algorithms to maximise settlement efficiency and minimise the amount of liquidity that must be provided.

A further aid to settlement is the assumption of a queue of unsettled trades, which also reflects practice in SSSs. Trades that are still unsettled at the end of settlement process are placed in a queue for settlement the following day.[1] Allowing for a queue of unsettled trades increases the amount of settled trades which otherwise would have been deleted. This reduces replacement cost risk for the participants.

Another feature of the model that can reduce settlement failures is the provision of intraday credit, which may be drawn upon during the settlement process in order to avoid settlement failure. The credit limit is set as a percentage of the total value of the participant's initial endowment of assets.

The initial shock

The initial shock in settlement is assumed to stem from an exogenous default of the largest participant.[2] All unsettled trades of the failed participant are then deleted from the system. We assume, further, that the default is anticipated. In other words, we assume that if the largest participant defaults on day t, all other participants learn of the impending default just before trading begins on day t, and they avoid trading with the defaulting participant during that day. The direct effects of the default, therefore, will be confined to the trades undertaken on days $t–2$ and $t–1$, before the impending default became known. Making such an assumption adds to the realism of the model, as in reality defaults are often anticipated.[3] Furthermore, it allows us to show that even an anticipated shock can cause large scale settlement failures.

Settlement efficiency

Settlement efficiency, or the percentage of trades actually settled on a given day, is used as an aggregate measure of liquidity risk. Settlement efficiency is calculated by dividing the aggregate value of settled trades by the aggregate value of trades needing to be settled. We distinguish between two measures: total settlement efficiency and indirect settlement efficiency. Total settlement efficiency includes in the denominator all trades committed two days earlier, including those involving the defaulting participant.[4] Indirect settlement efficiency, on the other hand, includes in the denominator only the trades that did not involve the defaulting participant. Hence, indirect settlement efficiency is a measure of contagion in the settlement system.

(1) In practice, the settlement process in any given day will involve several iterations, or batches. Trades that are unsettled in the first batch are tried again in the second, etc. The running of multiple batches reduces the number of trades left in the queue at the end of the day. Three batches are used in the settlement simulations reported here.

(2) Although the initial shock in settlement is assumed to arise from the default of the largest participant, this does not imply that solvency risk is playing a role in the model. The simulation takes into account liquidity risk only, gauged in terms of the trades that fail to settle because of insufficient cash or securities holdings by the transaction participants. Unlike the interbank contagion literature, participants' losses due to failed trades are not compared with a solvency constraint.

(3) The assumption of anticipated default is also equivalent to an assumption of an unanticipated default where the largest participant defaults just before trading begins on day t. Other assumptions are also possible; for example, the default on day t is anticipated on day $t–1$, in which case trading with the defaulting participant would cease on day $t–1$. Employing such an assumption would not change the qualitative results or the conclusions deriving from the simulations.

(4) Any unsettled trades in the queue from previous days are also included in the denominator.

Box 1 – Some technical assumptions of the model

Determination of trades

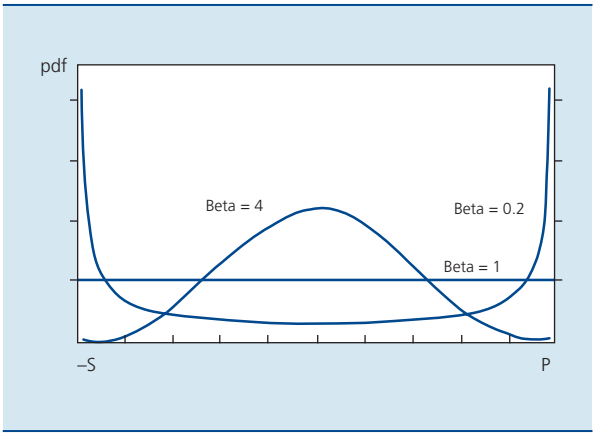
Suppose there are K securities. On day t, participant i's expected budget constraint, representing the expected amounts of securities and cash that the participant will have to settle trades undertaken on day t, can be expressed by a vector $B_{i,t}$ of dimension $K+1$, where the first K rows represent the expected quantities of each of the K securities, and the $K+1$st row represents cash.

Trades are determined as follows. First, a security k and two participants i and j are randomly chosen. Then, all feasible trades of the security between the two participants are determined from their expected budget constraints. The maximum amount of security k that participant i can purchase from j is given by: minimum $[B_{i,t}(K+1); B_{j,t}(k)]$; that is, by the minimum of the amount of cash of player i and the amount of security k held by player j. Call this amount P. The maximum amount of security k that player i can sell to player j is determined analogously: minimum $[(B_{i,t}(k); B_{J,t}(K+1)]$. Call this amount S. All feasible trades can be represented by the interval $[–S, P]$,

where negative values represent a sale of the security by i to j and positive values represent a purchase of the security by i from j.

The actual trade is then randomly chosen from the interval $[-S, P]$ according to a symmetrical beta probability density function (pdf) with parameter β. The parameter β determines the shape of the distribution and, therefore, the probability that a trade will occur in the middle of the interval versus the endpoints. Variations in the pdf as a function of β are illustrated by the graph below. For example, the constant pdf (the flat line) shows that the standard uniform distribution is a special case of the beta distribution. On the other hand, values $0<\beta<1$ represent more extreme trading behaviour, as trades occur more frequently near the endpoints. Different choices of β thus allow for simulations with differing degrees of moderation in trading behaviour.

CHART 1 PDF OF THE BETA DISTRIBUTION



Participants expectations' following a default

The default of a participant j during day t can have both direct and indirect effects on a participant i, and hence, on i's expected budget constraint for day $t+1$, $B_{i,t+1}$. The direct effects are linked to trades that were committed between i and j prior to the default but that are not yet settled at the time of default. These trades will be deleted by the settlement system (due to our assumption that j's default reflects insolvency of that institution). Since we assume that each participant knows its counterparties for all trades, it is possible for participant i to modify the expected budget vector $B_{i,t+1}$ to adjust for the deleted trades with j. Call this modified vector $\overline{B_{i,t+1}}$.

Whereas the direct effects of default can be calculated, the indirect effects of default are not known by participant i with certainty, since participants do not know the counterparties of their counterparties. Thus, participant i has to form some expectations about how the indirect effects of default will further alter the vector $\overline{B_{i,t+1}}$. We assume that participants use a mechanical rule to modify $\overline{B_{i,t+1}}$ to account for the indirect effects of default. Namely, we assume that participants diminish the expected quantities of each security and cash by some constant $o \leq \varepsilon \leq 1$. Thus, the new expected budget vector will be given by $(1-\varepsilon)\,\overline{B_{i,t+1}}$, and feasible trades will be chosen from this new vector. While the rule for incorporating indirect effects in participants' expected budget constraints is admittedly mechanical, there are few obvious choices of rules that would clearly be more "rational". In addition, the rule has the advantage of allowing comparison of results where participants react very conservatively to default (high values of ε) with results where participants do not react conservatively (low values of ε). This is one of the differences underlying the "high" and "low" scenarios depicted in Chart 2.

3. Simulation results

The tables and charts below present results from several scenarios, where 100 simulations have been run for each scenario. All scenarios reported below involved 15 participants and 30 securities.(1) The simulation begins five days prior to default by the largest participant and runs up to ten days following default. In the charts below, day D represents the day of default. Given that the default on day D is anticipated on that day, no trading with the defaulting participant occurs on day D; therefore, the direct impact of default will be due only to the trades conducted on days $D–2$ and $D–1$, which are not yet settled at the time of default.

The market shares of the largest participant (i.e. the share of total turnover value accounted for by this participant) averaged 20 p.c. in the simulations, with standard deviation equal to 2 p.c., and minimum and maximum values at 16 p.c. and 26 p.c., respectively.

Table 1 illustrates the first-day impact of default and presents the two measures of settlement efficiency on day D (for trades on day $D–2$) for differing amounts of liquidity provision. Simulations with three different credit limits are presented: (1) no credit; (2) a limit equal to 15 p.c. of the value of initial assets; (3) a limit equal to 30 p.c. of initial assets.

This table shows that settlement efficiency improves dramatically with liquidity provision, reflecting the positive role that liquidity can play in mitigating contagion. Interestingly, however, an increase in the credit limit from 0.15 to 0.30 does not seem to have a large effect. This suggests that although generous liquidity provision can significantly reduce contagion, it can not completely eliminate it.(2)

A question of interest is whether the magnitude of the first-day impact of the default depends upon the net trade position of the defaulting participant. If the defaulter is a net buyer, then the default will cause cash to be extracted from the system. As cash is used in every transaction, this may lead to significant contagion and hence low settlement efficiency. On the other hand, if the defaulter is a net seller, counterparties will become constrained on the securities side. However, as each security is only used in transactions of that particular security, contagion may be weaker and settlement efficiency higher.

TABLE 1 FIRST-DAY IMPACT OF DEFAULT, AS A FUNCTION OF THE INTRADAY CREDIT LIMIT

Credit limit (Equal to p.c. of initial asset value)		Indirect settlement efficiency (p.c.)	Total settlement efficiency (p.c.)
0	Mean	53.62	42.68
	Std dev	6.26	5.08
0.15	Mean	80.64	64.57
	Std dev	3.23	3.24
0.3	Mean	83.22	66.34
	Std dev	2.35	2.55

Charts 1A–1D, illustrate the effects on day-D settlement efficiency of the defaulting participant's net trade position (as measured from the trades on day $D–2$) for scenarios where the credit limits are zero and 15 p.c. of assets, respectively. The net trade position is defined as the sum of the values of all trades undertaken by the defaulting participant (where negative values represent sells and positive values represent buys) as a proportion of the total volume traded by that participant. The more positive is the measure of net trade position, the larger a net buyer the defaulting participant was on day $D–2$. A negative net trade position represents a net sell position.

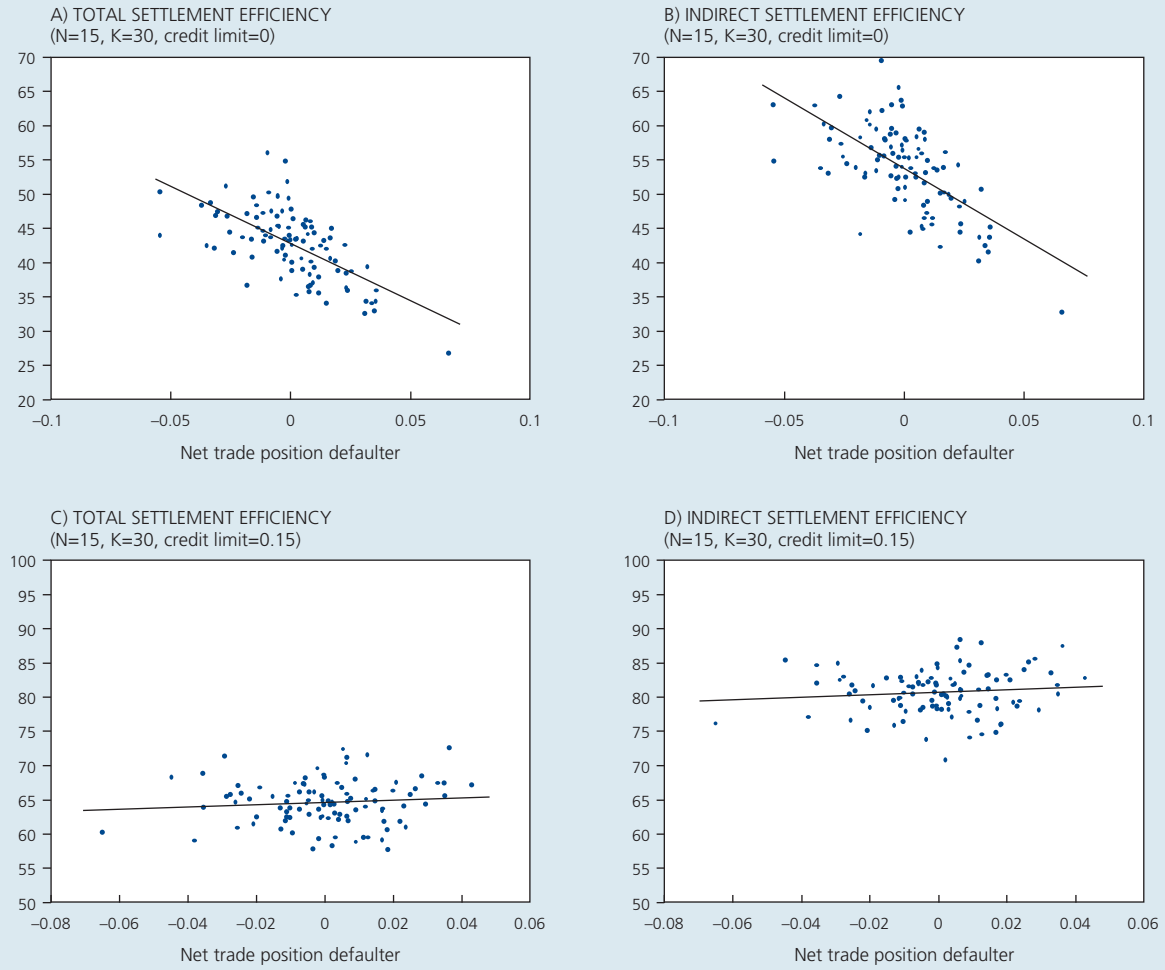
Charts 1A and 1B show that when no liquidity is provided by the SSS, the first-day impact of the default is greater if the defaulting participant is a net buyer than a net seller. As might be expected, the net trade position of the defaulting participant is more important in determining the extent of contagion (indirect settlement efficiency) than total settlement efficiency. When the credit limit is increased to 0.15 (Charts 1C and 1D), the differential impact on settlement efficiency of net buy and net sell positions disappears. Nevertheless, as suggested above, settlement efficiency does not return to 100 p.c. This is because even generous liquidity provision cannot completely compensate for shortages on the securities side of transactions.

The discussion above suggested that because of the settlement lag, settlement failures can continue for more than a single day following a default. This is illustrated by Chart 2, which compares two scenarios: a "high" and a

(1) The smaller the number of participants and the larger the number of securities, the more severe will be the effects of the default. See Devriese and Mitchell (2005). Although the number of participants and securities might appear rather low, this is not necessarily the case. For SSSs within the EU, for example, the number of participants varies from a dozen to a few thousand. Even when the SSS involves over a thousand participants, it is not uncommon that the ten largest participants account for over fifty percent of the trading volume. The number of securities that are actively traded may also represent only a small proportion of the total number of securities in the system (see ECB, 2004).

(2) It is possible to use the measures of indirect and total settlement efficiency to compute the percentage of total trades involving the defaulting participant. Using the mean values of the settlement efficiency measures, the trades involving the defaulting participant averaged around 20-21 percent of total trades across the different scenarios. This implies that in the absence of any indirect effects of default, total settlement efficiency would have averaged around 80 percent on the day of default.

CHART 1 FIRST-DAY IMPACT AS FUNCTION OF NET TRADE POSITION



"low" settlement scenario. The "high" scenario assumes a high credit limit (equal to 30 p.c. of a participant's initial assets) and very conservative expectations concerning the indirect effects of default (participants assume that 80 p.c. of previous trades will not settle as a result of the indirect effects of the default). The "low" scenario involves no credit and only slightly conservative expectations concerning the indirect effects of default (participants assume that 20 p.c. of previous trades will not settle as a result of the indirect effects of the default).

Chart 2 presents the values of settlement efficiency over a period of several days, from *D–1* up to *D+10*. The thick lines represent the average value of total settlement efficiency across simulations, and the thin lines represent two standard-deviations around the average.(1)

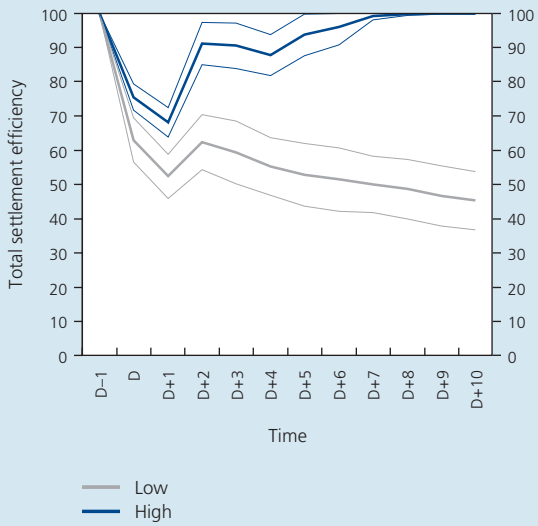
Several observations can be made. First, even in an SSS with DVP and gross settlement, there is still a possibility of a significant, multi-period disruption of settlement activity when a large participant fails.(2) Second, the rapid return of settlement efficiency to high levels in the high scenario occurs as a result of two factors : generous liquidity provision by the SSS and participants' very conservative expectations about the magnitude of indirect effects (which causes them to severely limit volumes in trades undertaken following default, thereby lowering the risk of settlement failures).(3) Third, even with generous liquidity provision, settlement efficiency may not return to its "pre-stress event" levels by day *D+3*. In the low scenario,

(1) The measure of total, rather than indirect, settlement efficiency is used in this figure, since from day *D+2* onwards there are no trades involving the defaulter; therefore, total settlement efficiency and indirect settlement efficiency are the same.

(2) Note that because the settlement efficiency measure is based on the value, rather than the number, of trades, the failure to settle a single large trade can result in a value of settlement efficiency well below 100 p.c..

(3) In each of these scenarios trades are selected according to a beta distribution with a value of β which generates trades nearer the endpoints of the participants' budget constraints (see Box 1). If a higher value of β were used, trades would be farther from the endpoints, and settlement efficiency would be higher.

CHART 2 LENGTH OF A CRISIS FOR DIFFERENT SCENARIOS: "HIGH" AND "LOW" SETTLEMENT



settlement efficiency declines over time due to the fact that inflows into the queue exceed outflows. Part of the new inflows are generated by participants' expectations not being "conservative" enough. The assumption underlying the low scenario is that participants expect that only 20 percent of their previously committed trades will not settle as a result of the indirect effects of the default. These expectations turn out, ex post, to be insufficiently conservative. In addition, part of the new inflows into the queue result from the unpredictable impact of the actual settlement of some of the trades that are in the queue, but for which settlement of that trade then affects the ability to settle a subsequent trade.[1]

Conclusion

This article has used a multi-period, multi-security model of gross settlement to simulate the impact on settlement efficiency of default of the largest participant in a SSS. The simulation results illustrate that differences between payment and securities settlement systems have important implications for the effects of disruptions to the system.

