Financial Stability
Review 2003

BanqueNationaleBank
DE BELGIQUE   VAN BELGIË

Contents

Foreword

By publishing its annual Financial Stability Review (FSR), the first issue having been launched in July of last year, the Bank wants to emphasise the importance it attaches to the maintenance of an efficient and resilient financial system. The achievement of this objective is henceforth considered as a key element in the activities of the Bank. However, this goal cannot be pursued in isolation, but must clearly be in keeping with the action undertaken by all the other institutions helping to safeguard financial stability.

The most notable sign of this co-operative approach is the recent rapprochement of the Bank, the Banking and Finance Commission (BFC) and the Insurance Supervision Office (ISO). The law of 2 August 2002 calls for close co-operation, the pooling of resources and the development of synergies between, on the one hand, the BFC and the ISO, which, on 1 January 2004, will merge into a single supervisory authority, the Banking, Finance and Insurance Commission (BFIC) and, on the other hand, the Bank whose role in the macro-prudential surveillance of financial markets has been explicitly recognised. Furthermore, the law establishes a Financial Stability Committee made up of the board members of each institution. This new Committee will deal with all matters of common interest, such as the global stability of the financial system or the co-ordination of crisis management.

The preparation of this FSR clearly benefited from this new structure. In its drafting, contacts and exchanges of views made it possible to take on board the experience and concerns of supervisors. In particular, extensive use was made of the databases and various sources of information available at the BFC.

At the same time, it was agreed that this FSR should remain a National Bank publication in order to maintain the necessary independence for the exercise of the specific competences of the various institutions, while not diluting their respective responsibilities. Indeed, macro-prudential surveillance, which is one of the core competences of the Bank and the main raison d'être of this FSR, can best be exercised by avoiding direct interference with the control of individual institutions, a function which requires supervisors to gather confidential information and to endorse specific micro-prudential responsibilities. To achieve this segregation of duties and, at the same time, to maximise synergies between institutions, the main article in this FSR, devoted to an overview of present financial stability conditions in Belgium, will from now on take the place of the Economic Section of the Annual Report of the BFC. To ensure that this does not cause the loss of important information, the analysis presented in this overview has been extended to cover a broader range of financial activities – including, in particular, securities markets and financial institutions other than banks – and has been complemented by a statistical annex.

The principle of the publication of a macro-prudential analysis under the aegis of the central bank also applies in other countries which have recently launched financial stability reviews. In all cases, it is the central bank which is responsible for those publications. The number of those national FSRs has increased significantly over the last few years, which is another sign of the collective effort by central banks to gain a better understanding of the various developments that could affect stability conditions on financial markets.

The general overview of financial stability conditions is supplemented by 5 thematic articles. The first two bring out a major development in the functioning of financial markets which is particularly relevant for financial stability, i.e. the growing importance of networks. Indeed, individual financial institutions are increasingly linked through a web of international infrastructures. While those devices greatly facilitate the handling of financial flows, they also have the potential to create systemic risks by spreading to the entire system shocks initially limited to a small sub-set of participants. It is crucial to be able, at the same time, to preserve the efficiency gains achieved by those systems and to circumscribe their potential threats to financial stability.

The first thematic article of this FSR is devoted to securities settlement systems. Long considered as a rather mundane process, the operating conditions of those systems are now undergoing fundamental review in what appears to be a major revamping of the very structure of this industry. Conflicting interests are involved, which makes it all the more important to pave the way for the emergence of an architecture which satisfies the dual objective of efficiency and stability while preserving a level playing field between the various institutions.

Another important network, examined in this FSR, is the interbank market. The degree of internationalisation of this market, traditionally quite high, has been further increased by the introduction of the euro. Belgian banks are at the forefront of this development, as the proportion of their interbank transactions involving foreign counterparties is much higher than that in other EU countries. This situation tends to reduce the contagion risks within the Belgian banking sector but, at the same time, could increase the vulnerability to shocks originating abroad. Drawing on the existing information on the structure of these interbank linkages, a second article proceeds to a stress test in order to evaluate the extreme contagion effect that a major bank failure could exert, via the interbank market, on the rest of the Belgian banking sector.

The interbank market helps banks to manage their liquidity and interest rate risks. Recently, a new category of instruments, credit derivatives, has been rapidly developing and is increasingly used by banks and other financial intermediaries to trade and transfer another kind of risk : credit risk. While extending the range of risk management techniques, these instruments also alter the traditional relationship between lenders and borrowers and create, within the financial sector, a new range of relationships between buyers and sellers of credit protection instruments. The third thematic article, written jointly by staff of the Bank of Canada, the Banque de France and the National Bank of Belgium, contains an analytical review of the credit risk transfer instruments. This paper, which evolved out of the work of a G10 working group aimed at addressing the financial stability implications of all types of credit risk transfer instruments, is published simultaneously in the Revue de la Stabilité Financière issued by the Banque de France.

To further improve the soundness of individual banks and to encourage banks to use solid risk management techniques, the Basel Committee on Banking Supervision is in the process of finalising new solvency requirements, which are better known as the Basel II proposal. The challenge here is to cope with these international regulatory standards while taking into account the specific characteristics of the national market, in which banks remain rooted. As domestic clients include a large number of small corporations, the discussion concerning the treatment of SMEs in the Basel II proposal is of particular importance. A fourth article devoted to a presentation of this Basel II proposal, examines more in detail its impact on Belgian banks' solvency requirements for loans to domestic corporations and its wider implications on the credit relationships between Belgian banks and their SME customers.

How to reconcile the interests of creditors and debtors is also a central debate in international organisations such as the IMF and the World Bank, as this problem comes to the fore in sovereign debt crisis situations. The previous FSR had already devoted a paper to the design of new approaches – statutory as well as contractual – put forward to help alleviate the co-ordination problems which frequently arise between debtors and creditors in periods of crisis. The distinction between borrowers and lenders often goes together with a divide between industrial countries and emerging or developing economies, thus giving a political dimension to the debate. Belgian authorities have been especially alert to that aspect, as Belgium is chairing a "mixed IMF constituency" where both sides are represented. Moreover, the Belgian constituency includes 3 of the present 15 EU members and 4 of the 10 newcomers, so it is particularly concerned by the EU enlargement process. A fifth article, focusing more on the future, explores the potential consequences of EU enlargement for the structure and functioning of the IMF.

Through its various articles, this FSR tries to consider both the national and the international angle. The main focus of analysis is on the stability conditions of the domestic financial sector. However, the experience gained and the role played by Belgian authorities in financial surveillance often extend beyond this market alone. The Bank's FSR aims to draw on this source of information and expertise in order to broaden the relevance of its analysis and of the messages conveyed.

Brussels, June 2003
Guy Quaden
Governor

Executive Summary

1. Overview

Last year's FSR had already noted the resilience of the Belgian and international financial system to an impressive series of shocks, including the sharp decline in equity prices, the substantial erosion of corporate credit quality, the events of 11 September, the Argentine default and the corporate accounting scandals. However, movements in financial intermediaries' stock prices since then suggest that markets may have become increasingly concerned about the impact of these shocks on the medium term prospects of financial institutions, albeit to a varying degree in the US and the euro area, and for banks and insurance companies.

As confidence remains fragile on financial markets, it is essential to closely monitor how financial markets are coping with the present adverse developments. In Belgium, as in most other industrialised countries, the two main issues for financial stability are the consequences of the economic slowdown in terms of credit risks and the implications of stock market turbulence for market risks.

1.1 Credit risks

The downturn in economic activity since 2001 has weakened corporate credit quality, all the more in that enterprises' balance sheets had been progressively burdened by the sizeable financial imbalances built up during the second half of the previous decade. Rising equity market capitalisation levels during that period fostered a surge in capital spending that was well in excess of corporations' internal funds. Together with a substantial – and M&A-related – increase in corporations' investments in financial assets, this led in turn to a sharp rise in external financing requirements in the US and in several EU countries, among them Belgium.

While US and euro area non-financial corporations met these external financing requirements primarily by relying on debt, which led to an increase in their leverage, Belgian enterprises tended to use equity rather than debt financing in the period 1999-2001. Those new issues largely took the form of non-listed shares, which are traditionally an important source of external funding for Belgian non-financial corporations, but also included large initial public offerings by two major Belgian enterprises. By increasing their own funds, Belgian firms were able to avoid an increase in leverage and ward off some of the corporate financial excesses witnessed in other countries.