The presence of a settlement log in SSSs leads to situations where settlement disruptions may persist over several days. This suggests that in order to evaluate the full effect of a settlement disruption, policy makers must look beyond the first-day impact. The securities settlement simulations also suggest that, as for payments systems, liquidity provision can be an important tool for limiting contagion. However, due to the presence of a securities as well as a cash leg in securities transactions, generous liquidity provision by an SSS cannot completely eliminate settlement failures. This suggests the need for a well functioning securities lending and borrowing programme in order to completely eliminate contagion; however, it is precisely during crisis periods that participants will be the least willing to lend securities.

In practice, SSSs may decide not to provide large amounts of liquidity, due to the costs or risks involved. For instance, in the high scenario illustrated in Chart 2 – where the SSS provides each participant an emergency credit line equal to 30 p.c. of the participant's total assets – aggregate end-of-day credit reaches a peak on day $D+1$ of 4 p.c. of outstanding securities in the SSS.

One remark following from the simulation results is that liquidity provision by the SSS and participants' conservative reactions to default – via reductions of the volume of trades – may serve as partial substitutes in response to a settlement disruption. That is, either very conservative reactions by participants to the crisis or ample liquidity can dampen the impact of a disruption and lead to a relatively rapid restoration of settlement efficiency. However, these two alternatives create a tradeoff from a financial stability perspective. Whereas generous liquidity provision places a potentially heavy burden on the liquidity provider but does not reduce trading activity, conservative reactions by market participants avoid the burden on the liquidity provider but entail a potentially severe fall in trading volume. Thus, on the one hand, conservative reactions by market participants to a default will result in a more rapid return of the SSS to a normal level of efficiency, and an end to the crisis. On the other hand, severe limitation of trading volume by market participants may sharply reduce market liquidity, which may have a significant, negative impact on financial stability.

Finally, the policy trade-off also suggests that the settlement efficiency measure used here, while a gauge of the extent of disruption in settlement, may not be an accurate measure of the total welfare loss due to the disruption. To the extent that trade volumes are lower than would have been the case in the absence of the disruption, welfare will be reduced beyond the loss due to the unsettled trades. Settlement efficiency may be very high, although trading volume is very low.

(1) Participants are implicitly assumed to ignore the specific trades that are in the queue when making current trades. Although this assumption might seem unrealistic, it would actually be quite difficult to have participants take account of these trades, as it is impossible to know which of the trades in the queue are likely to remain unsettled and which are likely to be settled in the next day's settlement process.

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Structured finance: complexity, risk and the use of ratings [1]

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Introduction

Structured finance involves the pooling of assets and the subsequent sale to investors of tranched claims on the cash flows backed by these pools. It has become an increasingly important tool for credit risk transfer. Issuance volumes have grown rapidly over recent years (Chart 1), paralleling technical advances in credit risk modelling.

Like other forms of credit risk transfer – e.g. credit default swaps (CDSs) or pass-through securitisations – structured finance instruments can be used to shift credit risk across financial institutions and sectors. Yet, a key difference between structured finance and other risk transfer products is that, via the tranching of claims, structured instruments also transform risk by generating exposures to different "slices" of the underlying asset pool's loss distribution. As a result of this "slicing" and the contractual structures needed to achieve it, tranche risk-return characteristics may be particularly difficult to assess.

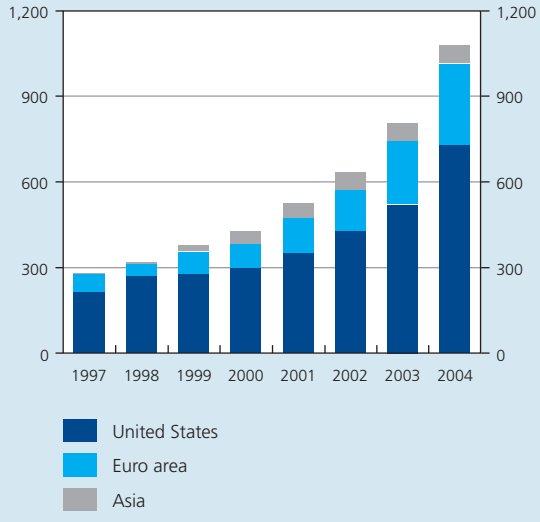
Ratings, which are based on the first moment of a security's loss distribution, have intrinsic limitations in fully gauging the risk of tranched securities. While this observation holds in principle for any security, it will be argued below that the tails of these loss distributions are likely to be more pronounced for structured products[2]. As a result, subordinated structured finance tranches in particular can be expected to be riskier than portfolios of like-rated bonds in that investors in the former are more heavily exposed to extreme loss events. Yet, the complexity of structured finance transactions may lead to situations where investors tend to rely more heavily on ratings than for other types of rated securities. On this basis, the transformation of risk involved in structured finance gives rise to a number of questions with important potential implications. One such question is whether tranched instruments might result in unanticipated concentrations of risk in institutions' portfolios.

(1) The views expressed in this article, which also appears in the BIS Quarterly Review June 2005, are those of the authors and do not necessarily reflect those of the BIS or the National Bank of Belgium; any errors and omissions are those of the authors.

(2) It should be noted that ratings are not intended to be comprehensive measures of risk. This means that the stated limitations relate to their use, not to ratings as such.

CHART 1 TOTAL FUNDED STRUCTURED FINANCE ISSUANCE BY REGION

(In billions of US dollars; data includes cash issuance and funded portion of synthetics)



Source: JPMorgan Structured Finance Research.

For various reasons, some of which are discussed below, structured finance products may be more effective than other financial instruments at addressing problems of adverse selection and segmentation in financial markets. This has made these products attractive for a variety of market participants. Financial intermediaries' motivations for issuing structured finance instruments include access to new sources of funding, reduction of economic or regulatory capital and arbitrage opportunities. Investor interest has been stimulated by portfolio diversification and the expectation of attractive risk-return profiles in an environment of low interest rates.

Recognising the potential of structured finance for risk transformation, the Committee on the Global Financial System (CGFS), which monitors financial market functioning for the central bank Governors of the G10 countries, established a working group to explore these instruments[1]. This article highlights some of the group's principal findings in the context of the "complexity" and "riskiness" of tranched products. Rating agencies and their evaluation approaches are important aspects of this discussion. Other aspects, such as potential conflicts of interest related to issuer fee-based ratings, are briefly mentioned below and covered in more detail in CGFS (2005).

The remainder of this article is organised as follows. The next section briefly discusses the economics of structured finance markets. This is followed by sections focusing on the complexity of structured finance instruments and their risk-return characteristics. The last section identifies some implications for policy makers, researchers and market participants.

1. What is structured finance?

Structured finance instruments can be defined through three distinct characteristics: (1) *pooling of assets* (either cash-based or synthetically created); (2) *de-linking* of the credit risk of the collateral asset pool from the credit risk of the originator, usually through the transfer of the underlying assets to a finite-lived, stand-alone special purpose vehicle (SPV); and (3) *tranching of liabilities* that are backed by the asset pool. While the first two characteristics are also present with classical pass-through securitisations, the tranching of liabilities sets structured finance products apart[2].

A key aspect of the tranching process is the ability to create one or more classes of securities whose rating is higher than the average rating of the underlying collateral asset pool or to generate rated securities from a pool of unrated assets. This is accomplished through the use of credit support specified within the transaction structure to create securities with different risk-return profiles. The priority ordering of payments offers one example of credit support: the equity/first-loss tranche absorbs initial losses up to the level where it is depleted, followed by mezzanine tranches which absorb some additional losses, again followed by more senior tranches. The credit support resulting from the priority ordering means that the most senior claims are expected to be insulated – except in particularly adverse circumstances – from the default risk of the asset pool through the absorption of losses by subordinated claims.

Each of the three key characteristics of structured finance contributes to "value creation" and to the attractiveness of structured finance markets for a variety of market participants. (Chart 2 illustrates the range of participants involved in a generic structured finance transaction). In this context, de-linking confers benefits similar to those of secured credit, with the additional feature that the income streams from the de-linked assets will tend to be more predictable than those of the ongoing firm. An important question relating to the pooling and tranching characteristics of structured finance is under what circumstances the tranching of liabilities, which is costly, can create value above and beyond that of pooling only (e.g. through "pass-through" securitisation). Answers to this question relate to the nature of imperfections in financial markets. For example, the presence of adverse selection and/or market segmentation can lead to situations where tranching adds value. When the originating institution has more information about the potential cash flows from the asset pool than do outside investors, or when one group of investors has more information or ability to value the assets than others, it may be optimal to issue a senior tranche (i.e. debt), which is at least partially insulated from default and purchased by lesser informed investors, and a junior tranche (i.e. equity), to be acquired by more informed investors or retained by the originating institution[3]. Indeed, banks typically hold the equity tranches of the collateralised loan obligations they issue. Market information also suggests that the more junior

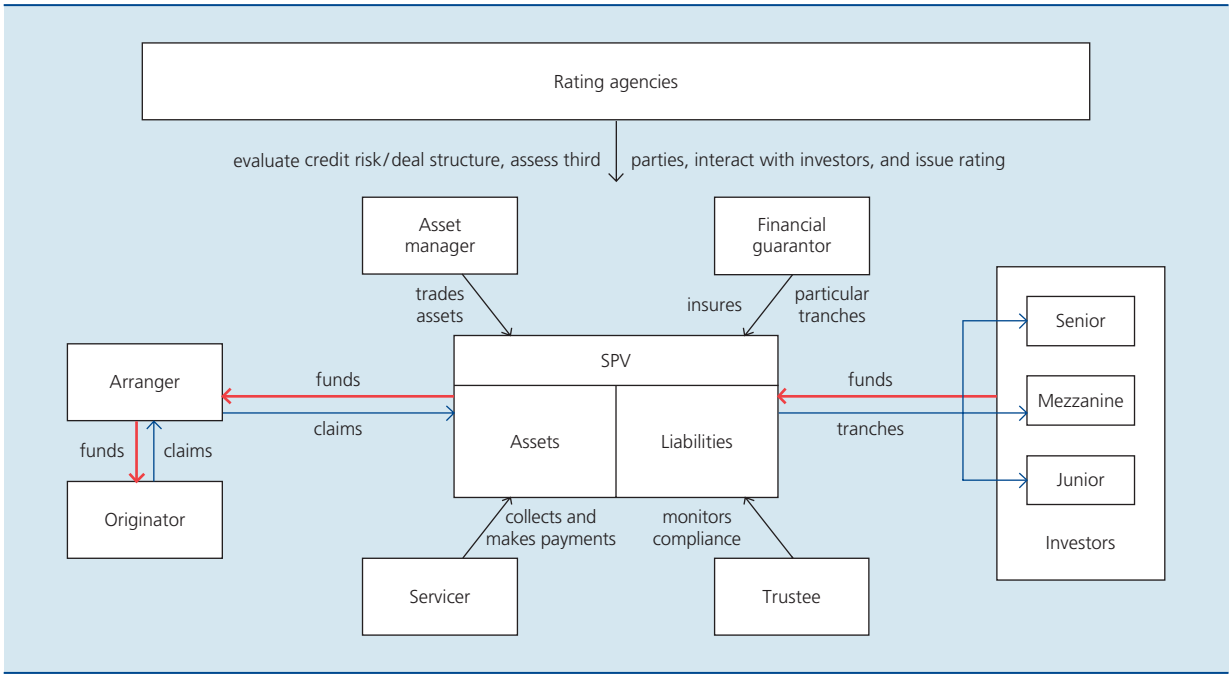
(1) The Working Group on the role of ratings in structured finance was chaired by Peter Praet of the National Bank of Belgium. Its report, CGFS (2005), and a number of background papers authored by working group members are available online at www.bis.org. See also CGFS (2003).

(2) In the remainder of this article, the term "traditional ABS" will be used for structured finance securities backed by large homogeneous asset pools, such as credit cards and auto loans. This contrasts with CDOs, themselves part of the ABS universe, which are backed by smaller pools of more heterogeneous assets, including assets such as bonds sourced in secondary markets and "unconventional" assets, such as tranches of other ABSs and CDOs.

(3) Gorton and Pennacchi (1990) show in a general context that it may be optimal for firms facing informed and uninformed investors to issue both debt and equity. For a review of literature relating more specifically to asymmetric information and market segmentation in structured finance markets, see Mitchell (2004). Ashcraft (2004) and Amato and Remolona (2003) present illustrations of value creation via arbitrage CDOs.

CHART 2 STRUCTURED FINANCE: KEY MARKET PARTICIPANTS

(Stylised overview of the "players" involved in (funded) structured finance transactions and of their roles)



tranches of structured products are often bought by specialist credit investors, while the senior tranches appear to be more attractive for a broader, less specialised investor community.

Similarly, segmented financial markets – due, for example, to the existence of investors with ratings-based investment mandates – may make it attractive for structured finance arrangers to create new assets with desired loss characteristics for particular investor classes. Investors benefit, as structuring helps to "complete" otherwise incomplete financial markets; for example by enabling investors constrained to invest in highly-rated securities to gain exposure to asset classes, such as leveraged loans, whose performance across the business cycle may differ from that of other eligible assets.

Whereas tranching claims may help to overcome certain market imperfections, it also introduces problems related to governance and to the question of who, if anyone, should take responsibility for restructuring the portfolio if some of the underlying assets become nonperforming. As is discussed in the next section, equity tranche holders may have an incentive to increase risk and return, whereas senior tranche holders have an incentive to minimise defaults in the asset portfolio. In addition, if third-party asset managers are required to hold the equity tranche of a transaction in order to control problems of moral hazard, then their incentives will be in conflict with the senior investor classes. Indeed, much of the contractual structure of tranched products amounts to an exercise in "complete contracting", detailing the rights and responsibilities of the asset manager, noteholders, and other third parties involved in the transaction. In practice, these provisions – which take the place of discretionary control rights granted to equity investors in ordinary, long-lived firms – have evolved substantially over time, often in response to poor transaction performance due to unanticipated, opportunistic behaviour by certain participants.

2. The complexity of structured finance

2.1 Sources of complexity

Pooling and tranching, while being key sources of value in structured finance, are also the main factors behind what might be called the "complexity" of these instruments. As far as pooling is concerned, evaluation of risk and return of a structured finance security necessitates modelling the loss distribution of the underlying asset pool, which may be complicated when the pool consists of a small number of heterogeneous assets. However, as tranching adds an extra layer of analytical complexity, the evaluation of a structured finance instrument (in other words, a tranche) cannot be confined to analysing asset pool loss. It is also necessary to model the distribution of cash flows from

the asset pool to the tranches; that is, to evaluate the deal's specific structural features. These features, defined via covenants, may entail sets of rules for the allocation of principal and interest payments received from the collateral pool and for the redirection of these cash flows in the case of stress situations, in addition to specifying the rights and duties of various third parties involved in the transaction[1].

As a result, structured finance instruments give rise to "non-default" risks – ie risks that are unrelated to defaults in the collateral pool, but which nevertheless affect the credit risk of issued tranches[2]. One source of non-default risk arises from the conflicts of interest among tranche holders. For example, senior note holders are promised interest during the life of the transaction and a principal payment at maturity. Equity holders have no promised principal payment; therefore, they have an interest in see(k)ing high up-front payouts before defaults begin to deplete their tranche holdings. By implication, to the extent that equity investors can influence initial portfolio selection, they may be willing to sacrifice credit quality in exchange for enhanced yield payments, eg, by including credits with wide spreads for given rating levels.

To try to control such conflicts, CDOs and other tranched products rely extensively on structural provisions based on loss triggers and threshold levels (eg overcollateralisation and interest rate coverage tests). These tests, when "failed", divert cash flow to protect senior note holders. In this context, preservation of "excess spread", which represents the difference between the income earned on the collateral assets in a given period and the contracted payments to the tranched liabilities, has become a key structural feature. As a result, the excess spread now tends to be held in a reserve fund rather than being distributed to equity tranche investors immediately. This serves to make pay-outs more back-loaded, cushioning the performance of senior notes.

Performance of third parties constitutes another source of non-default risk[3]. Servicer performance, in particular, is of key interest for traditional ABS instruments – especially for structures containing assets from jurisdictions or market segments with a relatively small number of third-party servicers, where replacement servicers may be hard to find. The importance of servicer performance for the robustness of structured finance transactions, including possible interactions with legal and default risks, has been highlighted by the losses experienced on certain transactions in the US manufactured housing ABS markets in the late 1990s[4].

2.2 Structured finance ratings

Given the complexities described above, structured finance has, from the beginning, been largely a "rated" market. Issuers of structured instruments were keen to obtain ratings according to scales that were identical to those for bonds, so that investors would feel comfortable purchasing the new products. Investors, in turn, had an interest in delegating part of the assessment of these instruments to third parties.

The rating agencies, in their traditional role as "delegated monitors" of the riskiness of debt instruments, emerged as a natural source for such services. The complexity of structured finance instruments in all likelihood heightened the importance of this role[5]. Interestingly, structured finance ratings are now among the largest and fastest growing business segments for the three leading credit rating agencies, and a principal revenue source. This has given rise to a number of concerns, including questions about potential conflicts of interest based on issuer-paid fees[6].

While much of the expertise involved in rating traditional debt carries over to structured finance, the special features of structured products lead to differences in the nature of the agencies' rating methodologies. Importantly, structured finance tranches are usually tailored by arrangers with target ratings in mind. This, in turn, requires the rating agencies to take part in the deal's structuring process, with deal origination implicitly involving obtaining structuring opinions from the rating agencies.

In practice, arrangers will routinely use the agencies' publicly available models to pre-structure deals and subsequently engage in an iterative dialogue with the agencies to finalise their structures. This process and the

(1) One might argue that evaluation of subordinated debt and related assets is similarly complex, given various covenants and differences across national bankruptcy laws. We argue that evaluation of structured finance instruments entails all of that complexity, plus additional layers, due to the pooled nature of the underlying assets and the elaborate, often non-standardised contractual structures.

(2) See, for example, Cousseran et al (2004) for a comprehensive description of these issues.

(3) The underperformance of certain early CDO structures has at least partially been blamed on the actions of asset pool managers. The recent legal dispute over CDO structures named "Corvus" and "Nerva" involving HSH Nordbank and Barclays Capital, which was settled out of court in February, may be a case in point. HSH Nordbank sued Barclays Capital because of losses incurred in these CDO structures, which Barclays managed and in which the asset manager had included some tranches from other, poorly performing Barclays CDOs.

(4) A decline in underwriting standards, combined with the servicers' delay of foreclosures, which allowed delinquencies to build, ultimately resulted in higher than anticipated loss severities. In the wake of the economic downturn starting in 2000, pool deterioration became increasingly apparent, triggering substantial downgrades. See CGFS (2005), appendix 5, for more detailed coverage.

(5) Indeed, work by Ammer and Clinton (2004) on pricing patterns for US ABSs suggests that reliance on ratings as a source of credit information seems to be somewhat higher in structured finance than in traditional bond markets. Specifically, ABS downgrades are found to have a stronger impact on prices than do downgrades for corporate bonds, with downgrades to speculative grade standing out in particular.

(6) Moody's annual report for 2003 documents that structured finance, at $460 million, accounted for more than 40 p.c. of its ratings revenues. Although separate public accounts for Fitch Ratings and Standard & Poor's are unavailable, the annual reports of their respective parent companies suggest that structured finance is of comparable importance for them too.

confined, contractual nature of a structured finance transaction allows arrangers to adapt the profile of a tranche in response to pre-rating feedback, which implies that the process of rating these instruments has a pronounced "ex ante" nature. This contrasts with traditional "ex post" ratings, for which targeted ratings levels and pre-rating feedback play less of a role, owing to the limited ability of issuers to adjust their credit characteristics in response to such information.

3. The risks of structured finance

3.1 Analysing pool default risk

Ratings, as indicators of the default risk embedded in debt instruments, are based on expected loss (EL) or probabilities of default (PDs)[1]. The estimate of EL or PD for a structured finance tranche will critically depend on the size (i.e. "thickness") and position of that tranche in the loss distribution of the underlying asset pool. To obtain this assessment, as highlighted above, an estimate of the asset pool's loss distribution (the result of *credit risk modelling*) has to be combined with information about the structural specifics of the deal and its tranches (the result of *structural analysis*).

The main factors driving the loss distribution of any portfolio and, hence, the three main inputs into each agency's structured finance rating methodology are estimates of: *probabilities of default* of the individual obligors in the pool; *recovery rates*; and *default* (*time*) *correlations* among the obligors within the pool. The choice of the approach used in conjunction with these inputs to model losses will depend on collateral pool specifics, such as the number and homogeneity of assets, obligor classes, and historical performance. In this regard, a key differentiation can be made between the approaches used to rate traditional ABS instruments versus those applied to CDOs.

Traditional ABS portfolios are usually made up of large, well diversified, homogeneous pools of assets (e.g. residential mortgages or credit card receivables), with no significant individual exposures relative to overall pool size. Thus, idiosyncratic risk is much less important for ABSs than for instruments with less diversified and more heterogeneous collateral pools. As a result, ABSs are typically rated by use of so-called "actuarial approaches", which rely on the assumption that each originator's unique underwriting policy gives rise to characteristic loss and recovery patterns that are reasonably stable over time. Loss and dispersion measures can then be reliably inferred from the loss histories of static pools of assets originated by the same lender.

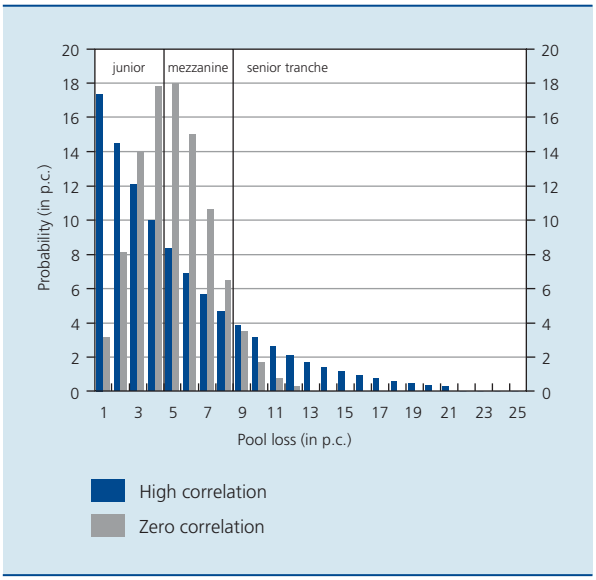
CDOs, on the other hand, are "lumpy" (i.e. less granular than traditional ABSs) and generally contain, or are referenced to, relatively small numbers of non-homogeneous assets. As a result, both idiosyncratic and systematic risks are important for pool performance, and methods used for calculating loss distributions for traditional ABS portfolios are inappropriate for CDOs.

One of the key issues affecting the assessment of the loss distribution for CDO portfolios is the estimation of default correlations among the obligors. When correlation is close to zero, a typical CDO's loss distribution will have a skewed bell shape that is best approximated by the binomial distribution. At higher correlation levels, however, the shape of the loss distribution changes, as probability mass is moved into the tails (see Chart 3). For a given level of expected loss, higher correlation among obligors in the pool thus leads to loss distributions such that the senior tranches bear greater risk and the most junior tranche benefits, as outcomes will be more dispersed.

Estimates of tranche risk and return, therefore, are quite sensitive to assumptions regarding the default correlation of obligors in the underlying pool. Consequently, estimates of tranche EL and PD – i.e. ratings – may differ across rating agencies due to differences in methodologies and/or assumptions. This, in turn gives rise to "model risk",

(1) Ratings issued by Standard & Poor's and Fitch are based on PDs, whereas Moody's ratings are based on EL. These differences have a historical component – in order to enhance comparability between bond and structured finance ratings, each agency elected to base its structured finance ratings on the same measure used for its bond ratings.

CHART 3 LOSS DISTRIBUTIONS: HIGH VS LOW CORRELATION



Source: CGFS

i.e. the risk that the specific model used to size the credit enhancement for a given tranche and rating may inaccurately reflect the "true" risk of the tranche. Investors, in turn, need to understand the model risk they are taking in order to demand appropriate risk-adjusted returns[1].

tranches of structured finance instruments can be more leveraged than the portfolio of underlying assets: i.e. the more subordinated a given tranche and the "thinner" that tranche, the greater the probability that the holder of the tranche will lose a significant portion of its investment.

3.2 Ratings and tranche risk properties

A related question is whether ratings, to the extent that they accurately reflect EL or PD, are a good guide to the risk properties of tranched instruments. For instance, depending on their position in the seniority structure,

(1) See Fender and Kiff (2004) for a comparison of the rating agencies' approaches for CDO modelling and a description of the key role played by default correlation in understanding model risk; Amato and Gyntelberg (2005) show how the price sensitivities of tranched instruments depend on default correlations.

Box 1 – Ratings and the risk properties of structured finance products[1]

Ratings are assessments of *expected loss (EL)* or *probability of default (PD)* and thus reflect an actuarial notion of credit risk that depends only on the first moment of the distribution of possible outcomes. Holding EL constant, however, an investment will tend to be riskier if its loss distribution is more dispersed. Risk profiles of financial instruments are, therefore, more fully described when estimates of EL or PD are combined with information regarding the *ex ante uncertainty of losses* as reflected, for example, in the variance and higher moments of the loss distribution. Ex ante credit loss uncertainty, in turn, has come to be commonly referred to as "*unexpected loss (UL)*". With regard to structured finance, two considerations merit mention in this context:

1/ Risk comparisons among structured finance tranches

Due to the additivity of EL, the process of tranching will distribute the EL of the underlying portfolio across the various classes of securities issued against the pool. The equity tranche, although typically the smallest tranche in terms of notional size, will end up bearing much of the pool's EL. In contrast, the senior tranche, being highly rated, will bear only a small portion of the EL, despite laying claim to most of the structure's principal. Tranche UL will exhibit similar patterns across tranches: measured against tranche notionals, the UL of a tranche will tend to be higher for more junior tranches. The risk profile of a structured finance tranche, in fact, depends largely on two factors: its *seniority* (as determined by the lower boundary of the tranche) and its *thickness* (i.e. the distance between the upper and lower tranche boundaries, see Chart 3). The lower the seniority, the lower the level of loss protection and the higher the risk of a given tranche. The narrower the tranche, the more the loss distribution will tend to differ from the distribution for the entire portfolio in that it is likely to be more bimodal and, thus, riskier.

2/ Risk comparisons with like-rated assets

Another aspect of structured finance is that tranching can lead to risk profiles that are substantially different from those of ordinary bond portfolios with the same (weighted average) rating. One factor behind this observation is the possibility of zero tranche recoveries for subordinated tranches. As a result, if defaults are severe enough, investors in all but the most senior tranches may lose the entire value of their investment even in the case of non-zero recoveries. The narrower the tranche, the riskier it will be, as it takes fewer defaults for the tranche to be wiped out once its lower loss boundary has been breached. Subordinated tranches, therefore, have a wider distribution of outcomes than like-rated bond portfolios and will thus need to pay a higher spread than traditional debt instruments to compensate for the added risk.

(1) See CGFS (2005), Gibson (2004) and Meli and Rappoport (2003).

As explained in Box 1, the variety of possible risk profiles generated through tranching can lead to substantial differences, in terms of unexpected loss and the timing of losses, among tranches as well as between tranches and ordinary bond portfolios. Importantly, these differences apply even when the two instruments have the same expected loss or probability of default. As a result, tranched products can have risk properties that differ substantially from those of equally rated bond portfolio exposures. An important implication is that, due to the joint effects of pooling and tranching, ratings of structured finance products are likely to provide only an incomplete description of their riskiness relative to traditional instruments. In particular, as "tail events" tend to be more likely than for like-rated traditional instruments, undue reliance by structured finance investors on ratings can thus lead to unintended exposures to unexpected loss.

Structured finance and bond ratings differ not only in the conceptual dimensions highlighted above, but also in terms of the empirically observed rating stability over time. Given the pooled nature of structured finance products, and resulting diversification, they might be expected to – and indeed do – exhibit greater average ratings stability. Empirical studies suggest, in particular, that the volatility of structured finance ratings is significantly lower than for corporate bonds, although the average number of notches per structured finance rating change appears to be higher – perhaps reflecting their higher inherent leverage described earlier. The likelihood of a rating change, therefore, is smaller in structured finance, while the magnitude of the change, when it occurs, is larger. At the same time, the results for structured finance products taken as a whole mask significant differences across different types of structured instruments, and particular asset classes seem to exhibit a markedly higher rate of downgrades than bonds[1].

4. Some implications

While structured finance instruments can contribute to market completion and a better dispersion of credit risk, they also give rise to a number of questions with potential financial stability implications. One of these is whether adding structured instruments to an institution's portfolio might lead to unanticipated risk concentrations. A closely associated question is whether ratings-related investment mandates and similar constraints are effective in defining maximum levels of risk when structured finance is an eligible asset class.

The discussion above suggests that tranched securities pose unique challenges to the application of ratings-based constraints in that a greater likelihood of "tail events" is not captured by ratings ranking expected loss or probability of default. Transaction-specific documentation makes the task of assessing the riskiness of tranched instruments even more difficult, which in turn may increase investors' reliance on ratings for "due diligence" purposes. And, even when asset managers do fully understand the risks they are taking, they may still be tempted to employ structured securities to increase portfolio risk to levels that are higher than what was intended by those who designed their investment mandates. By implication, market participants and supervisors should not rely exclusively on ratings when setting risk limits for credit portfolios[2].

Model risk is another important concern, being tightly linked to the complexity of structured products and to the sensitivity of tranche risk to differing assumptions embodied in estimates of the asset pool loss distribution[3]. Importantly, any effect of mis-specified model inputs, such as default correlation, may be magnified by governance issues, as equity tranche holders favour asset pools composed of obligors with high default correlations, at the expense of senior note holders.

In addition, it should be noted that model risk is a feature also of the pricing models used by deal arrangers and other market participants. As these models have to date been largely untested by a truly major stress event, even the most sophisticated market participants may thus need to be careful when trading structured instruments, given the resulting scope for mis-priced or mis-managed exposures. A related point is that adding tranched products to existing exposures in a portfolio raises issues regarding the management of correlations on the portfolio level – particularly for "correlation-intensive" instruments, such as CDOs based on tranches of other CDOs.

Fortunately, these issues appear to be reasonably well understood by many, if not most, market participants. Market surveys suggest that investors do not rely exclusively on ratings for their structured finance investment decisions; rather, they tend to see ratings as only one element of a broader process of risk management. In addition, those investors who lack the capacity to analyse

(1) One such example is CDOs, for which Moody's reports a downgrade-to-upgrade ratio of 19.0 for 1991–2002, as compared with long-term ratios of 1.2 for all structured finance products and 2.3 for corporate bonds. According to market sources, this record was primarily driven by an extraordinarily high rate of defaults and downgrades for bonds included in CDO pools and by shared concentrations in particular obligors. See also Violi (2004).

(2) The new regulatory capital requirements for banks' holdings of securitisations, as specified in the new Basel II framework, may be seen as a reflection of these considerations. They not only take account of the rating assigned to a tranche, but also explicitly incorporate factors such as the level of subordination of the tranche and the granularity of the underlying asset pool. For more details on the different approaches for computing regulatory capital for securitisations, see CGFS (2005), Box 6.

(3) Note that model risk is also present in bond ratings. However, given the less quantitative nature of the bond rating process, model risk is arguably more pronounced and its sources more easily identifiable in structured finance ratings.

complex structured finance instruments, such as CDOs, claim to avoid using them (see CGFS (2005) and ECB (2004)). However, to the extent that structured finance markets are broadening to include less sophisticated institutions and retail investors, the risk of unanticipated losses is real.

The rapid evolution of structured finance markets implies that new structures and asset classes are continually being introduced. As a result, unfamiliar structures create new opportunities for unanticipated behaviour by note holders or third parties, while the scarcity of data on the historical performance of new asset classes introduces additional model risk. Given the issues highlighted in this article and the fact that the structured finance market remains largely untested, policy makers and market participants alike have an interest in following closely the developments in these markets and in attempting to understand the core challenges faced.

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Measuring the interest rate risk of Belgian regulated savings deposits

Konstantijn Maes
Thierry Timmermans

Introduction

Deposits are at the core of banks' financial intermediation function. By issuing deposits, banks reconcile the wishes of small savers for high liquidity and low risk with the needs of investors, who require stable funding for risky, large, and long term projects. By transforming liquid deposits into long term assets, banks expose themselves to interest rate, credit, and liquidity risks, for which they are remunerated by a typically positive interest rate margin.

There exists a wide range of deposit accounts. *Sight deposits* can be withdrawn at any time and may be used as means of payments, but barely offer positive nominal returns. *Term deposits* offer substantially higher market-consistent returns, but cannot be withdrawn until their defined contractual term expires. *Savings deposits* are special, in the sense that they preserve a high degree of liquidity, while offering a relatively attractive rate of return.(1)

In Belgium, savings deposits are also special because they are the subject of important regulation affecting their pricing, remuneration structure, and fiscal treatment.(2) The favourable fiscal treatment aims to promote savings, whereas the price and remuneration structure regulation aims more at promoting economic objectives, such as the stimulation of fixed interest loan contracts by decreasing the variability of banks' volume and cost of funds.

Yet, savings deposit accounts raise important financial stability issues. Not only do they represent a significant proportion of banks' liabilities, but the large volume of funds is used as a major maturity transformation instrument, since aggregate savings deposit volumes tend to be fairly stable. However, depositors possess the right or option to withdraw all or a part of their deposited funds at any time. The existence of this "embedded" option, together with the bank's option to change the savings deposit rate in response to market rate changes, complicates banks' risk management and supervisors' prudential assessment. Nonmaturity accounts are complex financial instruments to price, value, and manage.

The difficulty of measuring the interest rate risk of savings deposits is mainly due to the presence of the two embedded options mentioned above, which are clearly not independent of each other. For example, if banks were to raise deposit rates only partially in response to an increase in market rates, depositors might withdraw their balances, or part of them, in order to invest their funds at the higher market rates. However, if banks fully adjust savings deposit rates to increases in market rates, the bank incurs a substantial cost as the increased deposit rate applies to all existing deposit balances, including the portion that would not have been withdrawn in the absence of a full adjustment. Such considerations and interactions show that repricing and volume risks should be studied jointly within an interest rate risk framework.

(1) In general, deposit accounts with uncertain effective maturity, i.e. sight and savings deposits, are often referred to as *nonmaturity* deposit accounts. Nonmaturity refers to the fact that the behavioural or effective maturity is perceived to be quite different from the contractual maturity, which is zero or close to zero. The return wedge between nonmaturity and defined maturity deposit accounts can be interpreted as an extra illiquidity risk premium that term depositors implicitly require. Alternatively, nonmaturity depositors can be thought to pay an insurance premium against illiquidity by accepting a lower return.

(2) The price and remuneration structure regulation is first specified in the Royal Decree of December 29 1983 and updated in the Royal Decree of August 27 1993 (KB/WIB 1992), while fiscal regulation of savings deposits already goes back to 1962. See Box 3 in the Overview of this FSR for further details. Belgium is not unique in regulating savings deposits. France, for example, also has a similar regulation in place for its saving passbooks, while Finland also had tax exempt deposits until mid 2000.

We analyse the interaction of bank and depositor behaviour from a conceptual point of view and discuss the different modelling approaches that can be used to model and measure it. While we focus on the special case of savings deposit accounts in this article, our analysis has a wider relevance, as similar modelling techniques can be applied to other financial instruments with effective maturities that differ from contractual ones, such as sight deposits or mortgage loans with embedded prepayment options.

The article is structured as follows. Section 1 analyses the stylized facts of Belgian regulated savings deposits, i.e. importance in the Belgian economy, recent evolution, and description of deposit volume and rate dynamics. Section 2 then focuses attention on the different approaches to measure savings deposits' interest rate risk. Finally, Section 3 concludes.