This consolidation of the capital base could explain why, despite a significant fall in corporate profits in 2002, the number of bankruptcies only increased moderately in Belgium. At the same time, Belgian banks have built up significant provisions for credit risks and losses on their securities portfolio. On average, those provisions increased by 59 p.c. in 2002, on a consolidated basis.

This upsurge is not exclusively attributable to domestic corporations, as Belgian banks are increasingly diversifying their activities abroad. While the majority of this exposure relates to other EU members and the US, the Belgian banking sector has also, through a major bancassurance group, built a strong presence in several EU accession countries. There has been a similar expansion by other Western European banks, so that subsidiaries of foreign banks now account for a significant share in some of those local markets, playing a central role in the region's financial systems.

CHART 1   **CORPORATE FINANCE INDICATORS FOR EURO AREA AND BELGIAN NON-FINANCIAL CORPORATIONS**
            (Flows ; percentages of gdp)
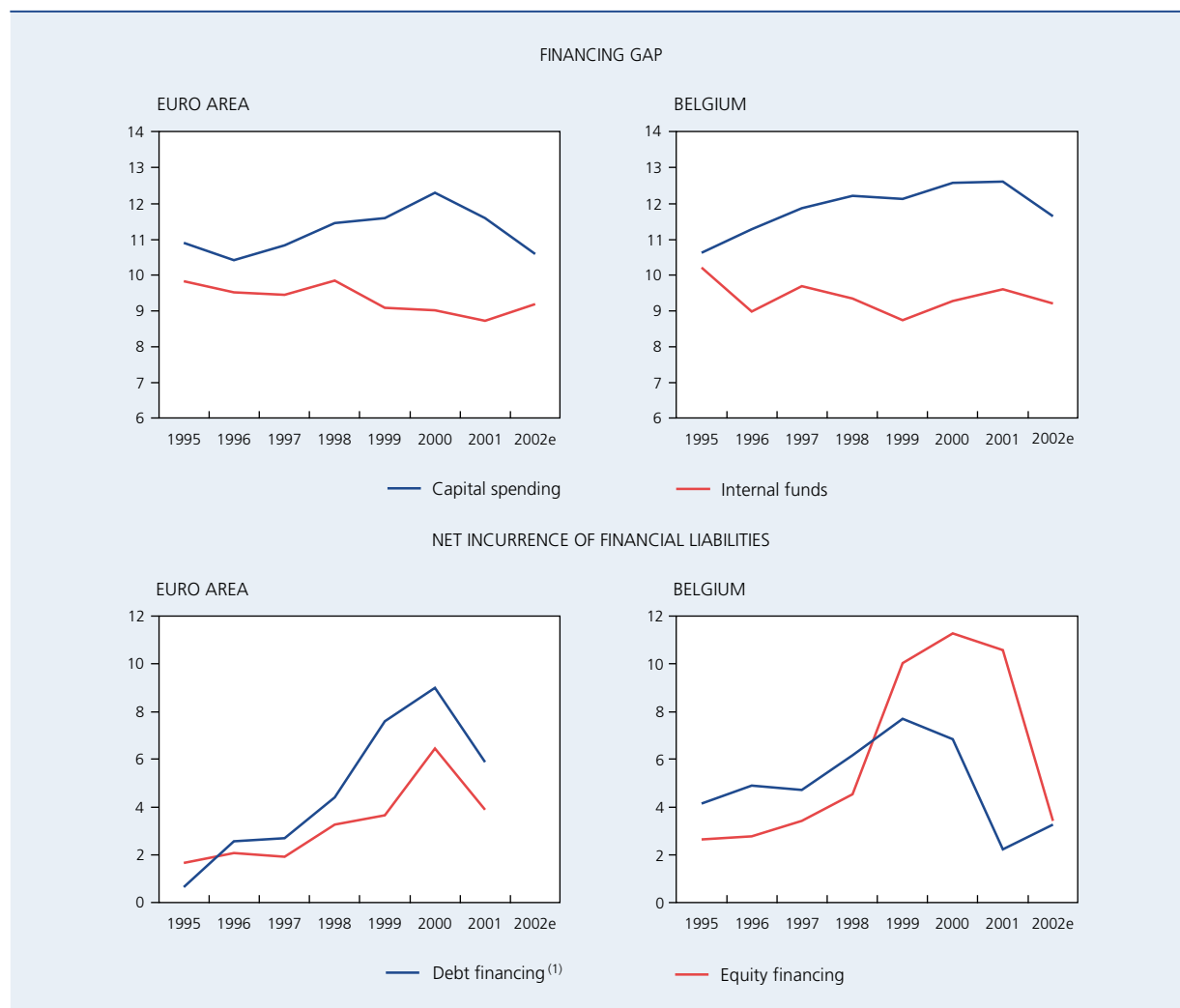
Sources : ECB, IMF, NAI, NBB.
(1) Debt financing through bank loans or issues of securities.

Banks' credit policies in these countries were until recently often characterised by a reluctance to lend to all but the most creditworthy companies. However, recent developments suggest that banks are starting to cater for lending to new customers and market segments, in particular by expanding their lending to SMEs and households. This entails new challenges for the risk management systems of banks, as this credit expansion sometimes seems to be occurring despite persistent weaknesses in crucial support structures, such as effective bankruptcy and collateral recovery procedures, or credit and collateral registers.

On the domestic market, a number of factors may, however, have helped limit the credit risks run by banks. First, a high proportion of Belgian banks' corporate loan portfolio consists of credit to SMEs. This limits the concentration of risks, not only because exposures are spread over a larger number of counterparties, but also because risks on small firms are more idiosyncratic, and therefore easier to diversify, than risks on larger firms which appear to be more closely correlated with each other.[1]

Second, Belgian households – which account for about 30 p.c. of banks' total loans (on a territorial basis) – continued to enjoy a very strong financial position, characterised by low debt ratios and large and diversified

(1) This general characteristic justifies the special treatment of SMEs in the new Basel II Capital Accord. See the thematic article in this FSR on "The Basel II Capital Accord, SME loans and implications for Belgium".

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CHART 2 NET PROVISIONS FOR CREDIT RISKS [1] AND THE BUSINESS CYCLE
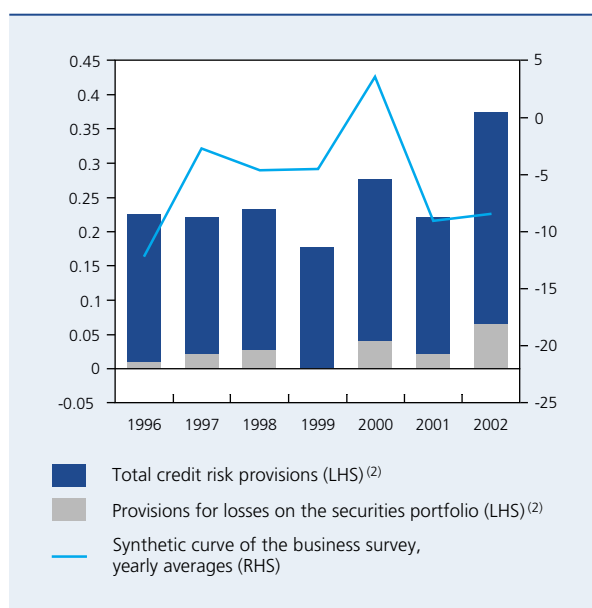
(Data on a consolidated basis)

Total credit risk provisions (LHS) [2]

Provisions for losses on the securities portfolio (LHS) [2]

Synthetic curve of the business survey, yearly averages (RHS)

Sources : BFC, NBB.
(1) Net provisions for credit risks charged to Belgian banks' profit and loss account.
(2) Expressed as percentages of the yearly average of the outstanding amounts of loans and advances to customers and securities on Belgian banks' balance sheets.

financial assets. While credit risks on households are quite limited, by marketing more complex investment products to their retail clients, banks could incur operational and reputational risks if those products are offered to unsophisticated investors without appropriate information or warnings. In this respect, it is symptomatic that Belgium is not the only country where consumer protection considerations have become an important dimension in the activities of supervisory bodies.