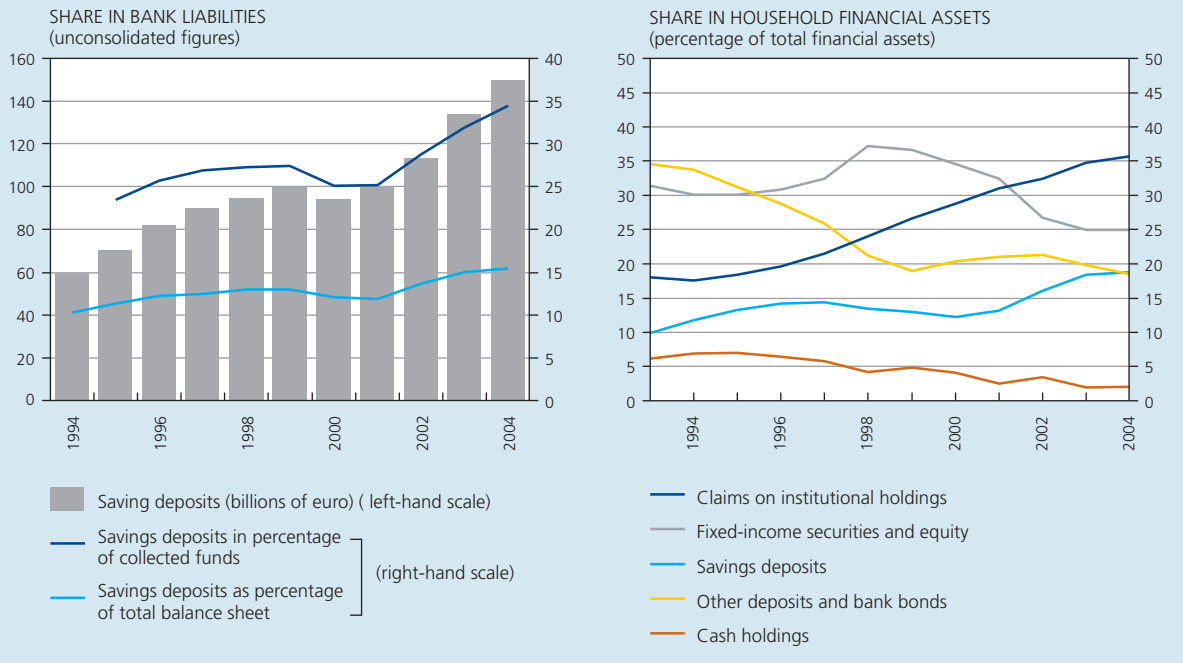
1. Importance and dynamics of Belgian regulated savings deposits

1.1 Importance

Savings deposits play an important role in the funding of Belgian banks. The left-hand side panel of Chart 1 shows that they increased from 60 billions of euro in December 1994 to 150 billions in December 2004, i.e. somewhat more than 50 p.c. of Belgian 2004 GDP. Savings deposits also gained importance in relative terms. The share of regulated savings deposits in bank liabilities increased from 10.3 p.c. to 15.5 p.c. in the last decade, while, expressed as a percentage of funds collected from customers (i.e. bank bonds and total deposits), their share increased from 23.5 p.c. to 34.4 p.c.

The above aggregate ratios conceal the fact that there is actually a substantial amount of variation across banks, according to their specialization and size. For example, whereas savings deposits account for 11 p.c. of liabilities on average for the 4 largest Belgian banks in 2004, this average proportion reaches 43 p.c. for the medium-size banks specialised in the distribution of this product.

CHART 1 IMPORTANCE OF REGULATED SAVINGS DEPOSITS FOR BELGIAN BANKS AND HOUSEHOLDS



Source : CBFA, NBB.

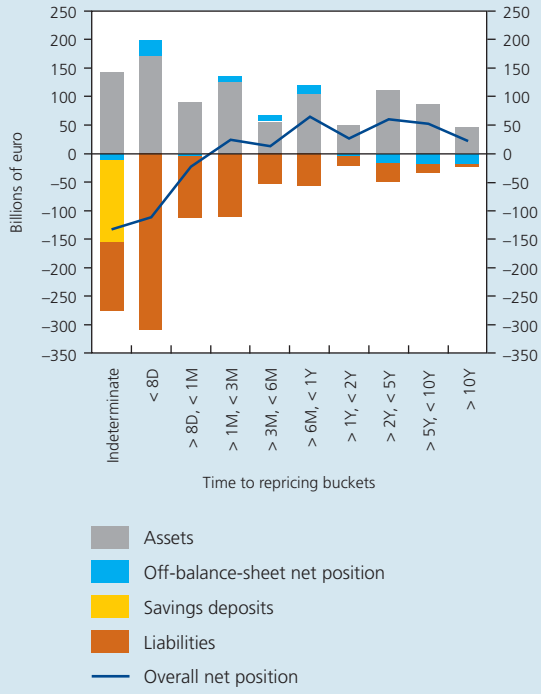
The right-hand side panel of Chart 1 shows that savings deposits also account for a significant and increasing proportion of Belgian household assets: their share increased from 9.9 p.c. in December 1993 to 18.8 p.c. in September 2004. As a result, savings deposits have recently outstripped the combined total of bank bonds and all other deposits held by households.

The importance of savings deposits in the interest rate risk management of Belgian banks is illustrated in Chart 2. The chart groups Belgian banks' assets, liabilities and net off-balance-sheet (OBS) positions according to their remaining time to repricing, from up to 8 days to more than 10 years. The difference between the long and the short positions across the repricing buckets is synthesised in the line indicating the overall net position. This latter is positive at the long end of the maturity spectrum and negative at the short end, which confirms the typical maturity transformation function of Belgian banks.

Besides the nine repricing buckets with specific time to repricing intervals, there exists a considerable amount of assets and liabilities with *indeterminate* time to repricing. For example, savings deposits are classified in this category and represent about 50 p.c. of all liabilities with indeterminate time to repricing.(1) However, to the extent that savings deposits effectively have a high degree of stability and relatively sticky interest rates, they should be allocated to longer maturity buckets for risk management purposes, thereby helping to dampen the overall interest rate risk.

CHART 2 ASSETS AND LIABILITIES OF THE BELGIAN BANKING SECTOR ACCORDING TO RESIDUAL TIME TO REPRICING

(September 2004, unconsolidated figures, billion of euro)



Source: CBFA, NBB.

1.2 Deposit rate dynamics

Chart 3 represents a quarter century of monthly Belgian market and savings deposit rates. More specifically, the savings deposit rate -proxied here by the base rate plus the loyalty premium offered by a major player in the market, hence representative of the rates applied by the large Belgian banks- is plotted against the 3m Treasury Certificate rate and the 10 year government bond rate. Focussing on the market rates, we observe a positively sloped yield curve in most of the past 25 years, with some exceptions in the early 1980s and 1990s. Comparing market with deposit rates, we see that savings deposit rates on average lie substantially below market rates. The spreads between long rates and savings deposit rates have been relatively stable, decreasing only slightly over time. Spreads between short market rates and savings deposit rates are much less stable and have dropped significantly in the last decade.

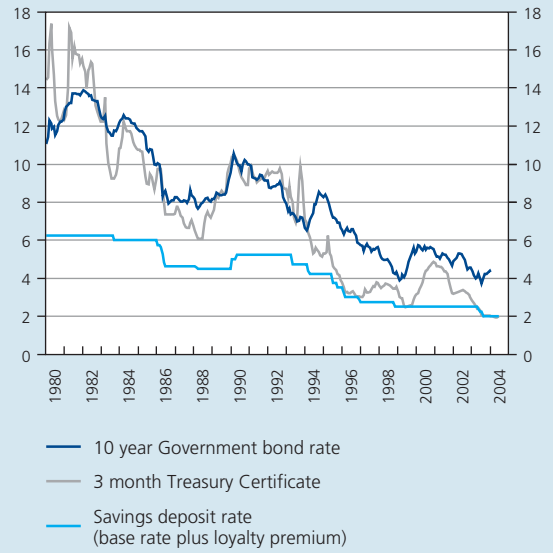
The decreased spreads between market and deposit rates may reflect a combination of structural changes in the market. Among these factors we could mention (i) the smaller cross-subsidisation by savings deposits of other banking products, (ii) lower servicing costs of savings deposits thanks to advances in technology, and (iii) changes in the competitive conditions. The latter refer to increased competition between savings deposits and other banking products, as well as increased competition between different banks within the market for savings deposits. Indeed, interest margin competition seems to have increased over time.(2) While the share of total liabilities of the four largest banks in the sector increased strongly during the last decade due to a wave of mergers and acquisitions, an inverse trend can be observed for the savings deposits in the same time span, where the share of the four largest banks actually decreased

(1) Own funds and fixed assets such as own buildings are also classified in the indeterminate time to repricing bucket, whereas mortgage loans are classified according to their contractual time to repricing, despite the presence of an early repayment option.

(2) Ausubel (1990) and Neumark and Sharpe (1992) show that the market structure indeed affects the deposit rate setting behaviour of banks. For example, both the equilibrium level and the speed of adjustment of deposit rates are found to depend on market concentration. It turns out that deposit rates are on average higher in less concentrated markets, in line with what we expect.

CHART 3 BELGIAN MARKET AND SAVING DEPOSIT RATES

(Percentages)



Source : NBB.

from 75 to 69 p.c.. A further Herfindahl-Hirschman index (HHI) analysis[1] signals that the competitive pressure is coming from a couple of medium-sized players, since the HHI for savings deposits still increased between December 1994 and December 2004 (from 1,130 to 1,800). However, the growth in the HHI for total liabilities was much stronger (from 760 to 2,580), so that the ratio of the former to the latter gradually dropped from 140 p.c. in 1994, to only 85 p.c. in 2004.

Despite these spread-tightening factors, Chart 3 indicates that savings deposit rates have been and still are rather sticky compared to market rates. When banks change the savings deposit rate, they seem to do so in a partial and sluggish way, i.e. in the same direction as lagged market rates and typically in multiples of 1/8th percentage points. The savings deposit rate level is capped by law, but binding deposit rate ceilings do not appear to have been the dominant factor in explaining deposit rate stability.[2] Indeed, deposit rates were also stable in the period prior to 1983, when there was no legal cap, and in recent years, when the cap was no longer binding. An obvious explanation for the upside deposit rate stickiness is that a repricing of savings deposits is not limited to newly issued deposits, as is the case with term deposits, but involves all outstanding balances. Hence, increasing the savings deposit rate is relatively costly for a bank with a large volume of savings deposits.

Box 1 presents further econometric evidence of partial, and asymmetric, adjustments of Belgian savings deposit rates.

1.3 Deposit balance dynamics

Deseasonalised savings deposit balances have grown fairly steadily over time.[3] During the last quarter century, they increased by 4.1 p.c. annually on average in real terms (7.1 p.c. in nominal terms). These averages conceal the fact that growth has been relatively strong in the last 5 years (6.2 p.c. real, 8.2 p.c. nominal), and was more moderate in the 80s and 90s (3.5 p.c. real, 6.9 p.c. nominal).

Chart 4 shows year-on-year growth rates of deseasonalised savings deposits. Despite the typically positive growth rates, aggregate deposit balances have sometimes decreased in the past, as illustrated by the negative growth rates in the periods 1990-1994 and 2000-2002. Deposit balances dropped by about 12 billions of euro (peak to trough in 1990-1994), i.e. approximately 20 p.c. of February 1990 balances, and by about 8 billions of euro (peak to trough in 2000-2002), i.e. approximately 8 p.c. of January 2000 balances.

Either general market conditions or idiosyncratic events may cause depositors to withdraw all or part of their balances.[4] Given that idiosyncratic events (e.g. death, divorce, relocation, house-ownership, etc.) are to a large extent diversifiable across depositors, aggregate deposit balance dynamics are driven by general market conditions.

More specifically, as is clearly illustrated in Chart 4, savings deposit balance growth rates are affected by depositors' opportunity cost, i.e. the maximum return that the deposited funds could earn if the funds were not deposited in a savings account. We approximate the opportunity cost as the difference between the 3m Treasury Certificate rate, net of withholding taxes, and the deposit rate.

(1) The Herfindahl-Hirschman statistic is defined as the sum of squared market shares (in percentage points) of individual banks. The statistic decreases both as the number of banks in the market increases and as the disparity in size between the banks decreases. It approaches zero when the banking sector consists of a very large number of banks of relatively equal size.

(2) The Royal Decree of August 27 1993 (KB/WIB 1992) specifies that the remuneration of savings deposits must consist exclusively of a base rate and a growth or loyalty premium. See also Box 3 in the Overview of this FSR for further details about the remuneration structure. Since April 1990, the legal ceiling has remained unchanged at 6 p.c., i.e. a base rate ceiling of 4 p.c. and a premium ceiling of 2 p.c. Between December 1983 and April 1990, the ceiling has been changed on various occasions.

(3) Savings deposit balances data show clear end-of-calendar-year effects, due to the pay-out of interest to the deposit holder at the end of each calendar year. Therefore, deseasonalised balances are analysed.

(4) Note that the Royal Decree of August 27 1993 (KB/WIB 1992) stipulates that banks must be able to require a 5 days' notice for withdrawals exceeding 1,250 euro and to impose a limit on withdrawals of 2,500 euro in any two-week period. In practice, these options are hardly used.

Box 1 – Belgian savings deposit rate dynamics

Deposit rate dynamics may be further analysed following O'Brien (2000), who has estimated a partial adjustment model for U.S. retail deposit rates. In the model, deposit rate changes depend on whether deposit rates are above or below a possibly time-varying long-run equilibrium or target deposit rate, which in turn is assumed to be a function of market rates. The model allows for an asymmetry in the reaction speed at which the deposit rate is expected to mean-revert to its long-run equilibrium level, since the upward change parameter may differ from the downward change parameter. O'Brien finds that deposit rates are particularly sluggishly when deposit rates are below their long-run equilibrium level, but adjust more swiftly when they are above this level. This asymmetry is considered to be a stylized fact of deposit rate dynamics in many countries. We estimate a similar non-linear partial adjustment model for Belgian implicit deposit rate changes[1]:

$$\Delta R_t = \left(\lambda^+ I_t + \lambda^- (1 - I_t)\right)(br_t - g - R_{t-1}) + e_t$$
$$I_t = 1 \quad if \quad br_t - g - R_{t-1} > 0$$
$$I_t = 0 \text{ otherwise}$$

where λ^+, λ^-, b, and g are the parameters to be estimated. The variable R_t stands for the deposit rate and $br_t - g$ is defined as the unobserved time-varying equilibrium deposit rate, itself a function of the market rate r_t (3m Euribor in our application). O'Brien argues that the long-run equilibrium deposit rate should be at a break even level. Hence, b can be considered to be a proxy for 1 minus the marginal reserve requirement if such a requirement applies, and g reflects the servicing cost and hence should be positive. I_t is an indicator variable that signals whether actual deposit rates are above or below the long run equilibrium deposit rate level. The estimates of the parameters λ^+ and λ^- will then teach us whether deposit rates adjust at different speeds when they are above or below the equilibrium level, respectively.

TABLE 1 ESTIMATES FOR THE PARTIAL ADJUSTMENT MODEL FOR BELGIAN IMPLICIT DEPOSIT RATES

(Data from June 1996 to September 2004)

Parameter	Range of parameter estimates for the four largest Belgian banks
λ^+	0.000 to 0.002
λ^-	0.072 to 0.267
b	0.826 to 0.990
g	0.000 to 0.005

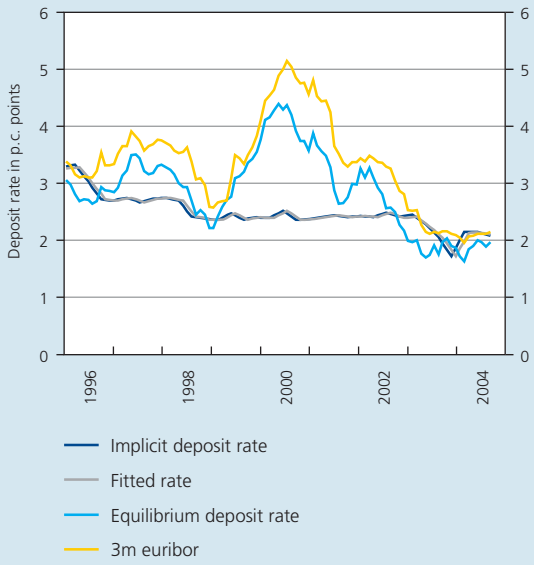
Table 1 presents the range of constrained nonlinear regression coefficient estimates that we obtain for the four largest Belgian banks, using a sample of 1996:06-2004:09 implicit deposit rates and the 3m Euribor rate for the market rate. The estimates are qualitatively similar to O'Brien's (2000), since we also find asymmetry in the adjustment of deposit rates towards the long run equilibrium level : λ^+ is estimated to be substantially smaller than λ^-, which implies that deposit rates react rather sluggish towards a higher long run equilibrium deposit rate, but respond more swiftly to a lower long run equilibrium deposit rate[2].

(1) Implicit deposit rates are defined as the ratio of the interest that is paid out by the bank over a certain period divided by the average outstanding balances over the same period. Compared to advertised rates, defined as the sum of base and premium rates, implicit deposit rates may better reflect the true cost to the bank, given the sometimes intricate day count rules that apply to the premium rates. Moreover, implicit rates make it easier to integrate pre- and post-merger deposit rate data.

(2) We have formally tested the asymmetry in deposit rate dynamics by computing a test statistic based on the sum of squared errors for both the unrestricted asymmetric and restricted symmetric model. The asymmetry is found to be statistically significant for most banks at conventional confidence levels.

CHART 1 MARKET AND DEPOSIT RATE DYNAMICS FOR A REPRESENTATIVE BELGIAN BANK IN A PARTIAL ADJUSTMENT MODEL

(Percentages, quarterly data)



Source : NBB.

The June 1996 to September 2004 partial adjustment dynamics for a representative Belgian bank are plotted in Chart 1, results being qualitatively similar for other banks. It can be seen that the model fits actual deposit rate levels and changes well. Actual deposit rates seem to decrease most when actual rates are above their long-run equilibrium level, whereas they remain relatively sticky when actual rates are below the long-run equilibrium level.

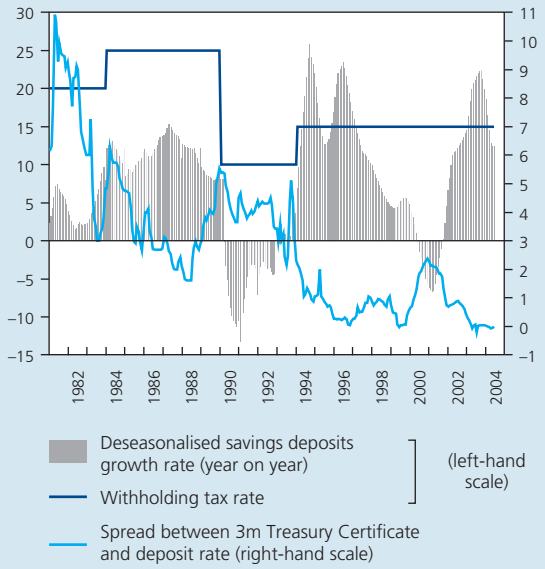
Defined as such, the opportunity cost is affected by two components: (i) the interest rate spread between the 3m Treasury Certificate rate and deposit rates and (ii) the withholding tax level. We expect a priori that an increased opportunity cost, i.e. a higher spread or a lower withholding tax level, leads to lower or negative deposit balance growth rates, and vice versa.

Both components appear to be important in understanding depositors' withdrawal behaviour. Indeed, the level of the withholding tax rate provides a partial explanation for deposit balance dynamics, as a substantial amount of earned interest on regulated savings deposits is exempt from this tax. The drop in aggregate deposit balances in 1990 coincides with the drop in the withholding tax from 25 p.c. to 10 p.c. in 1990. When the withholding tax was raised again in 1994 to 15 p.c., deposit balances returned to positive growth rates.

However, withholding tax regime changes are unable to explain the drop in aggregate balances in 2000-2002, since the withholding tax regime has remained unchanged since 1994. The second component of the opportunity cost, the increased spread between market and deposit rates, may have played a role here. Table 1 reports estimates from regressing the deseasonalised monthly changes in log deposit balances on a constant and the spread between 3m Treasury Certificates and the deposit rate. In line with what we expect, we find an inverse relation between the spread and savings deposit balances growth rates. More specifically, for each percentage point increase in the spread, the monthly deposit balance growth rate is

CHART 4 MAJOR DETERMINANTS OF MONTHLY YEAR-ON-YEAR CHANGES IN AGGREGATE SAVINGS DEPOSITS

(Unconsolidated figures, percentages)



Source : NBB.

TABLE 1 SENSITIVITY OF DEPOSIT BALANCE GROWTH RATES TO CHANGES IN INTEREST SPREADS

(Sample period : January 1981 to December 2003)

	Full sample	Pre 1994	Post 1994
Constant	0.934	0.837	1.271
Spread (monthly p.c.)	–0.116	–0.092	–0.535
p.m. Spread (annual p.c.) . .	*–1.4*	*–1.1*	*–6.6*

Table entries are ordinary least squares coefficient estimates. Corresponding *t*-statistics, corrected for heteroskedasticity and autocorrelation, are not reported, but imply statistical significance at conventional confidence levels. The spread is the difference between the 3m Treasury Certificate and the deposit rate (base rate plus loyalty premium). Monthly changes in deseasonalised log balances are used as dependent variable.

Source : NBB.

expected to be 0.116 p.c. lower, which corresponds to a 1.4 p.c. lower annual growth rate.

The sensitivity of annual growth rates is estimated to be only 1.1 p.c. when we focus on the pre-1994 subsample and as high as 6.6 p.c. in the post-1994 subsample, which may signal increased mobility and sophistication of small investors in the last decade.(1) The post-1994 increased sensitivity of deposit balance growth rates to changes in spreads between market and deposit rates can also be observed in Chart 4.

Notwithstanding this evidence on sensitivity of savings balances to rates, it is clear that depositors on aggregate do not withdraw their entire balances when rates on alternative investments are higher, i.e. it is not only deposit rates but also deposit balances that tend to behave in a sluggish way. This is also found to be the case in other countries. The term "core deposits" is sometimes used to reflect the fact that a substantial part of savings deposit balances is held by retail depositors who are not highly rate sensitive and are not expected to withdraw their balances over a short period of time. Key factors that may explain such behaviour are switching costs, mainly in relation to the services provided to the customer or the information cost incurred by looking for alternatives.

(1) A formal Chow breakpoint test statistic confirms the statistical significance of the difference in sensitivity between the two subsamples. The *p*-value of the test statistic is 1.2 p.c.

2. Measuring the interest rate risk of savings deposits

As illustrated in Section 1, deposit rate and balance dynamics of savings accounts are clearly intertwined. In practice and to limit the repricing impact of deposit rate changes, banks only sluggishly adjust savings deposit rates. However, if savings deposits are not fully and immediately repriced with market rates, this may entail an outflow of deposits, which banks will have to replace at a higher cost. In the end, the volume and repricing effects have to be taken into account simultaneously in the interest rate risk management of banks.

To measure the interest rate risk of savings deposits, two approaches can be adopted. The first one centres on banks' profitability and net interest income at risk. If the sensitivity of deposit rates and balances to market interest rate increases is underestimated, bank profitability will decline unexpectedly, as deposit rates are repriced more quickly and deposit balances are withdrawn more quickly than anticipated. If the sensitivity to market rate increases is overestimated, the bank may as a result invest in relatively short-term assets to hedge the interest rate risk and thus forego more profitable long-term investments.

Alternatively, the assessment can be based on the impact on banks' solvency or market value of equity at risk. In case of a move in market interest rates, it is important to measure the market value sensitivity of savings deposits, since savings deposits value changes may partially offset

the value change in the other direction on the asset side, thereby acting as a hedge for the market value of equity.[1] In this article, we focus upon the latter solvency approach and analyse the *duration*, i.e. market value sensitivity to interest rate changes, of savings deposits.

Section 2.1 illustrates the impact that different savings deposits duration hypotheses can have on the assessment of the interest rate risk of Belgian banks. Section 2.2 discusses the various models that are available to estimate the duration of savings deposits. Finally, Section 2.3 critically discusses these models from a statistical and especially prudential point of view.

2.1 Duration of nonmaturity accounts : should we care ?

The contractual duration of savings deposits is close to zero. However, in normal times, the behavioural or *effective* duration of savings deposits is much larger and will depend on the sensitivity of deposit rates and balances to market rates. Extreme sensitivity to changes in market rates gives rise to a zero duration, whereas extreme insensitivity or sluggishness of deposit rates and balances gives rise to a much longer duration, close to the duration of a consol.

(1) We define equity as net assets, i.e. what remains after deducting liabilities from assets.

(2) Banks typically measure the duration of savings deposits in their internal models by allocating savings deposits to various categories, such as core, volatile and remaining deposits, where each of these categories receives a specific duration. The exercise here in fact assumes that the weighted average total duration across these categories is equal to 0 to 5 years.

(3) The risk weights are computed as proposed by the Basel Committee on Banking Supervision, i.e. as the approximate modified duration times the assumed interest rate shock (see BIS (2004)). The approximate modified duration calculation is based upon the midpoints of each time bucket, e.g. a time to maturity of 3.5 years is used to proxy for the modified duration of exposures in the 2 to 5 year time to repricing bucket.

(4) It is important to realise that these losses of market value of equity will not be immediately and fully reflected in banks' profit and loss through a lower net interest income. The change in market value of equity, i.e. the discounted sum of future net interest income, simply measures the difference in price when liquidating the bank's assets and liabilities before and after the yield curve shock (liquidation viewpoint and not going concern viewpoint).

In fact, the effective durations differ widely across time and banks, possibly reflecting bank-specific deposit rate setting behaviour, client-specific withdrawal behaviour, the general interest rate environment, and differences in the modelling approaches used by banks to estimate duration.

The importance of variation in duration estimates is reflected in Table 2, which illustrates the impact of unexpected yield curve shocks on the market value of equity of the Belgian banking sector for different savings deposits duration assumptions, all else remaining equal.[2] The table reports the results of interest rate stress tests for the overall Belgian banking sector for six different durations of savings deposits (from 0 to 5 years). The shock tested is a 2 p.c. upward shift of the entire yield curve. The data used for this test are (i) the various net exposures per time to repricing bucket as illustrated in Chart 2 and (ii) risk weights per time to repricing bucket that proxy for the impact of the simulated yield curve shock on the market value of equity in the different time buckets.[3] The risk weights are then multiplied by the net exposures and the sum of these products gives an estimate of the change in the market value of equity following specific yield curve shocks.

The stress tests also require to introduce hypotheses concerning the duration of sight deposits. As they can be withdrawn at any time, sight deposits are incorporated, in the supervisory reporting scheme, in the repricing bucket 'up to 8 days'. However, these deposits are mostly held for transaction purposes instead of investment purposes which makes them quite insensitive to interest rate changes. To take this specificity into account, an ad-hoc treatment has been introduced through two hypotheses. In a first scenario, 50 p.c. of sight deposits are kept in the 'up to 8 days bucket' while the other 50 p.c. are shifted to offset the longest positive net exposures. In the second scenario, 100 p.c. of sight deposits are used to offset the exposures with the longest duration.

TABLE 2 IMPACT OF A 2 P.C. UPWARD PARALLEL YIELD CURVE SHOCK ON THE BELGIAN BANKING SECTOR'S MARKET VALUE OF EQUITY [1]

(Expressed in percentage of regulatory own funds, unconsolidated December 2004 figures)

Hypotheses for sight deposits	Duration of savings deposits in years					
	0	1	2	3	4	5
50 p.c. offset of longest positive exposures	–14.0	–8.5	–3.3	1.8	6.6	11.2
100 p.c. offset of longest positive exposures . . .	–7.0	–1.5	3.7	8.7	13.6	18.2

Source : NBB.

(1) Calculated under the hypothesis of an initial flat 4 p.c. interest rate with all currencies converted to euro.

As can be expected for a banking sector largely engaged in maturity transformation activities, the market value of Belgian banks' equity would be significantly affected by large unexpected upward yield curve shifts[4]. More importantly, Table 2 indicates that, for any given yield curve shock, the specific duration estimate of savings deposits has a large impact on the ultimate change in market value of equity. There is a clear monotonic relation between the impact of parallel yield curve shocks and the duration, with smaller duration resulting in a larger negative impact.

Under the hypothesis that only 50 p.c. of sight deposits are shifted to the long end of the repricing spectrum, a 2 p.c. parallel shock is projected to reduce the banking sector's market value of equity by an amount equal to 14 p.c. of regulatory own funds when the average savings deposits duration is assumed to be 0. This negative impact is reduced to 8.5 p.c. when the duration is assumed to be 1 year. If all sight deposits are allocated to the repricing bucket with the longest duration, those losses are reduced respectively to 7 and 1.5 p.c. of regulatory own funds.

It is also interesting to observe that the banking sector becomes liability sensitive when savings deposits are assumed to have relatively long durations. In this case the market value of equity would start to increase after a parallel increase in interest rates in this case[1].

Internal model estimates of duration differ substantially across individual banks. In the next section, we will discuss the most common models that are being used by banks to estimate the duration of their nonmaturity accounts.

2.2 Modelling and estimating the duration of nonmaturity accounts

To estimate the duration of their nonmaturity accounts, most large Belgian banks rely on a particular variant of the static replicating portfolio model described below. However, some Belgian banks actually use or have been experimenting with more sophisticated modelling approaches, such as dynamic replicating portfolio models and net present value Monte Carlo simulation models. This section briefly discusses the general idea behind the different modelling approaches.[2] Some supervisory concerns about these techniques are identified in Section 2.3.

STATIC REPLICATING PORTFOLIO MODELS

The idea is to calculate the return from investing the available volume of deposits in a portfolio of fixed-income assets with various maturities such that a specific objective criterion is optimised and subject to the constraint that the portfolio exactly replicates the dynamics of outstanding deposit balances over some historic sample period. For example, a possible criterion could be to select the portfolio of assets that yields the *most stable margin* over the deposit rate over the sample period, i.e. the portfolio that minimises the standard deviation of the margin, while replicating the deposit balance dynamics. Alternatively, another criterion may aim to *maximise the risk-adjusted margin*, measured by the margin's Sharpe ratio, i.e. the ratio of the average margin to the standard deviation of the margin, while replicating the deposit balance dynamics. The duration of saving deposits is then estimated as the duration of the replicating portfolio, combining fixed-income assets of various maturities, that optimizes the criterion.[3]

A concrete application of the replicating portfolio model to a Belgian bank is illustrated in Box 2.

(1) The above results need to be interpreted with care, given that many caveats apply: (i) the exercise is done on unconsolidated figures only, (ii) options and other nonlinear products are treated in a relatively rudimentary way at their delta value and, for example, do not reflect caps and floors, (iii) exposures of opposite sign in different currencies are assumed to offset and each other.

(2) There are few descriptions of the replicating portfolio approach in the public domain. The description below is based on Wilson (1994), as well as on discussions we had with several ALM practitioners and CBFA analysts (see also Box 2). Ellis and Jordan (2001) and OTS (2001) are good introductory reviews of the Monte Carlo net present value approach. We will not discuss the very different statistical individual account approach, where the idea is to track and store data on individual deposit accounts for several years and to measure their sensitivity to changes in deposit and market rates. Anderson and McCarthy (1986) describe such a statistical approach and report deposit premiums between 6 and 8 p.c. The results of Sheehan (2004) also indicate that deposits have substantial value to financial institutions. He finds that the value of core deposits varies substantially by institution, depending on the institution's supply of deposits and ability to retain deposits.

(3) An additional important decision variable can be inferred from these simple models, since the estimated optimal portfolio return can be interpreted as the correct transfer price of the deposited funds. Indeed, the transfer price of savings deposits can be defined as the return that the bank could have gained if it had invested the deposited funds in the replicating portfolio, since the latter minimizes the interest margin risk and reflects the withdrawal risk. All business lines subsequently may be required to use the transfer price as their hurdle rate, i.e. their benchmark cost of funds. In universal banks or financial conglomerates, the determination of a fair transfer price for funds allocated to the different business lines is an important issue.

Box 2 – Replicating portfolio models: application to a Belgian bank

The replicating portfolio approach basically boils down to an optimisation problem: we need to pick a vector of portfolio weights of assets such that the value of the objective function is optimised and subject to the restrictions that, at all instances, the volume of the replicating portfolio should match that of the replicated deposits. All weights need to sum up to unity and short selling is often not allowed. Given that only liquid, standard assets are held to maturity, the investment strategy will only require small trading costs, which are subsequently neglected in the empirical analysis.

Typically, the replicated deposits are only a portion of total deposits, since banks, in practice, classify total deposits into interest-rate insensitive core deposits, volatile deposits, and remaining balances. Only the latter will get replicated, whereas core deposits are assumed to be invested at a discretionary long horizon and volatile deposits at the interest rate risk free short horizon.

For the optimisation criterion of minimising the standard deviation of the margin, i.e. the spread between the portfolio return and the deposit rate, the problem can be stated as follows:

$$Min \quad std(r_p - R)$$

subject to the constraints that (i) $\sum^{n} w_i r_i = r_p$, where $\sum^{n} w_i = 1$, (ii) no short sales are allowed, i.e. $w_i \geq 0$, $\forall i$, and (iii) the volume of deposits is perfectly replicated by the portfolio investment at all sample dates. In the above, r_p denotes the return of the replicating portfolio, R the deposit rate, and $\{w_1, \ldots, w_n\}$ the vector of weights corresponding to the set of n available standard assets, each with return r_i. Since market rates are higher than deposit rates on average (recall Chart 3), the resulting replicating portfolio return will typically exceed the deposit rate, and average margins will be positive. Investments are held to maturity and need to be rolled-over when they mature.

We estimate such a model on data for a large Belgian bank for the period June 1996-November 2004, where Bibor/Euribor and zero coupon bond yields are used as market rates and implicit deposit rates. The baseline specification of our model assumes (i) a 100 month window size (total length of our sample), (ii) six assets with 3m, 6m, 12m, 3yr, 5yr and 10yr maturities, (iii) minimisation of the standard deviation of the margin as objective

TABLE 1 IMPACT OF CHANGES IN REPLICATING PORTFOLIO MODEL PARAMETERS AND STRESS EVENTS ON THE DURATION ESTIMATE OF REGULATED SAVINGS DEPOSITS

	Model specifications			
	0 = baseline	1	2	3
Optimisation criterion	Std. dev.	Sharpe ratio	Std. dev.	Std. dev.
Core deposits (p.c.)	25	25	10	10
Volatile deposits (p.c.)	10	10	25	25
Stress event	no	no	no	yes
Average margin (p.c.)	3.21	3.41	3.21	1.76
Standard deviation margin (p.c.)	0.11	0.15	0.11	0.31
Duration (years)	4.0	4.3	4.0	1.9
Total duration (years)	3.5	3.7	2.9	1.6

Source: NBB.

function, and (iv) 25 p.c. core deposit balances, invested at a 7 year horizon, and 10 p.c. volatile balances, invested at a monthly horizon. The remaining 65 p.c. of original balances is replicated by the model.

Besides the baseline specification, we will also analyse the sensitivity of duration estimates to alternative model specifications, in particular the impact of (i) an alternative objective criterion, (ii) alternative assumptions about proportions of core and volatile deposits, and (iii) stress circumstances[1]. More specifically, in specification 1 we repeat the optimisation in the baseline case, except for the optimisation criterion, which is now to maximise the Sharpe ratio of the margin. Indeed, a bank may want to accept a slightly higher standard deviation of the margin, if it can increase the average margin substantially by doing so. Specification 2 lowers the proportion of core deposits from 25 p.c. to 10 p.c. and increases the proportion of volatile deposits from 10 p.c. to 25 p.c., compared to baseline. Specification 3 introduces a stress scenario by adding six monthly observation points to the available sample of deposit rates, savings deposit balances, and market rates, after which the estimation is conducted over the 106 available time points. The stylized stress circumstances imply that (i) all market rates increase with 0.5 p.c. every month for the next 6 months, (ii) savings deposit rates increase by 0.33 p.c. every month, (iii) balances are assumed to remain constant, and (iv) core deposits drop to 10 p.c. and volatile deposits increase to 25 p.c. of total deposits.