In addition, Belgian banks have, in recent years, made more extensive use of credit derivatives to transfer some credit risks to other market participants. The notional amounts of total return swaps, credit default swaps and credit spread options in Belgian banks' books rose by more than 60 p.c. in 2002. While gross figures are inflated by the large-scale activities of a US specialised subsidiary of a major Belgian banking group, active as an arranger, market maker and trader of credit derivatives, net positions are also substantial. They indicate that, globally, Belgian banks use credit derivatives to mitigate their risk, by transferring – in net terms – credit risks from their balance sheets to other market participants. At an individual level, however, some smaller Belgian banks have been net sellers of protection. This corroborates a recent analysis of the credit derivatives market performed by FitchRatings [2], which concluded that banks are significant buyers of protection through the credit derivatives market, but that net purchases by the larger banks are partially compensated by net sales of protection by smaller regional banks.

1.2 Market risks

Apart from slow economic growth and weakening corporate credit quality, the second major development which has affected the operating environment for Belgian financial institutions is the substantial change in the prices of most financial assets. On the one hand, the yield curve shifted downward by more than 100 basis points between December 2001 and May 2003. On the other hand, stock markets have continued the general downward trend that started with the bursting of the bubble in March 2000, notwithstanding a partial recovery since March 2003.

(2) FitchRatings, "Global credit derivatives: Risk management or risk?", 10 March 2003.

TABLE 1 USE OF CREDIT DERIVATIVES BY BELGIAN CREDIT INSTITUTIONS

(Data on a consolidated basis ; notional amounts in billions of euro)

	December 2001		December 2002	
	Protection bought	Protection sold	Protection bought	Protection sold
Total Return Swaps	6.0	0.2	3.1	0.3
Credit Default Swaps	23.7	14.6	40.0	28.8
Credit Spread Options	0.3	...	0.2	...
Total	30.0	14.8	43.3	29.1

Source : BFC.

This decline of stock market prices over the past three years may, to a large extent, reflect an unavoidable, and in itself desirable, correction of previous market valuation excesses. It appears, however, that volatility on the stock markets was also fed by persistent investor concerns over the integrity and transparency of corporations' financial reports, in the wake of new cases of corporate accounting fraud.[3]

Financial institutions have been affected in quite different ways by these developments, depending on the nature of their activities and the maturity structure of their balance sheets.

In the banking sector, the direct impact of the fall in stock market prices was rather marginal, as banks only keep small positions in equities. However, those institutions have been affected indirectly, as they are increasingly relying, for their income, on trading, investment banking and asset management activities, which have all been severely depressed by the recent market conditions.

The ensuing decrease in fees and commissions has been only partially compensated by the positive impact of the decline in long term interest rates on the intermediation margin and on the market value of fixed income securities. Indeed, the Belgian banks' assets include a sizeable portfolio of government bonds on which fairly large unrealised gains have accumulated recently. At the end of 2002, those gains corresponded to 14.3 p.c. of regulatory own funds and 33.8 p.c. of banking income. The level of these unrealised gains is very sensitive to movements in interest rates. After a sharp drop in 1999, as a consequence of an upsurge in long term rates at the end of that year, it has increased since then in conjunction with a new easing of the capital market rates. In recent years, part of those latent reserves has been used to smooth fluctuations in the banks' overall results.

The balance between those positive and negative effects has been quite different in the insurance sector. At the end of 2002, about 22 p.c. of the financial assets' portfolio of Belgian insurance companies was invested in equities. Although this share compares rather favourably to a euro area average of around 34 p.c., it makes the sector quite sensitive to an equity bear market. It is mainly this source of vulnerability which explains the low return achieved in 2002 on the investment portfolios of Belgian insurance companies.

Unrealised capital gains (LHS)

Reference rate 10-year linear bonds (RHS, in percentages)
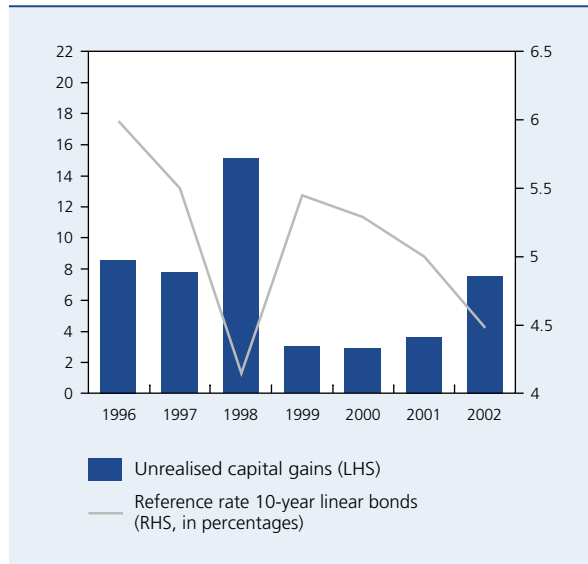
Sources: BFC, NBB.
(1) Defined as the difference between the market value and the historical cost of quoted long term securities (initial maturity over 1 year) in the credit institutions' investment portfolios.

This return would have been even lower had the sector not recorded sizeable capital gains on its bond holdings, thanks to the decline in risk-free interest rates. In a longer term perspective, however, insurance companies have to meet very long fixed term liabilities, whose duration often exceeds that of their assets. In present market conditions, it is becoming increasingly difficult for insurance companies to get the return needed to fulfil the commitments linked to their defined benefit contracts.

1.3 Profitability and solvency

Faced with these increased credit and market risks, financial institutions have been able, on average, to maintain their profitability and solvency. This has been the case, in particular, in the banking sector. Weighted by the share of each individual bank's assets in the total assets of Belgian

(3) These investor concerns were also one of the reasons that motivated a revision of Belgian corporate governance law in August 2002. The main features of this revision are described in chapter 5 of the Overview.

CHART 4   MAXIMUM GUARANTEED RETURN ON DEFINED
BENEFIT LIFE INSURANCE CONTRACTS

(Daily data, percentages)

Long term interest rate (1)   Maximum guaranteed return

Source : NBB.
(1) Rate on the secondary market for 10-year Belgian government bonds.

CHART 5   RETURN ON THE INVESTMENT PORTFOLIO OF
INSURANCE COMPANIES

(In percentages of the portfolio (1))
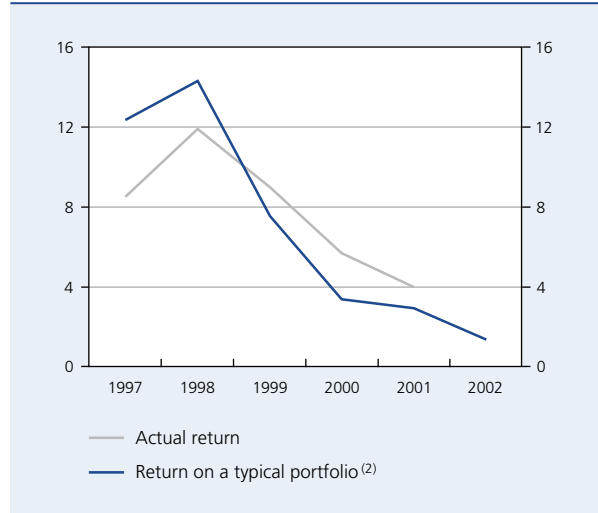
Actual return
Return on a typical portfolio (2)

Sources : NBB, PUI, Thomson Financial Datastream.
(1) Including capital gains or losses and value corrections.
(2) Portfolio with 40 p.c. Belgian government bonds, 30 p.c. corporate bonds with a maturity between 7 and 10 years, 18 p.c. international shares, 5 p.c. Belgian shares and 7 p.c. liquid assets in euro at 2 months.

banks, the average risk asset ratio increased slightly in 2002 to reach 13.1 p.c. while the proportion of assets held by institutions with a ratio exceeding 12 p.c. rose further from 68.5 p.c. in 2001 to 74.5 p.c. in 2002. Although the average return on equity went down from 13.7 p.c.

to 11.8 p.c. during the same period, the major Belgian credit institutions all achieved a return ranging from 9 to 16 p.c.

CHART 6   WEIGHTED DISTRIBUTION OF BELGIAN
BANKS' RISK ASSET RATIO

(Data on a consolidated basis, percentages of total assets of Belgian banks)

1999   2001   2002
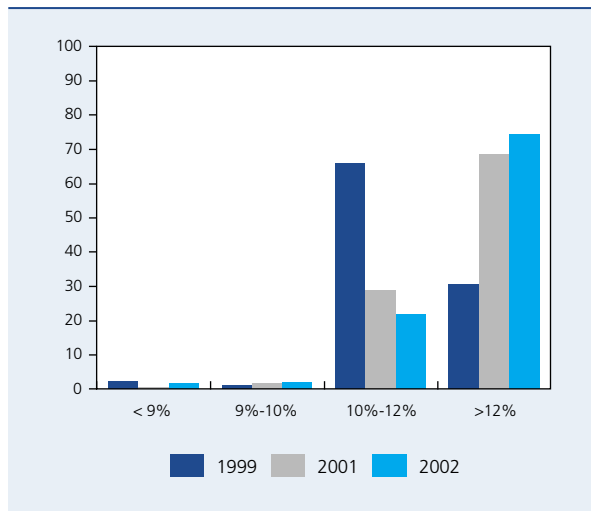
Source : BFC.

CHART 7   WEIGHTED DISTRIBUTION OF BELGIAN
BANKS' RETURN ON EQUITY

(Data on a consolidated basis, percentages of total assets of Belgian banks)

1999   2001   2002

Source : BFC.

PROFITABILITY AND SOLVENCY OF BELGIAN FINANCIAL INSTITUTIONS

(Percentages)

	Return on equity			Solvency			
	Banking sector [1]	Insurance sector	4 large bancassurance groups [2]	Banking sector [1] [3]	Insurance sector [4]	4 large bancassurance groups [2]	
						Banking entity [3]	Insurance entity [4]
1998	11.0	34.2	13.7	11.3	319	11.1	326
1999	17.1	26.9	15.9	11.9	267	11.8	307
2000	20.4	21.5	16.8	11.9	265	11.7	261
2001	13.7	12.1	17.1	12.9	276	12.7	231
2002	11.8	n.	13.7	13.1	n.	12.8	211

Sources : BFC, ISO, NBB, major bancassurance groups' annual reports.
(1) Credit institutions governed by Belgian law.
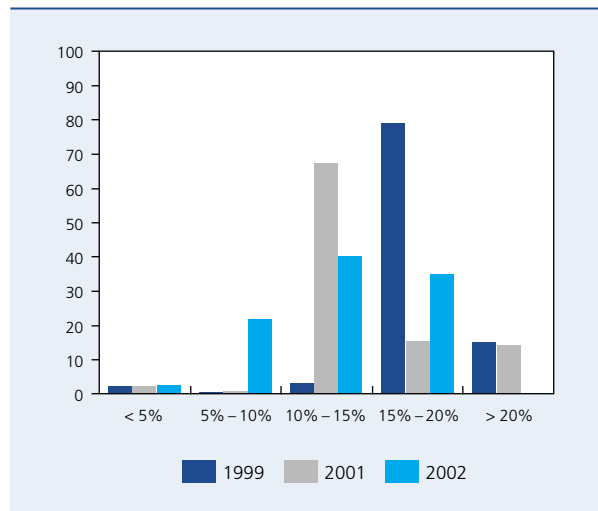(2) Dexia, Fortis, ING, KBC.
(3) End-of-period ratio between own funds and risk-weighted assets, as defined by the Basel Committee on Banking Supervision.
(4) Coverage ratio : available solvency margin over required solvency margin.

The financial position of the four major Belgian financial groups also has to be measured on a wider basis, given the heavy involvement of these institutions in bancassurance. While the return on equity of bancassurance groups was affected by the sharp drop in the profitability of their insurance branch, combining the two activities nevertheless seems to have had a stabilising effect on the overall results of these groups. In regard to solvency, the trend has also been more favourable in the banking arm, where the risk asset ratio has improved since 1998, than in the insurance arm. For the latter, the coverage ratio, which corresponds to the ratio between the available capital and the solvency margin required by the supervisory authorities, has fallen from 326 to 211 p.c.

Those profitability and solvency ratios compare favourably to the levels achieved in the neighbouring countries but financial institutions have to address important challenges, not the least of which is the uncertain economic outlook. Potential risks for the financial system in the future could range from a new downturn in global economic growth, with associated equity market weakness and corporate credit deterioration, to an acceleration of global growth, which could in turn lead to a stronger than expected increase in short and long term interest rates. While a sharp increase in risk-free interest rates would certainly be preferable to a further decline in the context of a deflationary environment, such a development could nonetheless pose a significant challenge for those financial institutions that have sizeable exposures to interest rates.

2. Summary of Articles

2.1 New structure for clearing and settlement systems in the EU

The European Union has set itself the strategic goal of integrating its capital markets by 2005. The streamlining of post-trade processing, i.e. the clearing and settlement of securities trades, is an important factor in achieving this objective. Indeed, the overly fragmented nature of the EU clearing and settlement infrastructure seriously increases the costs of cross-border securities transactions.

There is a general consensus that this move to a more integrated solution should be market-led. To this end, the existing barriers to competition will need to be abolished. Depending on the path chosen by the market, this could lead to the emergence of large service providers eager to fully exploit consumption network externalities and production economies of scale. To ensure that system users reap the full benefit of the enhanced clearing and settlement infrastructure, non-discriminatory and fair access should be given to the functions that are perceived as essential facilities, corresponding to the natural monopoly component of the infrastructure, while competition should be open for all other functions. Furthermore, the governance structure of the system will have to be organised in such a way that the interests of all users are taken into account in the design and management of the system.

Cross-border settlements raise specific financial stability issues that are currently being considered by securities commissions and central banks. Cross-system settlements are more complex and potentially riskier than those within one system. In addition, increased integration of the settlement of trades may heighten the impact of any disruption of the settlement system. Finally, in a changing clearing and settlement environment, all service providers that are considered as systemically important should comply with comparable standards of soundness and efficiency.

2.2 The Belgian interbank market: interbank linkages and systemic risk

Interbank markets play an important role in the financial system, redistributing liquidity from banks with a cash surplus to those with a cash deficit. These markets allow banks to help insure their depositors against liquidity shocks, and they also enable banks to better manage their own risks. Yet, linkages created through interbank activities may represent a potential channel of contagion, through which problems affecting one bank (domestic or foreign) could spread to other banks.

By analogy with analyses carried out by other central banks, this paper conducts a stress test with respect to interbank markets. It simulates, in a mechanical way, how the non-repayment of interbank obligations by one bank affects the ability of its interbank lenders to meet their own interbank obligations (and any further domino-type effects).

Several observations emerge from the simulations. First, the risk of contagion arising from a potential default by a domestic bank on its interbank obligations appears to have decreased over the past decade. Second, Belgian banks' interbank exposures are generally of short maturity, and a relatively high proportion of interbank exposures is secured. These characteristics reduce the risk of contagion. Third, the Belgian interbank market is highly international; the vast majority of interbank exposures is cross-border. This suggests that the potential contagion risk originating from a foreign interbank borrower's default is more significant than the risk arising from a domestic interbank borrower's default. Nevertheless, the contagion simulations suggest that risks associated with foreign exposures are concentrated in a very small number of countries. Moreover, the foreign banks whose interbank defaults could generate contagion in the simulations are all internationally recognised with high investment grade ratings.

2.3 An analytical review of credit risk transfer instruments

During the 1990s, the emergence of credit derivatives and collateralised debt obligations enlarged the range of instruments for transferring credit risk, both between banks and from banks to non-bank institutions. The tradability of these new instruments, as opposed to more traditional instruments such as collateral or guarantees, has resulted in the creation of very rapidly developing markets for credit risk transfer. The potential for these markets to affect financial stability is likely to increase over time.