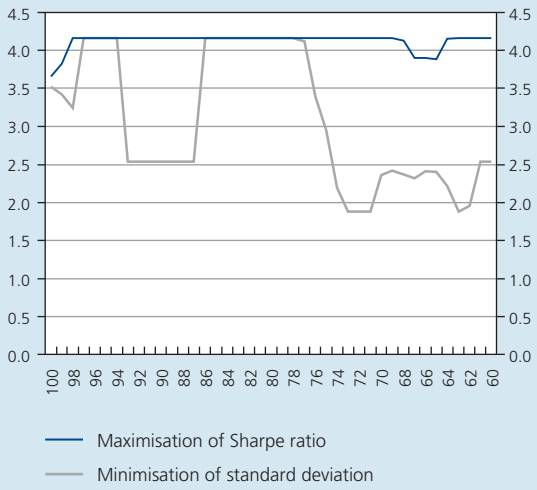
The last two rows of Table 1 report the duration estimates that result from our optimisation exercise. We distinguish between the duration estimate that follows from our replicating portfolio application to non-volatile, non-core deposits and the total duration estimate that also incorporates the effect of the assumptions about volatile and core deposits. The baseline model specification results in a total duration estimate of 3.5 years. As expected, we can see that the Sharpe ratio criterion in specification 1 implies a slightly higher margin standard deviation, but at the benefit of a substantially higher average margin. The total duration is estimated to increase only slightly. Specification 2 reveals the sensitivity of the total duration estimate to the assumptions made with regard to core and volatile deposits. The total duration may decrease by more than 6 months if core deposits are shifted to volatile deposits. Finally, the stress circumstances in specification 3 lead to a substantial deterioration of both the average margin and the standard deviation of the margin, compared to the baseline case. Most importantly, the total duration falls to 1.6 years.

In Chart 1 we plot the full sample (i.e. 100 month) total duration estimate against increasingly smaller window size duration estimates (up to the 60 month window) for both the standard deviation and Sharpe ratio criterions. The chart reveals that the choice of the estimation window may not be innocuous, since the duration estimate varies between 1.8 and 4.2 years in the standard deviation optimisation, depending on how far back in time one is willing to go. We also observe that the standard deviation and Sharpe ratio criterions need not always give similar results. The former may lead to substantially lower estimates in our case. This is intuitive, since, in periods where interest rate volatility becomes relatively more important, the standard deviation criterion duration will immediately reflect this, while the Sharpe ratio criterion will trade off the increased volatility against a smaller margin.

(1) We have also analysed the robustness of duration estimates with respect to the inclusion and exclusion of zero coupon bonds and the use of advertised instead of implicit deposit rates, but found that duration estimates were reasonably close to our baseline estimates along these dimensions.

CHART 1 DURATION ESTIMATES FOR DIFFERENT WINDOW SIZES

(In years, total duration)



DYNAMIC REPLICATING PORTFOLIO MODELS

Whereas, in the static replicating portfolio models, maturing funds are always renewed at the same maturity and the replicating portfolio vector is assumed to be constant, dynamic replicating portfolio models allow the bank to react more quickly by adapting the portfolio to changes in client behaviour and the market environment.[1] In particular, the models are able to incorporate uncertainty in interest rate and balance dynamics by generating scenarios of their possible future outcomes, whereas care is taken to capture the observed correlations between interest rates and volumes. Since the scenarios are based on current market circumstances, the resulting replicating portfolios are adjusted dynamically over time to the current situation.

NET PRESENT VALUE MONTE CARLO SIMULATION MODELS

The net present value Monte Carlo simulation models are related to the dynamic replicating portfolio models, in the sense that they also try to capture the impact of uncertainty about rates and balances and their interaction. However, they differ through a focus on the valuation of deposit accounts, defining the value of the deposit liability as the discounted future cash flows that correspond to servicing outstanding balances. The idea can be summarized in five steps:

1. The dynamics of deposit rates and deposit balances are estimated as a function of market rates, lagged variables, and other, potentially relevant variables.

2. A large number of market rate paths, say 1000, are then simulated for the next, say, 30 years, from which 1000 simulated deposit rate and balances paths are then derived. The time t economic rent[2] is defined as outstanding balances at time t times the difference between market rates and the cost to the bank of issuing the deposits, i.e. the sum of the deposit rate that is paid plus the servicing cost as a percentage of outstanding balances at t. Hence, the dynamics of economic rents depends on the dynamics of the spread between market and deposit rates, deposit balances, and servicing costs.

(1) See Frauendorfer and Schürle (2003) and Zenios and Ziemba (1992) for examples of multistage stochastic programming models.

(2) The banking literature suggests that economic rents exist (Selvaggio (1996), O'Brien (2000), Anderson and McCarthy (1986), etc.). Potential sources of economic rents include: regulatory barriers to entry leading to market concentration (Jarrow and van Deventer (1998), Hannan and Berger (1991)); clients accepting low deposit rates because they benefit from other services, for example more advantageous mortgage financing (Jarrow and van Deventer (1998)); costs to consumers of switching banks (Ausubel (1992), Sharpe (1997)); and limited memory of depositors (Kahn, Pennacchi, and Sopranzetti (1999)).

3. The value of the saving deposit account, often referred to as the deposit liability value, is then defined and computed as the net present value of all future economic rents, averaged over all simulation paths. The difference between current nominal outstanding balances in euro and the deposit liability value is defined as the deposit premium.

4. Steps two and three are repeated, but now based on the simulated market rate paths shocked by, typically, 100 basis points. As a result, we get different numbers for deposit liability value and deposit premium.

5. In line with the traditional definition, the duration of the saving deposit account is then set equal to the change in the deposit liability value divided by the change in the market interest rate[1].

There are two related modelling approaches to calculate the net present value of future economic rents, and both are common in option pricing and term structure modelling[2] The first is the Option Adjusted Spread (OAS) approach, where the idea is to discount expected future cash flows with a discount rate that reflects the riskiness of the cash flows. The discount rate includes an extra risk premium, the OAS, to account for the embedded option riskiness of the cash flows. The second approach is the contingent claim or no-arbitrage approach. Here, the idea is to manipulate the true cash flows so that the manipulated cash flows can be discounted at the risk free rate. The manipulation of the cash flows is done by subtracting a risk premium that reflects the embedded option risk, resulting in certainty-equivalent cash flows.

2.3 Prudential concerns and assessment

The replicating portfolio and net present value Monte Carlo simulation models each raise a number of statistical and conceptual concerns. Because the concerns are not easy to address, supervisors may have been discouraged from relying on any single specific modelling approach to estimate duration of savings deposits. The concerns can be grouped into two broad categories: specification of behavioural relationships and sensitivity to discretionary model assumptions.

(1) O'Brien (2000) reports typical mean retail deposit premia between 10 and 20 p.c. of outstanding deposits, i.e. the deposit liability value lies 10 to 20 p.c. below its nominal value (hence issuing deposit accounts typically increases the market value of equity of banks).

(2) Examples of the former are Selvaggio (1996) and Office of Thrift Supervision (2001), examples of the latter are Hutchison and Pennacchi (1996), Jarrow and van Deventer (1998), O'Brien (2000), Janosi, Jarrow and Zullo (1999), and Kalkbrener and Willing (2004).

A reliable and robust measurement of the relationship between deposit balances and deposit rate dynamics is very difficult to obtain, since the relationship may in fact change from bank to bank and even, within the same bank, over time. For example, new financial products can make more attractive alternatives available to depositors, which will increase their sensitivity to the opportunity cost.

Moreover, the use of backward looking approaches to tackle this issue, i.e. looking at the last x years of data to estimate behavioural relationships, may not reveal relevant information when the future is likely to be very different from the past. A related problem is that the use of a longer time series, which is in principle advisable for more reliable statistical inference, may increase the risk of failing to detect changes in market or behavioural structure.

The static replicating portfolio models suffer particularly from these drawbacks, whereas the net present value Monte Carlo simulation and dynamic replicating portfolio models are more forward-looking through simulating and averaging over a range of possible future scenarios. However, the latter still remain sensitive to the specification of behavioural relationships.

Besides the above problems relating to the specification of behavioural relationships, the model results are also quite sensitive to discretionary model parameter choices. For example, replicating portfolio models require assumptions about the optimisation criterion, the proportion of "core" and "volatile" deposits, and the relevant window size for estimation, while net present value Monte Carlo models also require a selection of explanatory variables that enter the behavioural relationships and assumptions about the size of the servicing cost parameter.

The application of the replicating portfolio model to a large Belgian bank in Box 2 illustrates that the impact of alternative assumptions about model parameters may not be innocuous in terms of the estimated duration of savings deposits. While replicating portfolio (and alternative models) may be useful as risk management tools, the relatively large range of duration estimates that can be derived from these models may make supervisors reluctant to use a single model to make inferences about the interest rate risk of savings deposits. From the supervisory viewpoint, the value added of a consistent modelling approach across banks lies in the fact that uniform parameter assumptions are applied across different banks, which should enhance the comparability of the estimates between institutions and through time.

In general, a problem with the observed range of banks' reported duration estimates is that it is unclear whether those variations are due to different bank behaviour, client behaviour, modelling approach, parameter assumptions, general interest rate market environment, or a combination of all these factors. Moreover, it is unclear to what extent the duration estimated in normal times reflects savings deposits' characteristics in stressful circumstances.

Conclusions

The favourable tax treatment and the liquidity services that regulated savings deposits provide to the deposit holder, as well as the stable source of finance they represent for banks, account for the popularity of saving deposits in Belgium.

Given their importance, savings deposits potentially have major financial stability implications for the Belgian financial system. Compared to defined maturity accounts and traditional fixed-income products, regulated savings deposits are challenging to analyse from a prudential and risk management perspective. Those complexities arise from the presence of two embedded options, the withdrawal option and the deposit rate setting option, which are clearly not independent of each other. The exercise of one of those options will certainly influence the timing of the exercise of the other.

In this article, we identified stylised facts regarding the dynamics of Belgian saving deposit balances and rates and discussed the models that are being proposed and used by banks to account for their interest rate risk. We discussed potential model weaknesses, which are in fact not specific to the Belgian context, from a prudential point of view. We find that simple static replicating portfolio models may fail to reflect the impact of stress events and are particularly vulnerable to model risk. Net present value Monte Carlo and dynamic replicating portfolio models seem conceptually stronger and are able to capture uncertainty about future events, but still rely heavily on discretionary model assumptions and the stability of the behavioural relations. Hence, they may also yield a relatively large range of duration estimates.

In the end, interest rate risk management of nonmaturity accounts remains an art as well as a science, being inherently exposed to model risk. Therefore, it is perhaps understandable that the IASB is reluctant to enter the debate of fair valuation of nonmaturity accounts at anything below the nominal value, and that bank regulators want to make conservative assumptions regarding the duration of savings deposits in their off-site identification of interest rate risk outliers.

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Bilateral investment treaties and the resolution of sovereign debt crises

Cédric Piétrus
Dirk Ooms

1. Executive Summary

Recent years have seen a number of initiatives aimed at reducing the social and economic costs of international sovereign debt crises by promoting a more orderly (and hence more timely) resolution of such crises. Some initiatives have actually been implemented by the respective parties involved: contractual Collective Action Clauses (CACs) are inserted into the documentation of new bond issues under US law, and a number of emerging economies and private creditors' associations have agreed upon the text of non legally binding "Principles for stable capital flows and fair debt restructuring in emerging markets" (hereinafter called "the Principles"). Other initiatives have been shelved, in particular the so-called "statutory approaches" (such as the Sovereign Debt Restructuring Mechanism, SDRM, initially proposed by the First Deputy Managing Director of the IMF, Anne Krueger).

These initiatives, concerning in particular the provision of adequate information and addressing co-ordination problems among creditors, perhaps did not pay sufficient attention to the sometimes kaleidoscopic general legal framework surrounding sovereign debt crises.

Indeed, under international law, several legal norms exist that could impact upon the rights and obligations of the different parties involved in sovereign debt restructuring. Among them are the numerous Bilateral Investment Treaties (BITs). Such BITs in essence aim at attracting foreign direct investment into less developed and emerging economies, by guaranteeing foreign investors the right to individual protection (and, if need be, to appropriate defence and compensation).

In view of the substantive differences, legal as well as economic, between their nature, aim and effects, one would not expect BITs to interfere in any way with crisis resolution initiatives such as CACs. However, this article indicates that there are sound legal arguments permitting private creditors to invoke the protection granted by BITs. That possibility could affect the incentives for different classes of creditors either to participate in a debt restructuring or to hold out. The rights granted to individual creditors by a rather general legal framework (BITs) could hence impact upon the functioning of another, very specific framework, designed to establish a proper balance between the public good of an orderly and timely resolution of a debt crisis, and the preservation of the rights of private creditors as a group (CACs).

Such interaction between two different spheres is unwarranted, in particular as the amounts involved could become significant: in the case of Argentina, the debt remaining unrestructured after the closing of the offer amounts to 19.6 billion USD, or 11.5 p.c. of GDP. The potential direct and indirect costs involved are thus substantial.

A solution to the problem should be sought at the international – and preferably the multilateral – level. Both a multilateral agreement on investment and a multilateral statutory mechanism for debt restructuring could clarify the situation overall, with the latter presenting the advantages of transparency and consistency. In the end, this article therefore adds to the arguments in favour of the international community resuming the work on a sovereign debt restructuring mechanism.

The paper is organised as follows: Section 2 will present the characteristics of BITs and of recent initiatives on a more orderly resolution of sovereign debt crises and their differences, and Section 3 will review classic features of BITs. The likelihood of interference between BITs and CACs will be examined under Section 4, and the nature of such interference will be further explored in Section 5. Section 6 will propose ways to moderate such interference.

2. BITs and recent initiatives on a more orderly resolution of sovereign debt crises

Although both BITs and recent initiatives on a more orderly resolution of sovereign debt crises (see Box 1), in particular CACs, impact on the balance of power between a sovereign State and foreign creditors or investors, they differ substantially on several points:

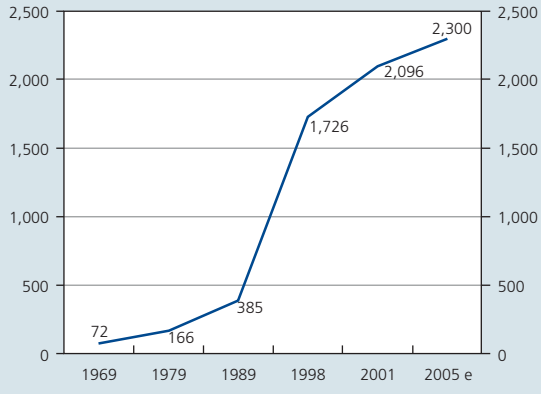
- *their primary aim*: BITs aim at attracting foreign direct investment, in general, into less developed and emerging markets. In particular, such investment is promoted by granting individual rights to protection to all the nationals of another State who make an investment. By contrast, CACs impact upon the contractual relationship between a State and a debt holder, with regard to a specific portfolio investment. They aim at preventing and, if need be, limiting the overall costs of a debt crisis, by addressing information provision and coordination problems between creditors. Although factual evidence points in the opposite direction, it is widely believed that the insertion of CACs tends to make the bond issue concerned less attractive for foreign investors;
- *their impact on the balance of power*: whereas BITs assign rights and security to individual investors in relation to a sovereign State (the host country), CACs provide a sovereign with the legal tools for increasing the orderliness of a debt workout, while preserving the rights of its creditors as a group (and hence limiting the rights of individual creditors holding out);
- *their origin*: BITs appeared in the early 1960s and were mainly concluded between Western European countries and their former African colonies. Since the 1990s, the number of BITS has proliferated rapidly around the world[1] (see Chart 1). Up to now, more than 2,300 BITs have been ratified, with more than 1,000 for the EU members, and more than 60 for the Belgium-Luxembourg Economic Union[2]. On the other hand, the renewed interest in CACs (under New York Law, as they are a standard device under English Law) finds its origin in the aftermath of the Mexican sovereign bond crisis in 1994. Standard clauses have been proposed by the official as well as by the private community, and Mexico has led by example, by introducing CACs in an issue under New York Law in February 2003. The example was followed by many other countries, and (some categories of) CACs are becoming a market standard under New York Law as well;
- *their legal nature*: BITs are treaties, a public law instrument of a general and non-specific nature, while CACs are clauses inserted into one specific contract, and belong to the sphere of private law;
- *the relationship between the home country/sovereign debtor and investors/creditors*: on the one hand, BITs being treaties concluded between States (the home country and the host country), there is *stricto sensu* no contractual relationship between the host country and the foreign investor, who is a third party to BITs. Nevertheless, through the protection granted by BITs, rights are created directly in favour of investors. This is quite normal in international law, and is known as direct applicability. On the other hand, CACs figure in legal instruments concluded directly between a State (the sovereign debtor) and several private parties (its creditors). Therefore, unlike the protection granted by BITs, CACs' effects are based directly on a contractual relationship between a debtor and its creditors.

(1) This is similar to what has happened in investment cases between host countries and investors in international arbitration. For instance, from its launch in 1966 until the beginning of 2002, the International Centre for the Settlement of Investment Disputes (ICSID) had registered 95 cases; since then, the caseload of ICSID has grown exponentially by another 73 cases. The ICSID is part of the World Bank Group and was created by the Convention on the Settlement of Investment Disputes between States and Nationals of Other States, Washington, 18 March 1965. At the end of 2004, 142 States had ratified this Convention. ICSID is also competent for disputes involving non-member host countries which have accepted its jurisdiction (through its Additional Facility Rules).

(2) Investments fall within the scope of the Belgium-Luxembourg Economic Union (BLEU) Convention. Therefore, BITs are concluded on behalf of the BLEU.

CHART 1 BITs, 1969-2005

(Cumulative number)



Source: UNCTAD

Box 1 – Recent initiatives on a more orderly resolution of sovereign debt crises

In countries with excessive debt levels, a timely and orderly restructuring of sovereign debt may be appropriate to avoid problems of debt overhang and debt panics. Debt overhang may inefficiently reduce investment and growth in the debtor country, so that debt restructuring might benefit not only debtors but also creditors overall. Debt panics due to self-fulfilling runs by creditors may entail systemic risks involving capital flight, exchange rate problems and banking crises affecting the creditor countries also.

Timely debt workouts, however, may be hampered by coordination problems due to diverging incentives for the creditors. Individually, creditors have incentives to race to the courthouse to call in their claims against overextended countries or to hold out in debt renegotiation, thereby impeding or delaying the conclusion of debt restructuring. Renegotiation encourages free riding as a debt write-down by other creditors will increase the capacity of the debtor to repay the remaining creditors. A collective action problem arises as the destructive race to liquidate assets injures the economic performance of the debtors so much that the creditors suffer collectively[(1)].

In addition to promoting the provision of timely and accurate information, recent initiatives on a more orderly resolution of sovereign debt crises, in particular, address such collective action problems.