This paper explores the financial stability implications of credit risk transfer (CRT) instruments. At the micro level, CRT instruments provide benefits for financial institutions in managing their credit risk, yet these instruments also alter traditional relationships between borrowers and lenders, and they create new relationships: between lenders and credit protection sellers. This leads to new potential problems of asymmetric information and risk management, such as weaker incentives on the part of banks to screen and monitor borrowers, or increases in counterparty risk. These problems can be mitigated to greater or lesser degrees via the choice of CRT instrument. Nevertheless, they can raise financial stability concerns if not properly addressed. In addition, the pricing of CRT instruments remains difficult, which raises the prospect that CRT prices may not adequately reflect the risk.

At a macro level, CRT markets may affect the total availability of credit, and they have the potential to disperse credit risk. While there is evidence that CRT markets have moved some credit risk out of the banking sector, the true degree of dispersion achieved via these markets is at present unknown. Improved disclosure of CRT activities would go a long way towards enabling market observers to judge their true impact.

2.4 The Basel II Capital Accord, SME loans and implications for Belgium

The Basel Committee on Banking Supervision is in the process of establishing a new regulatory framework for banks to increase the risk-sensitivity of minimum capital requirements. As loans to SMEs constitute an important part of Belgian banks' portfolios, the paper highlights how this specific category of assets is treated in the new Basel proposal, discusses the rationale of this treatment and analyses the implications of the Basel II proposal on capital requirements for loans to non-financial Belgian firms.

Recognising the special characteristics associated with SMEs, the Committee has agreed on a lower risk weight for loans to SMEs which are eligible for the retail and the corporate portfolios. The justification for the different risk weight curves for SMEs is based mainly on the argument that, although small firms may, on average, have higher default probabilities than large firms, this higher default risk is mainly caused by idiosyncratic risk which can be diversified away in a large portfolio. Research on foreign and Belgian data confirms the positive relationship between firm size and correlation of asset returns with a systematic factor.

To analyse the impact of the Basel proposal on capital requirements for Belgian banks' corporate loans, the paper uses a dataset that combines information on credit granted to firms in Belgium with balance sheet data on individual firms. The analysis suggests that, on average, banks' capital requirements for loans to non-financial firms will not go up relative to the requirements of the current Basel Accord. This appears to be especially true if banks adopt the internal ratings based (IRB) approach in the new Accord, which should imply lower capital requirements than the standardised approach. The analysis suggests that Basel II should not lead to credit rationing for SMEs.

2.5 The governance of the International Monetary Fund with a single EU chair

The introduction of the euro and closer co-ordination of economic policies in the EU are fuelling discussion on the representation of Europe in international financial institutions. This exploratory article focuses on how the establishment of a single EU chair at the IMF would affect the governance of that institution.

The introduction of a single EU chair would indeed affect the balance of power at the IMF. An interesting paradox here is that a reduction in the number of European Executive Directors, in the global voting power of Europe and in its contribution to the Fund's general resources could go hand in hand with an increase in the Union's impact on IMF decision-making. The consequences which a single EU chair could have for mixed constituencies might also affect the co-operative nature of the Fund. Likewise, some issues are raised with regard to the future internal governance of the EU chair itself, which could be crucial in determining its effective impact.

The article concludes that, if a single EU chair were established, the debate on the governance of the international financial system would become inescapable. What can be seen as a positive step on the long road to further European integration, could have major implications extending far beyond the borders of the Union, and the functioning of the IMF as such.

Financial Stability Overview

Introduction

This survey of financial stability aims at identifying risks of disruption in the Belgian financial sector. In view of the stressful environment in which the markets have had to function in recent years, how resilient is the system at present? In other words, what is the likelihood that an initial shock could, through a contagion mechanism, spread to other parts of the system and affect one or more of the key functions of financial markets, namely the management of risks, the provision of liquidity and the processing of information? This is all the more complex to monitor since the distinction between shocks and propagation mechanisms is not always clear-cut, so that the channels through which disruption could occur are potentially very diverse.

Chapter 1 briefly analyses the situation on the international markets, which could have a particularly large impact on financial stability since the Belgian banking sector's exposure to foreign counterparties is proportionally greater than that in other EU countries.

Chapter 2 reviews the resilience of the financial position of the Belgian private sector. Developments in this sector will affect financial stability either directly, as Belgian corporations and households are major customers of domestic banks, or indirectly through their impact on the functioning of securities markets, which are an important field of activity for credit institutions.

Chapter 3 examines the situation of the Belgian banking sector. This is a key part of the overview, as the crucial functions performed by banks in payment mechanisms, securities settlement systems or the interbank and credit markets put them in a position both to generate shocks and to accelerate contagion through the system.

Chapter 4 analyses more specifically the large bancassurance groups in Belgium. It is mostly through those institutions that problems in the insurance sector could have wider implications for the global stability of the financial system.

To strengthen the foundations of financial markets, it is essential to rely on sound corporate governance mechanisms. In a context where confidence in these markets has been shaken by the disclosure of flaws in the accounting practices or control structures of some major international corporations, efforts to improve those mechanisms have been recently undertaken in several countries. A final chapter details the initiatives taken in Belgium in this domain.

1. International financial markets

During the period under review (June 2002 - May 2003), developments on international financial markets proved (yet again) to be one of the key factors shaping the operating environment for Belgian financial markets and institutions.

In this connection, it may be recalled that last year's FSR already documented the progressive internationalisation of Belgian banks over the past few years. At the end of December 2002, Belgian banks' total foreign claims amounted to 1143 p.c. of own funds, with the corresponding figure for the EU banking sector at the end of September 2002 being 887 p.c. While the bulk of this international exposure consists of claims on West European counterparties, the data presented in Chart 1 show that the Belgian banking system also has considerable claims on residents in the US and in developing Europe, which exceed, in both cases, the corresponding levels registered for the EU banking sector.

As one of the large Belgian banks has developed – through subsidiaries – a strategic interest in the financial systems of a number of Central European countries, it is not surprising that nearly three-quarters of the exposure to developing Europe consists of local claims in local currency. Such claims also account for about half of the total foreign claims of Belgian banks on US residents. The rest of the exposure to the US consists of local claims in foreign currency and cross-border claims (which are grouped here under the heading international claims). The breakdown of these international claims indicates that a significant share of Belgian banks' exposure to the US takes the form of loans granted to or securities issued by the US non-bank private sector. International claims on this sector alone in fact amount to 72 p.c. of the Belgian banking sector's own funds, which is significantly higher than the corresponding EU average of 39 p.c.

In view of the Belgian banking system's substantial international exposures, and given the growing integration of Belgian financial markets into European (and global) money and capital markets, this overview starts with a chapter devoted to key developments in mature and emerging financial markets, before turning to an assessment of relevant developments in Belgium.

1.1 Developments in mature financial markets

Chart 2 gives an overview of developments in a number of key financial markets since the beginning of 2000.

Although stock prices did manage to stage a partial recovery from the multi-year lows reached in the first half of March 2003, the period under review brought no sign of a decisive break in the general downward trend that has prevailed on stock markets world-wide since the bursting of the bubble in March 2000. As a corollary, the persistence of high levels of implied stock market volatility – which, in the second half of 2002, reached levels that had not been seen since the aftermath of the September 11th terrorist attacks –, suggests that investors have remained cautious about the prospects for a sustainable recovery on equity markets.

CHART 1   IMPORTANCE OF CLAIMS ON FOREIGN COUNTERPARTS (EXCLUDING WESTERN EUROPE) IN BANKS' BALANCE SHEETS [1] [2]
(Data on a consolidated basis, after risk transfers ; claims expressed as a percentage of own funds)
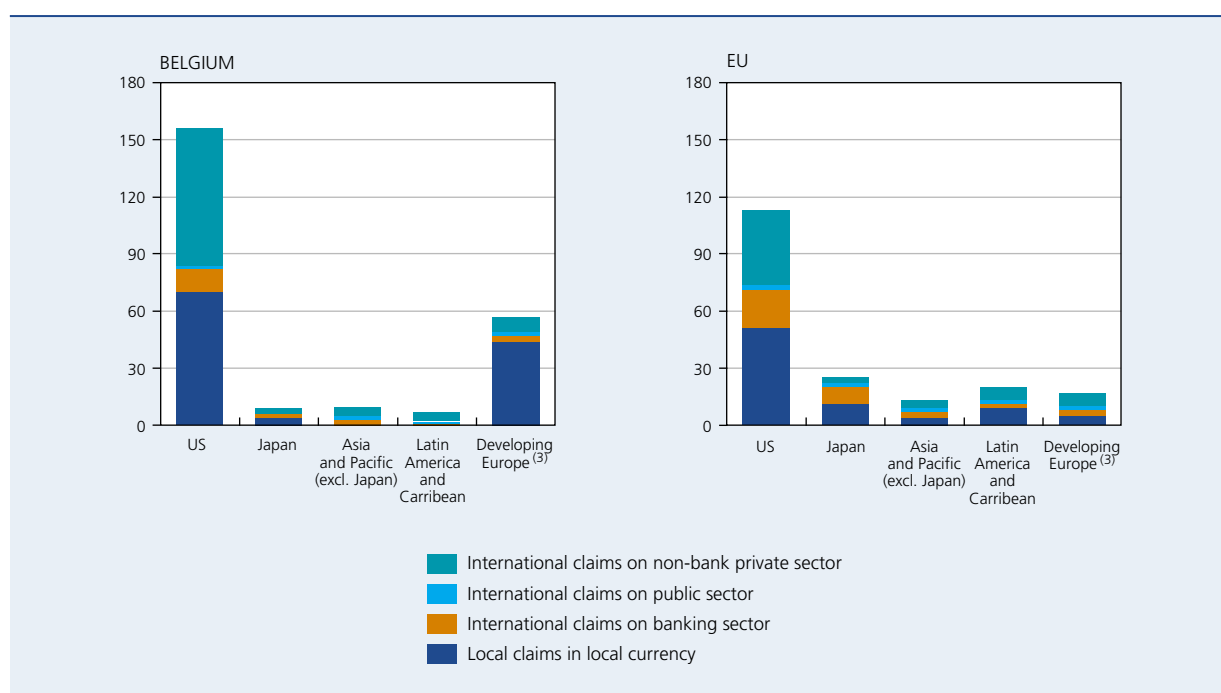
Sources : BIS and NBB.
(1) End-December 2002 figures for Belgian banks, end-September 2002 figures for EU banks.
(2) International claims comprise local claims in foreign currency and cross-border claims. The small part of the international claims not allocated to a specific sector do not appear in the chart.
(3) Developing Europe includes the 12 EU Accession countries, Turkey and East European transition economies (including Russia).

CHART 2   OVERVIEW OF DEVELOPMENTS ON SOME KEY FINANCIAL MARKETS

STOCK MARKET INDICES
(January 2000 = 100)

IMPLIED VOLATILITY[1]
(Percentages)

CORPORATE BOND SPREADS
(Vis-à-vis swaps, in basis points)
UNITED STATES

CORPORATE BOND SPREADS
(Vis-à-vis swaps, in basis points)
EURO AREA

YIELD CURVE[2]
(Government securities, percentages)
UNITED STATES

YIELD CURVE[2]
(Government securities, percentages)
EURO AREA
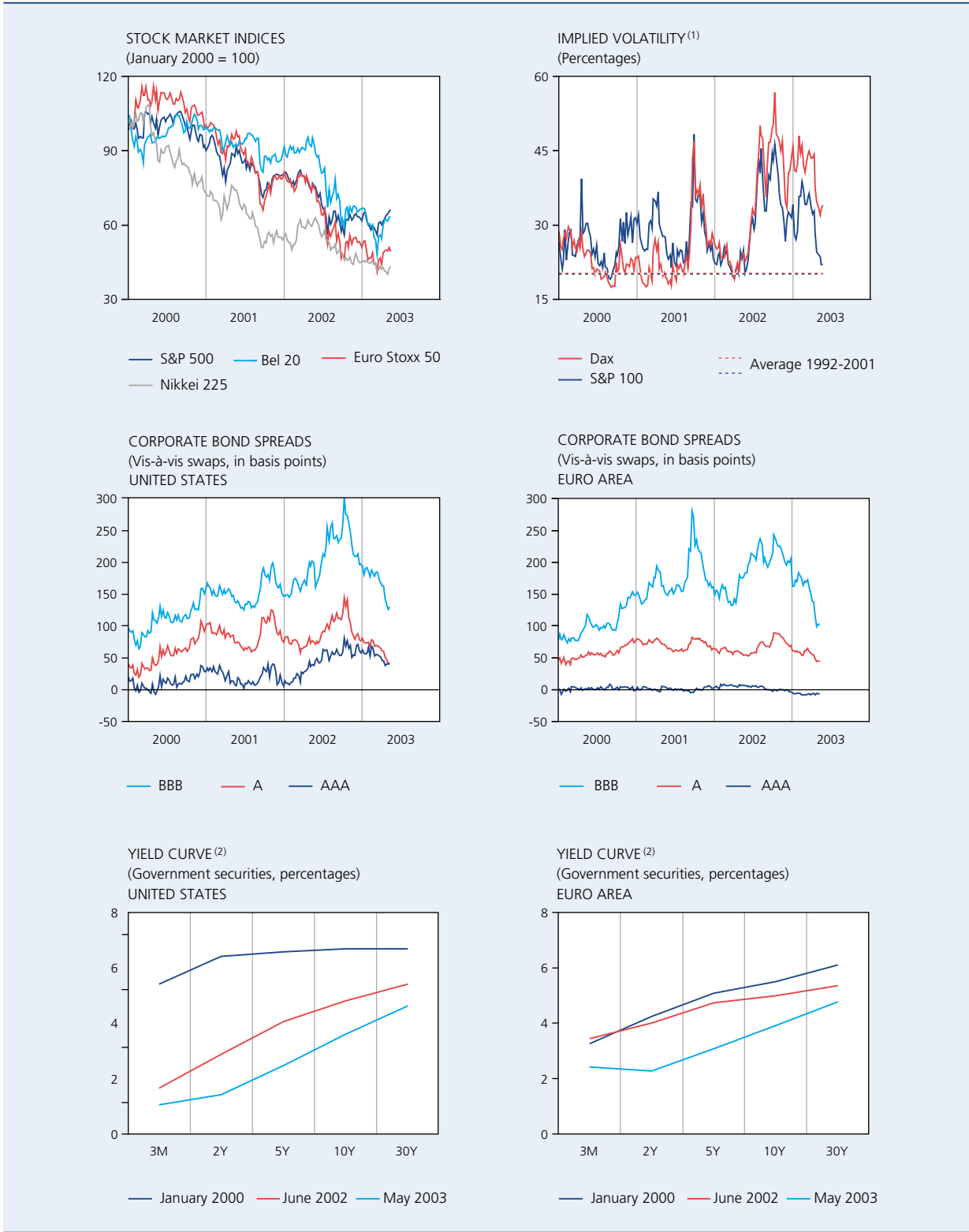
Sources : Bloomberg (Merill Lynch) and Thomson Financial Datastream.
(1) Based on the volatility implied in S&P 100 and Dax options.
(2) Mid of month observation.

While the decline of stock market prices over the past three years may to a large extent reflect an unavoidable – and in itself desirable – correction of previous market valuation excesses, other factors appear to have been at play as well during the period under review, including heightened geo-political tensions, a weaker than expected recovery of corporate profits from the downturn experienced in 2000, the persistence of sizeable financial imbalances in corporate balance sheets and continued investor concerns over the integrity and transparency of corporations' financial reports.

As regards the latter, new cases of corporate accounting fraud – some involving high-profile companies such as Worldcom and Healthsouth in the US, Ahold in the Netherlands and SK Global in South Korea – recalled prominent features of the Enron scandal, such as substantial flaws in corporate governance structures and shortcomings in the external controls effected by auditors, banks, financial analysts and institutional investors. In this context, however, it is notable that the investors' loss of confidence in the reliability of corporate earnings' reports appears to have gone beyond the issue of whether or not reporting and accounting practices conform to existing regulations. Indeed, in line with the dramatic drop in reported profits after the collapse of the bull market in March 2000, investors appear to have grown more circumspect about several reporting and accounting practices that may have contributed to the spectacular, but unsustainable, rise in corporate profits and stock prices in the period 1995 - 2000. In this perspective, the absence of a requirement to charge the cost of employee stock options as an expense under the US Generally Accepted Accounting Practices (GAAP), or the discretionary valuation rules allowed for assets of defined benefit corporate pension plans, have recently come under scrutiny. Likewise, investors appear to have taken a more critical stance towards corporations' practice of publishing "pro forma" earnings reports, which are essentially company-defined measures of corporate profits that tend to provide investors with a more upbeat representation of the firm's profits than those reported in accordance with the GAAP.