CACs are clauses to be incorporated in sovereign debt contracts and aiming mainly at making the process for restructuring sovereign debt more orderly by:
- fostering early dialogue, coordination and communication among creditors and a sovereign debtor;
- ensuring that there are effective means for creditors and debtors to re-contract, without a minority of debt-holders being able to obstruct the process;
- ensuring that disruptive legal action by individual creditors does not hamper a workout that is under way, while protecting the interests of the creditor group.

CACs thus tend to shift away from the individual investor/creditor, aiming at protecting the public interest while preserving the interests of investors/creditors as a group.

The "Principles for stable capital flows and fair debt restructuring in emerging markets" are the result of a joint effort, supported by the official community, of emerging markets issuers (primarily Brazil, Korea, Mexico and Turkey) and private sector representatives (e.g. the Institute of International Finance and the International Primary Markets Association). Their aim is to provide a market-based, voluntary and flexible framework for cooperation between debtors and creditors in order to contain crises at an early stage and to facilitate debt restructurings. The Principles are based on four pillars:
- transparency and timely flow of information;
- close debtor-creditor dialogue and cooperation to avoid restructuring;
- good faith actions during debt restructurings by debtors and creditors;
- fair treatment of all creditors.

In view of their voluntary nature, the Principles are not legally binding, and none of their provisions is deemed to constitute a waiver of legal rights.

The Principles were subscribed to by the public and private parties mentioned above in November 2004; they were welcomed by the G20 (20-21 November 2004).

(1) Debt forgiveness might benefit not only debtors, but also creditors if the write-down of nominal claims was more than offset by an increased likelihood that the country might repay its remaining debt. For further arguments, see Rogoff K. and J. Zettelmeyer (2002), "Bankruptcy Procedures for Sovereigns: A History of Ideas 1976-2001", *IMF Staff Papers*, 49 (3), 470-507.

From their substantially different legal nature and features, as well as from their diverging economic rationale, one would tend to conclude that there should be no major interference between BITs and CACs. The question arises, however, whether the protection granted by BITs to some individual creditors may not affect their incentives to litigate or to hold out in a debt renegotiation process, and thus interfere with the implementation of the framework provided by CACs. Hence, the protection granted by BITs and the particular clauses they contain in this respect should be further analysed.

3. An introduction to BITs

BITs around the world share a lot of common features: they define the kind of investments that they protect (3.1), they contain some classic clauses (3.2) and they address the issue of discrimination between foreign investors (3.3).

3.1 Investments protected by BITs

The traditional aim of BITs is to promote and to protect investments reciprocally (although it is clear that the economically less strong partner hopes to benefit most). Investments are traditionally defined by BITs as any kind of assets invested in the host country, including, though not exclusively, property and property-related rights, rights in companies, monetary claims and titles to performance, copyrights and industrial property rights, and concessions and similar rights. For instance, the definition included in the BLEU model text is:

"The term 'investments' shall mean any kind of assets and any direct or indirect contribution in cash, in kind or in services, invested or reinvested in any sector of economic activity.

The following shall more particularly, though not exclusively, be considered as investments for the purpose of this Agreement:

a) movable and immovable property as well as any other rights in *rem*, such as mortgages, liens, pledges, usufruct and similar rights;
b) shares, corporate rights and any other kind of shareholdings, including minority or indirect ones, in companies constituted in the territory of one Contracting Party;
c) bonds, claims to money and to any performance having an economic value;
d) copyrights, industrial property rights, technical processes, trade names and goodwill;
e) concessions granted under public law or under contract, including concessions to explore, develop, extract or exploit natural resources.

Changes in the legal form in which assets and capital have been invested or reinvested shall not affect their designation as 'investments' for the purpose of this Agreement."

The investors concerned are defined as the nationals (citizens and companies) of each Contracting Party.

3.2 Classic clauses of BITs

The goal of BITs is not the opening of markets as such (as opposed to the draft Multilateral Agreement on Investment – MAI – of the OECD[1]) but to promote investments in sectors which the host country authorities have already opened up unilaterally. This promotion implies protection, through a limitation of the powers of the host country in its capacity as a sovereign State, in order to provide legal security to foreign investors or investments, in an environment in which such security cannot be taken for granted.

Although the interpretation of some clauses may differ between the major geographical regions of the world, the content of BITs is rather similar, irrespective of domestic legal systems. BITs generally contain clauses on:

– promotion and admittance of investments;
– protection *stricto sensu* of investments (fair and equitable treatment, full protection and security, prohibition of unjustified or discriminatory measures);
– national treatment of investors;
– most favoured nation (MFN – see below);
– expropriation (see point 5.1);
– free transfer of capital (see point 5.3);
– subrogation of investors by the home country or by its credit insurance institution;
– settlement of investor-host State disputes (see point 5.2);
– settlement of State-State disputes;
– umbrella clause: BITs usually offer the investor the right to choose the legal regime which is the most favourable to the investor (contractual agreement with the host country, BIT, multilateral agreement, laws of the host country… – existing or to be subscribed to by the host country).

(1) Between 1995 and 1998, the MAI was negotiated within the OECD (Argentina, Brazil, Chile, Hong-Kong, Estonia, Latvia, Lithuania, and the Slovak Republic being invited as observers). Under the terms of reference, the MAI was to be a "free standing international treaty, open to all OECD Members and the European Communities, and to accession by non-OECD Member Countries". Its proposed objective was to "provide a broad multilateral framework for international investment with high standards for the liberalisation of investment regimes and investment protection and with effective dispute settlement procedures". Negotiations ceased in December 1998, due to strong international criticisms (too liberal text, issues of environment and labour insufficiently addressed, negotiation of the text in a club of developed countries…).

3.3 BITs and discrimination

Despite the broad similarity in content, BITs could be a source of discrimination between investors from different countries, but as a rule such potential discrimination is addressed by the MFN clause. According to this clause, investors and their investments will be treated no less favourably than the investors from other countries.

The only traditional exception to the MFN clause concerns privileges granted to investors from certain countries by virtue of participation in or association with a free trade area, customs union, common market or any other form of regional economic organisation.

Discrimination will, however, remain possible between investors from countries which have concluded BITs with the country hosting the investments and those from countries which have not concluded BITs, or those which have concluded BITs with a more limited scope. This potential discrimination can affect bondholders' class actions. Indeed, if BITs provide a particular class of bondholders with additional enforcement mechanisms/legal protection grounds in case of sovereign default, that may provide them with more incentives for legal action, resulting eventually in uncoordinated litigation.

4. The likelihood of interferences between BITs and CACs

There is no real consensus on classifying bonds as investments falling within the scope of BITs, but there is a growing trend towards doing so (4.1). Economic considerations may also shed some light on the issue (4.2). Finally, the possibility that one legal framework could prevail over the other will be examined (4.3).

4.1 BITs and bonds: Do bonds fall within the scope of BITs?

Neither legal practice nor legal doctrine offers an unambiguous answer to the question whether sovereign bonds qualify as investments under the terms of BITs. The issue can be addressed at two levels:

- as mentioned under point 3.1, the definition by BITs of the notion of investment is rather broad and exemplified by a non exclusive list of categories. Two of those categories (monetary claims and rights in companies[1]), open the door for the inclusion of bonds. Moreover, several BITs (European-style BITs – including the BLEU model text and most of the treaties entered into by the BLEU –, US BITs…) explicitly mention bonds in their definition of the term "investment". This was also the case with the draft text of the MAI (see footnote 1 p. 4). Some BITs, or BITs-like agreements, explicitly exclude port-folio investments from the definition of "investment" (ASEAN Framework Agreement on Investment…). This could be seen as an *a contrario* sign that portfolio investments are covered by the definition of "investment" if not explicitly excluded;
- cases concerning debt instruments are rather rare in international arbitration. However, some recent rulings confirm the trend mentioned above[2]. Current cases involving countries such as Argentina will also probably help to shed some light on this issue.

If bonds as such are protected as investments by BITs, does this protection extend to bonds issued by a sovereign? Some arguments point to a positive answer: first, the ordinary meaning of "bond" already includes governments as possible issuers of bonds[3]. Second, BITs explicitly defining bonds as investments do not make any distinction between the numerous categories of bonds. Moreover, and *a contrario*, some BITs protecting bonds explicitly exclude from their scope bonds issued by a State (*e.g.* Spain – Mexico BIT, 1995). Third, during the MAI negotiations, a broad majority was in favour of including bonds issued by a public authority in the scope of the MAI. However, the discussion was inconclusive about potential interference by the MAI in public debt restructuring arrangements, and about the possibility of inserting a limited carve-out clause in the MAI to cater for that.

(1) *E.g.* "shares or bonds, equity as well as debt".

(2) *Fedax N.V. v. the Republic of Venezuela*, ICSID case n° ARB/96/3, Decision on objections to jurisdiction, 11 July 1997 (http://ita.law.uvic.ca/documents/Fedax-1997-Last.pdf); *Ceskoslovenska Obochodni Banka A.S. v. the Slovak Republic*, ICSID case n° ARB/97/4, Decision on objections to jurisdiction 24 May 1999 (http://www.worldbank.org/icsid/cases/csob_decision.pdf).

(3) According to the Shorter Oxford English Dictionary, a bond is "a deed by which one person binds himself or herself to pay another; a (government's) documentary promise to repay borrowed money, usu. with interest; a debenture; an insurance policy; a financial guarantee against the collapse of a company, esp. a tour operator etc." (our underlining). In financial Law dictionaries, "bond" is "a long term, interest bearing instrument issued by a corporation or government to provide for a particular financial need" (our underlining).

4.2 Economic considerations

An analysis of the economics underlying the conclusion of BITs may also provide some insights into the issue at stake.

BITs are concluded with the aim of augmenting more legal certainty for investments abroad, and hence reducing transaction costs and increasing international capital flows. The protection offered by BITs is particularly needed in order to increase the flow of international direct investments, given the high risks involved in risk capital financing.

One would therefore be tempted to exclude bonds, and in particular sovereign bonds, from the scope of BITs, as these instruments have very little to do with the aim of BITs, *i.e.* promoting risk capital financing by non residents.

It could be argued that sovereign bonds contribute to this aim indirectly. Indeed, to the extent that the sovereign finds its financing abroad, a larger amount of domestic savings will be available for investment purposes. Such reasoning, however, is a long shot, and disregards the second important aspect of BITs, next to attracting foreign financing, *i.e.* transfer of expertise between the home and the host country, by establishing long lasting and direct links between the economies involved.

4.3 Does one legal framework prevail over the other ?

From the considerations in the two paragraphs above, it follows that the economic rationale for including bonds under the protection framework offered by BITs is weak, but that sound legal arguments could be invoked for doing so nevertheless.

Where BITs exist alongside CACs, for instance, the question arises whether one legal framework should normally prevail over the other. One might think that the umbrella clause (see above, point 3.2) would enable CACs to prevail over the protection granted by BITs. However, this interpretation of the umbrella clause would directly contradict its goal, which is to ensure the most favourable treatment for the investor, and should therefore be rejected. CACs could also be considered as an exception to BITs according to the general principle of international law *lex specialis derogat legi generali* (the more specific text prevails over the general). However, there is no real guarantee that this principle would apply in this case, as there is not really any direct link between BITs and CACs, and it is therefore not self-evident that CACs should be classed as a specific implementation of the more general principles contained in BITs. Moreover, the application of the *lex specialis* principle was recently ruled out in some international arbitration cases on the specific jurisdiction issue, allowing investors to refer a contract dispute to an arbitral tribunal on the basis of BITs despite the existence of different dispute settlement clauses in the contract(1).

5. Specific BITs clauses

In a scenario of CACs existing alongside BITs, several BITs clauses can interfere with the initiatives on a more orderly resolution of sovereign debt crises. In order to avoid becoming too technical, only three – the most obvious – cases are illustrated hereunder. These relate to the expropriation clause (5.1), the settlement of investor-State disputes clause (5.2), and the clause on the free transfer of capital (5.3).

5.1 The expropriation clause

Most BITs contain a clause stating that investments must not be expropriated or nationalised, except for a public purpose, in a non-discriminatory manner, in accordance with due process of law and against payment of prompt, adequate and effective compensation. This rule is confirmed by numerous cases and is considered part of customary international law.

"Expropriation", or "deprivation of ownership", or "taking", are used by BITs but seldom defined by them. However, the ordinary meaning (to legally take away something for public use or benefit) is self-evident. "Nationalisation" belongs to the same category but implies an operation on a larger scale.

Measures taken in a different legal form but having the same effect are increasingly treated in the same way as expropriation and nationalisation *stricto sensu*. Those measures are often qualified as indirect (or creeping, or *de facto*) expropriation.

(1) See *Lanco International Inc. v. Argentine Republic*, ICSID case n° ARB/97/6, Preliminary decision on jurisdiction, 8 December 1998, 40 ILM (2001); *Salini Construttori S.p.A. and Italstrade S.p.A. v. Kingdom of Morocco*, ICSID case n° ARB/00/4, Decision on jurisdiction, 23 July 2001, 42 ILM (2003); *Compania de Aguas des Aconquija S.A. and Vivendi Universal v. Argentine Republic*, ICSID case n° ARB/97/3, Award, 21 November 2000, http://www.worldbank.org/icsid/cases/ada_AwardoftheTribunal.pdf; *LG&E Energy Corp., LG&E Capital Corp., and LG&E International v. Argentine Republic*, ICSID case n° ARB/02/1, Decision of the arbitral tribunal on objections to jurisdiction, 30 April 2004, http://ita.law.uvic.ca/documents/LGE-DecisiononJurisdiction-English.pdf; *Enron Corporation and Ponderosa Assets L.P. v. Argentine Republic*, ICSID case n° ARB/01/3, Decision on jurisdiction, 2 August 2004, http://ita.law.uvic.ca/documents/Enron-DecisiononJurisdiction-FINAL-English.pdf.

There is no definition of indirect expropriation in BITs (except in the new US model BIT[1]). However, jurisprudence and the literature lead to a definition of indirect expropriation as interference by a state in the use of an investment or with the enjoyment of the benefits, even where the investment is not seized and the legal title to the investment is not affected.

Measures taken in the context of a sovereign debt crisis, for instance a bond restructuring, can seriously affect the economic value of the assets concerned. Could such a restructuring be considered as an indirect expropriation, falling therefore within the scope of BITs, and requiring compensation? The line between indirect expropriation and the sovereignty of a State is very thin. For instance, measures taken in the general interest come under the State's right to regulate, and are not considered as indirect expropriation but as regulations which do not give rise to any compensation.

This specific issue is not addressed by legal texts, but an analysis of jurisprudence shows the existence of several criteria determining whether an indirect expropriation has occurred: the degree of interference, its duration, its sole effect on the investor, its purpose and its context…. Among those criteria, some could be helpful in deciding whether or not a restructuring qualifies as an indirect expropriation: (i) the degree of interference, understood as the severity of the economic impact caused by a government action, (ii) the purpose or the context, for instance an economic crisis and its severity, (iii) the interference with reasonable investment-backed expectations, when the restructuring is not fair for creditors, or (iv) the discriminatory character, if discrimination is applied between creditors (between domestic and foreign creditors, between institutional and small investors, or between other classes of creditors).

Nevertheless, there is no jurisprudence on this very precise issue. Future rulings by the ICSID on several cases involving Argentina will certainly be of some relevance on this question. Indeed, among creditors of Argentina, the Global Committee of Argentina Bondholders is currently envisaging using the expropriation clause to challenge the Argentine restructuring proposal.

In the case of recent initiatives on a more orderly resolution of sovereign debt crises, the expropriation clause would cause serious interference: whatever the restructuring terms sanctioned by these initiatives, hold out creditors would still be able to request full compensation for the indirect expropriation imposed on them.

As creditors have more incentives to hold out when they are protected under the umbrella of BITs, the collective action problem becomes worse, hampering a timely and orderly debt workout. The problem may even be exacerbated if the distressed bonds are actively traded in secondary markets and acquired by bondholders from countries who expect their investments to be protected by BITs.

(1) See http://www.ustr.gov/assets/Trade_Sectors/Investment/Model_BIT/asset_upload_file847_6897.pdf, Annex B, § 4.

Box 2 – The sovereign strikes back

This article, as well as other publications on the subject, including some by bondholders, follows the pattern of a private bondholder invoking a BIT against a sovereign. However, it seems that, at least in theory, the sovereign can also make use of some clauses contained in BITs, against (hold out) bondholders. An avenue of the kind is provided by a traditional clause on nationalisation and expropriation.

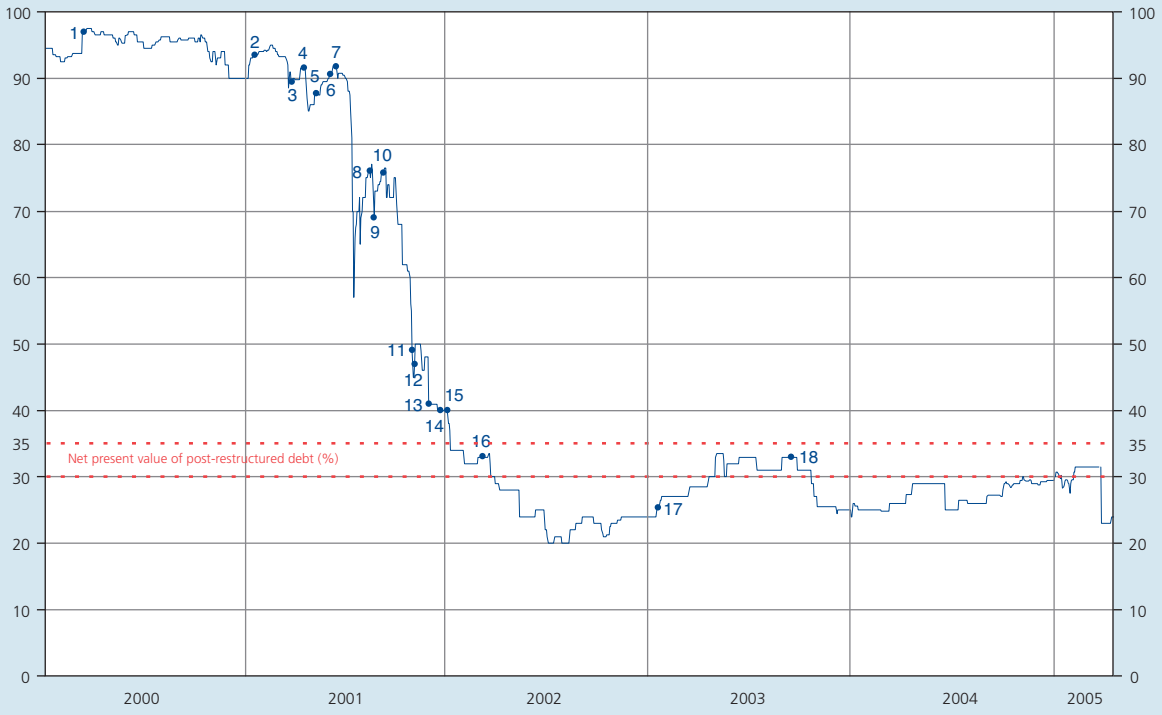
Most BITs state the general principle that investments by investors of the other contracting party must not be nationalised or expropriated, neither directly, nor indirectly. However, it is equally traditional to formulate exceptions to this rule. The conditions put forward for such exceptions include provision for the payment of a prompt and adequate compensation. The amount of such compensation should be equal to the real value of the investment, i.e. the market value on the day preceding the day on which the imminent nationalisation or expropriation is decided or becomes common knowledge.