In response to these concerns, and with the aim of helping to restore investors' confidence in the integrity and transparency of corporate financial reports, market practitioners, standard setters, regulators and supervisors have taken – at national and international levels – a number of initiatives in the areas of accounting, disclosure, auditing and corporate governance. A prominent example in this regard was the Sarbanes Oxley Act of July 2002 in the US, which enacted significant regulatory changes in the areas of governance, disclosure and auditing. In Europe as well,

a number of countries have strengthened their corporate governance regulations, or are in the process of doing so (see Chapter 5 for a more detailed discussion of last year's changes in the Belgian corporate governance law).
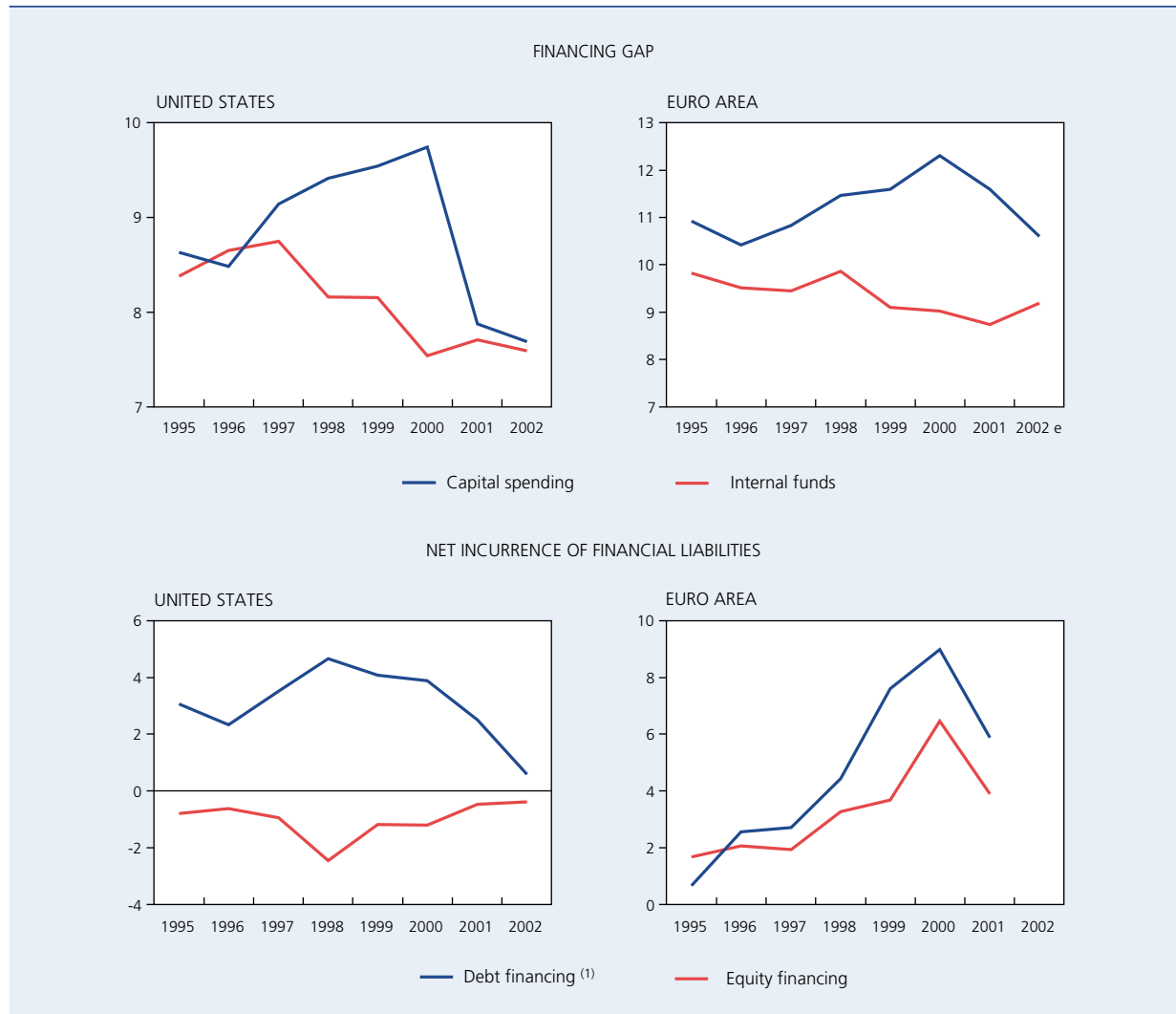
Alongside the above-mentioned concerns over corporate financial reports, the poor performance of equity markets also seems to have increased investors' awareness of sizeable financial imbalances in corporate balance sheets. As illustrated in Chart 3, these imbalances were built up in the period 1995 - 2000, when rising equity market capitalisation levels fostered, in both the US and the euro area, a surge in capital spending that was well in excess of the available internal funds. The resulting financing gap was met by external financing sources, which also financed a massive (and M&A-related) increase in the acquisition of financial assets by corporations. Although the data presented in the chart may not be fully comparable between the US and the euro area – due to differences in statistical methodologies –, it is noteworthy that both US and euro area corporations relied more heavily on debt than on equity to meet their external financing requirements. While the associated increase in corporate leverage was masked until 2000 by the dramatic increase in equity market capitalisation levels, balance sheet leveraging appears to have been particularly strong in the US, as net issues of equity by corporations were negative during the whole period. This negative figure can be explained by the fact that, in spite of the large sums of new equity being issued on the capital markets, an even larger amount of equity was being retired by US corporations in the context of equity buy-back programmes and cash-financed M&A operations.

While the increase in corporate leverage in the period 1995 - 2000 also helps explain the subsequent surge in corporate bond defaults and the increase in (low-grade) corporate bond spreads – with both indicators reaching historically high levels in 2002 –, the gradual improvement in US corporate default rates since the second quarter of 2002 and the recent decoupling of corporate bond spreads from equity market developments seem to suggest that the corporate credit cycle may have bottomed out, at least in the US. Indeed, although moderate profit growth and weak equity markets continue to slow the process of balance sheet repair, corporations appear to have made some progress in reducing the pressures stemming from a high level of debt, by trimming their levels of capital spending and financial asset acquisitions, by selling (non-core) assets, by strengthening their capital bases and by refinancing short term debt with longer term debt. In spite of the decoupling, corporate bond spreads nevertheless remain at high levels, suggesting that any further improvement in corporate credit quality is expected to be slow.

CHART 3   CORPORATE FINANCE INDICATORS FOR US AND EURO AREA NON-FINANCIAL CORPORATIONS
(Flows ; percentages of gdp)

FINANCING GAP

UNITED STATES

EURO AREA

— Capital spending   — Internal funds

NET INCURRENCE OF FINANCIAL LIABILITIES

UNITED STATES

EURO AREA

— Debt financing [1]   — Equity financing

Sources : ECB, Federal Reserve Board, IMF and NBB.
(1) Debt financing through bank loans or issues of securities.

1.2   Resilience of the international financial system

While last year's FSR had already noted the international financial system's resilience to an impressive series of shocks – including the sharp decline in equity prices, the substantial erosion of corporate credit quality, the events of September 11th, the Argentine default and the corporate accounting scandals –, the movement in financial intermediaries' stock prices since then (see Chart 4) suggests that markets may have become increasingly concerned about the impact of these shocks on the medium term prospects of financial institutions, albeit to a varying degree in the US and the euro area, and for banks and insurance companies. In this connection, it is also notable that, in the case of Belgian bancassurance groups,

stock price movements fell midway between those of the European banking and insurance sectors.