▶

A sovereign could try to invoke this clause against bondholders holding out in a debt restructuring, in order to avoid being obliged to reimburse 100 p.c. of the bond's nominal amount plus interest. For such a defence to be successful (i) the restructuring offer must qualify as a nationalisation or expropriation and (ii) the haircut proposed must not exceed the discount at which the bond issue concerned was quoted *in tempore non suspecto*.

We refer to the main text for considerations with regard to the first condition. The issue of market quotation "under normal circumstances", raised by the second condition, constitutes a factual question. Below is an illustration: the graph plots the quotation of one particular Argentine bond issue contained in the restructuring offer (the same pattern applies broadly to other comparable bond issues), while indicating events which could be considered relevant to the question whether an upcoming expropriation was either publicly announced or had become public knowledge.

CHART 1 MARKET QUOTATION OF A BOND ISSUED BY THE ARGENTINE REPUBLIC (AR. REPUBLIC, 9 P.C., DUE 09, EUR) AND RELEVANT EVENTS



1 2000-03-10 IMF Board approves a 7,2 billion USD stand-by arrangement with Argentina. The Argentine authorities indicate that they intend to treat the credit as precautionary.

2 2001-01-12 IMF Board approves augmentation of Argentina's stand-by arrangement to 13,7 billion USD. At the same time, additional financing is arranged from official and private sources.

3 2001-03-26 International rating agencies lower Argentina's long-term sovereign rating.

4 2001-04-14 Minister of Economy Cavallo announces a modification of the convertibility law, with the replacement of the dollar by an equally weighted basket of the dollar and the euro.

5 2001-05-08 S&P lowers Argentina's long-term sovereign rating further from B+ to B.

6 2001-06-04 Authorities announce the completion of the mega-swap, involving the voluntary exchange of some 29 billion USD in mainly near-dated securities for longer-dated, higher-yielding bonds.

7 2001-06-15 Mr. Cavallo announces a package of tax and trade measures to stave off a potential debt default, including a trade compensation mechanism for exporters and importers. Concern that this is a first step towards full-scale devaluation sends the price of Argentina's bonds tumbling as a devaluation would force the government to default on its huge debt.

8 2001-08-10 Press quotes market sources to report that an IMF package will only delay the default.

9 2001-08-21 IMF announces planned augmentation of Argentina's stand-by arrangement by 8 billion USD.

10 2001-09-07 IMF Board approves augmentation of Argentina's stand-by arrangement (to 22 billion USD), with up to 3 billion USD set aside to be used in support of a possible voluntary and market-based operation to increase the viability of Argentina's debt profile.

11	2001-11-01	The Argentine authorities announce a new package of measures intended to give a decisive boost to competitiveness through tax incentives and to make further progress in ensuring fiscal solvency, including a two-phase debt exchange, which is characterised as "orderly" as opposed to "voluntary". Phase I of the debt exchange is aimed mainly at domestic creditors and entails an exchange of old credit for guaranteed loans to the federal government at substantially lower interest rates and longer maturities, collateralised by revenue from the financial transaction tax, while phase II is to be directed at international creditors under international conventions.
12	2001-11-06	S&P lowers Argentina's long-term sovereign rating from CC to SD (selective default) as it characterises the debt swap that is ongoing in November 2001 as a coerced exchange. The rating is lowered to D on those bonds that are eligible for the domestic debt swap.
13	2001-12-03	The government announces that the first phase of the debt-rescheduling plan had been successful. In order to buy time while the second stage is completed, the government introduces a partial deposit freeze and capital controls.
	2001-12-05	The IMF issues a press release indicating that the fifth review under the stand-by arrangement can not be completed at this point. This also means that the scheduled tranche of 1,3 billion USD will not be released, which the government needs to honour its debt-repayment schedule.
14	2001-12-24	President Rodriguez Saá declares partial default on Argentina's sovereign debt (excluding the "guaranteed loans" that resulted from the previous debt swap and the debt held with International Financial Institutions). The decision causes few ripples as it was widely expected.
15	2002-01-03	President Duhalde announces the end of convertibility and the introduction of a dual foreign exchange regime. Argentina actually misses a payment on its debt.
16	2002-03-08	The pesoisation of government debt under Argentine law is decreed.
17	2003-01-24	The IMF approves a transitional stand-by arrangement for Argentina.
18	2003-09-20	The IMF approves a new three-year stand-by arrangement for Argentina.
	2003-09-22	Argentina announces the broad outline of its debt restructuring proposal.

The haircut included in the Argentine offer is generally estimated at between 65 and 70 p.c. Depending on the precise date judged as being the moment on which the expropriation was decided or became public knowledge, the offer could therefore be judged as being above or below market conditions. Interestingly, market quotation has been consistently below 100 p.c., implying that under the terms of the expropriation clause of a BIT, the sovereign would never be obliged to reimburse the full nominal amount.

Be that as it may, if and when BITs are judged to apply in cases of debt restructuring, the ultimate outcome of the proceedings could be beneficial for either the sovereign or the bondholder. BITs could therefore interfere in a very complex manner with recent initiatives to promote a more orderly debt crisis resolution.

5.2 The settlement of investor-State disputes clause

The coordination problems due to divergent incentives for creditors in sovereign debt restructurings are compounded by the variety of procedures available for the settlement of disputes. Different options given to all creditors, or to different classes of creditors, may become a source of uncoordinated litigation, rendering the solution of collective action problems even more difficult.

Under BITs, a dispute between an investor and a host country can be submitted, usually at the option of the former, to the national jurisdictions of the country concerned or to international arbitration. For international arbitration, BITs propose one or several fora. For instance, in the BLEU model text, these fora are the ICSID, *ad hoc* tribunals (set up according to the arbitration rules laid down by the United Nations Commission on International Trade Law), the International Court of Arbitration in Paris, and the Arbitration Institute in Stockholm.

As a rule, the possibility of submitting the dispute to a court of the investor's choice is conditioned only by time constraints, as most BITs reserve some time for the amicable settlement of the dispute (consultation, negotiation…), ranging usually between three and twelve months. Once this period has elapsed, the dispute can be referred to a court: the investor does not need to obtain the consent of the host country before going to international arbitration (such consents are usually irrevocably expressed in BITs). Moreover, several BITs even contain an explicit clause providing that local remedies do not have to be exhausted.

In contrast, CACs limit an investor's right of litigation (before a domestic court, usually of the same nationality as the law applicable to the issue). For instance, the G10 set of CACs offers the possibility of a stay of legal action, providing a sovereign with a breathing space from disruptive litigation during the period in which it is organising its affairs after a default, and in anticipation of a restructuring. Another clause concentrates the power to initiate litigation within a bondholder representative.

5.3 The free transfer of capital clause

This classic clause provides that international transfers relating to an investment (exemplified by a non exhaustive list) can be made freely and without undue delay. Some BITs do not limit such free transfer at all, some contain restrictions which can vary. A reference to domestic laws and regulations (including exchange controls), or the possibility of suspending the free transfer of capital temporarily in the case of balance-of-payment problems are obvious examples.

In the heat of a debt crisis, it could be assessed appropriate to impose temporary exchange controls in order to prevent the crisis from being exacerbated by "speculative" capital flows.

If a BIT contracted by the country concerned does not deal with the issue explicitly, could the imposition of exchange controls possibly be deemed contrary to the free transfer of capital ensured by the BIT? The issue is not settled by jurisprudence, and the doctrine is divided. Some authors hold the view that temporary exchange controls would indeed constitute a breach of the BIT concerned, while others defend the position that the controls would be allowed, either on the basis of the *clausula rebus sic stantibus* (all things remaining equal) principle, or on the basis of the general principle of necessity. Here again, future jurisprudence on Argentina will probably shed some light.

In the absence of a global institution having jurisdiction over the temporary imposition of exchange controls, such a measure is a complex and delicate undertaking, from a legal and administrative point of view. If surrounded by too high a level of uncertainty, *e.g.* due to possible inconsistency with the rights and obligations stemming from BITs, evasive mechanisms could be set up quickly and successfully, and the impact on the markets could diminish or even become negative, as the main effect of the measure could be to add to the anxiety in the markets.

Box 3 – Belgian law, Euroclear and litigation relating to sovereign debt crises

Other factors, such as national legislation, can also interfere with sovereign debt crisis resolution.

Euroclear – an International Central Securities Depository established in Belgium – was recently involved in two cases under Belgian law between a sovereign debtor and one of its creditors not participating in a debt rescheduling: the Elliott case and the LNC case.

In 2000, LP Elliott Associates obtained an order from the Brussels Appeals Court preventing Euroclear from accepting payment or paying out cash from Peru to discharge the interest due on Peru's Brady bonds. This order was granted without the defendants, Euroclear and Peru, being given the opportunity to present their counter-arguments. It was based on a broad interpretation of the *pari passu* provision. According to this interpretation, Peru could not make interest payments on its restructured sovereign bonds (Brady bonds) without at the same time making proportionate payments to holdout creditors (Elliott). Peru decided to settle amicably with Elliott in order to avoid being forced to default on its Brady bonds payments.

In 2003, on the basis of the same interpretation of the *pari passu* provision, LNC, a US debt collection company, obtained an order from the Brussels Commercial Court preventing Euroclear from accepting payment or paying out cash in respect of Nicaragua bonds. This order was also granted without the defendants, Euroclear and Nicaragua, being given the opportunity to present their counter-arguments.

The issue raised by those cases was addressed in two ways: first, by the (at least) partial reversal of the "Elliott jurisprudence", and second, by an amendment to the Belgian legislation.

Reversal of the "Elliott jurisprudence": in 2004, following the appeal lodged by both Nicaragua and Euroclear, the Brussels Court of Appeal dismissed LNC's claim, mainly for the reason that a third party (Euroclear) to a contract (between LNC and Nicaragua) cannot be considered as liable for the execution of that contract (which was the ▶

result of the appealed order). The Court did not even have to look into the interpretation of the pari passu provision. However, LNC lodged a new appeal (pourvoi en cassation), before the Belgian Supreme Court (Cour de Cassation), on the grounds that the conclusion of the Brussels Court of Appeal was based on an erroneous interpretation of Belgian law. The Belgian Supreme Court is not expected to rule on LNC's appeal before the end of 2005.

A*mendment of the Belgian legislation*: a Belgian law of 28 April 1999 prohibits the attachment of any cash settlement account held with the operator of a payment system or of a securities settlement system designated by the said law, or with the settlement agent of one of those systems. This law aims to ensure that the smooth functioning of a payment or securities settlement system is not paralysed or impaired by an attachment or sequestration, or by a court order blocking an account. But Elliott and LNC, with their respective claims, circumvented the objective of protection sought by this law, by blocking a payment to be credited to a settlement account in a protected system, thus at a stage prior to it being registered in the account. Therefore, in order to safeguard the full effect to the 1999 law, the Belgian Government proposed to amend it, by providing that the rules also apply to transfers of sums to be credited to a cash settlement account through an intermediary acting as cash correspondent (*i.e.* a Belgian or foreign credit institution). This amendment was adopted by the law of 6 December 2004 amending insolvency rules concerning credit institutions and insurance undertakings. The law was published on 28 December 2004, and entered into force on 7 January 2005. The amended text provides: "Any cash settlement account maintained with the operator of a system or with a cash settlement agent, as well as any cash transfer, through a Belgian or foreign credit institution, to be credited to such cash settlement account, cannot be attached, put under sequestration or otherwise blocked by any means by a participant (other than the operator or the settlement agent), a counterpart or a third party."

6. Possible solutions

As already mentioned, interference by BITs is due to the progressive extension of their scope and to their increasing number, but also to the fact that recent initiatives on a more orderly resolution of sovereign debt crises do not pay sufficiently due attention to the legal framework surrounding sovereign debt crises.

From the preceding chapter it follows, however, that it is uncertain whether the potential interference described will occur in real life. Therefore, one could imagine leaving things as they are and waiting for the development of a jurisprudence. Such a solution could never be entirely satisfactory, as due to the case-by-case nature of jurisprudence and the lack of unity in international arbitration, complete legal certainty will never be attained. Another factor to take into account is that, while the overall impact of hold out creditors has usually been considered relatively limited until now, the current Argentine restructuring, with the hold out creditors accounting for some 14 p.c. of the country's outstanding debt (or 11.5 p.c. of the country's GDP), could greatly increase the risks of a wait-and-see solution.

Since the type of interference under review is of a formal legal nature, it can only be addressed by legally binding rules. It would therefore be useless to try to devise a solution through "the Principles" (see Box 1) or other kinds of gentlemen's agreements.

As BITs may amplify collective action problems in two major respects, a solution favouring timely and orderly debt workouts should also address both aspects. First, as the additional enforcement mechanisms provided by BITs may give investors more scope and incentives to hold out and to litigate, the protection given should be curtailed in the case of a sovereign debt crisis. Second, the bilateral approach taken by BITs introduces preferential treatment features, making the necessary coordination among bondholders more difficult. To avoid such problems in a sufficiently general way, a multilateral approach is in order.

From a legal point of view, two solutions could be designed in the optimal form of multilateral instruments: a multilateral instrument dealing with international investment (6.1) and a multilateral instrument dealing with more orderly resolution of sovereign debt crises (6.2). These two solutions are not mutually exclusive; in order to avoid any conflict such as those described under point 4.3, and therefore to ensure greater legal certainty, they could be complementary.

6.1 Multilateral instrument dealing with international investment

The issue could be addressed from the "Investment Treaty" angle, with the insertion in every BIT of a carve-out clause concerning public debt and/or sovereign debt crisis. However, this solution is not realistic, bearing in mind the growing and already daunting number of BITs. Moreover, this insertion would only work for the future, which would have an *a contrario* effect on the classification of bonds as investments under existing BITs.

A multilateral instrument would not suffer from this drawback.

The text of a multilateral carve-out clause would have to be very precise, in order not to exclude public debt entirely from the protection of an investment instrument. Indeed, some rules of investment law have a beneficial function, such as the MFN clause for instance. Its text could be similar to one of those discussed during work on the MAI in the OECD:

"A breach by a government of a public debt obligation in the context of a general debt default or general debt restructuring, including an imminent debt default or restructuring, is not a breach of the MAI. Any general rescheduling or reorganisation of such public debt obligations is not subject to the MAI, and a sanctioning by a government of a general workout of debt contracted by private parties is not a breach of the MAI.

A general debt restructuring includes, but is not limited to, a debt restructuring in the Paris Club or the London Club. A breach of a public debt payment obligation by a government is a failure of a government, entity or enterprise controlled by a government, to make a timely payment of its obligation under:
a) a public debt instrument; or
b) a governmental guarantee.

A public debt instrument includes a bond or note issued by a government, or a loan made to a government."

A carve-out clause focused on disputes on sovereign debt default and sovereign debt restructuring could also be designed with regard to the settlement of investor-State disputes clause.

However, the success of such clauses presupposes the successful launching of work on such a multilateral instrument (in the OECD, the WTO, or some other international organisation), and could only be ensured if the instrument were adopted by several countries, including those most concerned by sovereign debt crises, *i.e.* emerging market countries. If those countries did not adopt this multilateral instrument, their sovereign bonds would still fall within the scope of BITs.

6.2 Multilateral instrument dealing with more orderly resolution of sovereign debt crises

Another possibility would be to address the problem from the "Sovereign Crises Resolution" angle. Indeed, a multilateral instrument dealing with a more orderly resolution of sovereign debt crises, enshrined in an international treaty, could contain some rules relating to other treaties, such as BITs.

One clause would provide a specific institution with exclusive competence over issues arising from a sovereign debt default and a sovereign debt restructuring.

A complementary clause would exclude the application of investment instruments (BITs or MAI) to sovereign debt default and sovereign debt restructuring.

However, as in the case of the solution described under point 6.1, and for the same reason, this kind of solution would only work if the treaty enshrining this multilateral instrument were globally ratified.

This option would benefit from a higher degree of transparency when compared to the option presented under point 6.1, as all the features linked to a sovereign debt workout would be dealt with in the same instrument. It would also be more consistent, as it would not only ensure that BITs will no longer have the potential to interfere with the resolution of debt crisis, but would also establish in the same text the procedure to be followed in such cases.

To achieve this, works on such an instrument should be relaunched in international fora. Bearing in mind its experience on the SDRM and its almost universal membership, the IMF seems to be the appropriate place for doing so. In any case, the road ahead will be a long and difficult one.

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On 23 March, the National Bank launched its new website, which was thoroughly revised and reorganised. The extensive information which it provides is more complete and more accessible.

The website offers a number of new features.
Its new architecture allows users to find information via a system of menus, refining the search in three stages.

The home page offers two access routes to the information: either via a basic menu setting out the information by subject, or via menus which select the information that is of more specific interest to particular target groups. Next to the new features presented in the middle of the home page, there is an area where the upcoming publications are shown, which will make the site more dynamic. Finally, a regularly updated score board on the Belgian economy, displays the latest available figures.

In this way, the National Bank means to reinforce its role as a key player in the production and dissemination of economic and financial information in Belgium. The new website meets two major objectives of the National Bank i.e.: to make its services more accessible and to enhance the visibility of its work. Wherever possible, the information is supplied in four languages: French, Dutch, German and English.