Notwithstanding an increase in credit risk provisions and (in Europe) a further decline in profitability, US and European banks appear to have weathered recent developments in international financial markets relatively well. This may be explained by their generally limited exposure to equity markets, the substantial decline in risk-free interest rates – which boosted the value of low-risk fixed income securities on the asset side of banks' balance sheets – and the absence of major falls in asset prices on real estate markets. Moreover, the overall impact of the deterioration in corporate credit quality on banks' loan portfolios appears to have been mitigated by the

trend towards disintermediation in corporate financing and improvements in risk management, which included the increased use of credit risk transfer mechanisms. As concerns the latter, a survey by the rating agency, FitchRatings, on the use of credit derivatives by financial intermediaries in fact confirmed that, in aggregate terms, the banking sector has in recent years transferred large amounts of credit risk to other market participants, most notably to insurance companies.

This assumption of corporate credit risk through credit derivatives appears to have been part of a more general trend whereby insurance companies have expanded their investments in corporate equity and bonds in recent years. While boosting profitability when equity market returns were high and corporate credit quality strong, this expansion into more risky corporate securities was bound to expose the insurance sector to large investment losses when these markets turned down. Together with underwriting losses in the non-life sector and a growing mismatch in life insurance between available investment yields and returns guaranteed to policyholders, these developments in turn resulted in a sharp drop in insurance companies' earnings and the erosion of solvency margins. In spite of a large number of rating downgrades in the sector, the ratings of most insurance companies

CHART 4   SELECTED INDICATORS FOR FINANCIAL INSTITUTIONS IN THE US AND THE EURO AREA

STOCK MARKET INDICES
(June 2002 = 100)

UNITED STATES

EURO AREA

— Market   — Banks   — Insurance   — Bancassurance (Belgium) [1]

BANKING SECTOR INDICATORS [2]
(Percentages)

UNITED STATES

EURO AREA

— Return on equity (LHS)
— Capital adequacy ratio (LHS)
— Credit provisions in p.c. of customer loans (RHS)
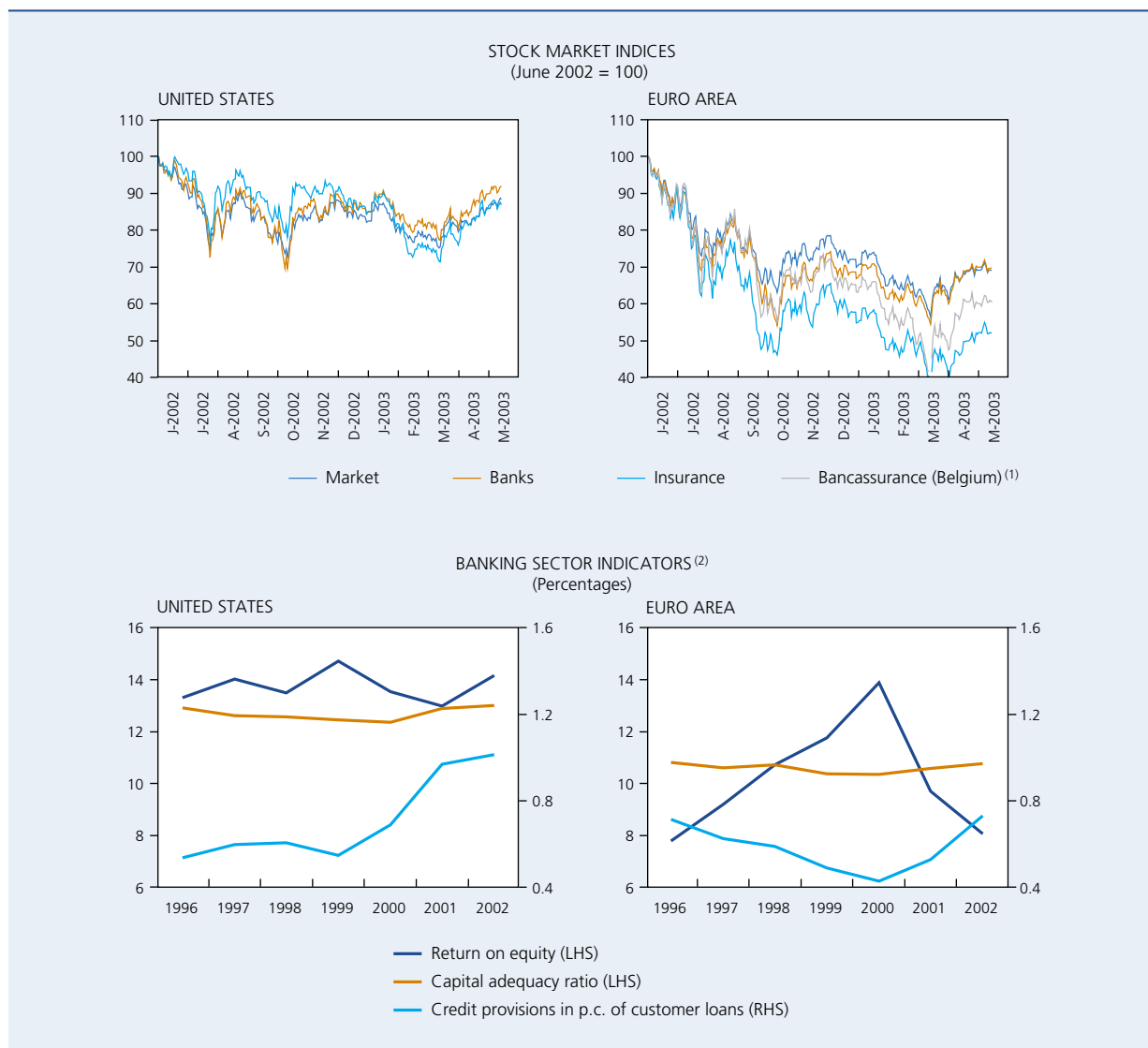
Sources : Bankscope, Bloomberg, FDIC, NBB and Thomson Financial Datastream (FTSE indices).
(1) The Belgian bancassurance index is calculated as a weighted average (on the basis of balance sheet totals at the end of 2002) of the share prices of the four major bancassurance groups on the Belgian market (Dexia, Fortis, ING and KBC).
(2) Differences between the United States and the euro area in the levels of the indicators may be due to differences in regulation or accounting.

nevertheless remain relatively strong, suggesting that the underlying financial strength and creditworthiness of the insurance sector has (so far) not been fundamentally questioned by the rating agencies. Many insurance companies have also started to adjust to the recent financial pressures, for instance by changing the composition of their investment portfolio, re-pricing their products or strengthening their capital base.

Although it is a cause for comfort that no major financial institution has failed in the face of the series of shocks that have hit the international financial system over the past three years, one cannot rule out the possibility that the accumulation of shocks may have eroded the capacity of a number of individual institutions to cope with additional adverse developments. In this perspective, potential risks for the global financial system in the future could range from a new downturn in global economic growth, with associated equity market weakness and corporate credit deterioration, to an acceleration of global growth, which could in turn lead to a stronger than expected increase in short and long term interest rates. Moreover, given the presence of still sizeable current account imbalances in the global economy, there remains a risk of disorderly exchange rate adjustments.

While a sharp increase in risk-free interest rates would be preferable to a further decline in interest rates in the context of a deflationary environment, such a development could nonetheless pose a significant challenge for those financial institutions that have sizeable exposures to interest rates. Some of the potential implications of these scenarios for Belgian banks and bancassurance groups will be discussed in more detail in Chapters 3 and 4.

1.3 Developments in emerging markets

As evidenced by the movement in the spread between the yield on the EMBI-+ debt composite and the yield on US Treasuries, borrowing costs for emerging markets started to improve in the autumn of 2002, following a significant tightening of financing conditions in the first half and the summer of that year (see Chart 5). This movement in fact closely tracked the near tripling and subsequent narrowing of the risk premium on Brazil's sovereign debt.

The ebb and flow of investor confidence in regard to Brazil was directly related to political uncertainties in the run-up to the presidential and parliamentary elections of October, but it also seems to have reflected more fundamentally a heightened concern in financial markets about the sustainability of Brazil's net public debt, rising from about 35 p.c. of GDP in 1997 to above 55 p.c. of GDP last year.

Investor confidence started to return, however, with the approval of a new 15-month IMF Standby Arrangement of 30 billion US dollars in September and the authorities' resolve to further raise the public sector's primary fiscal balance from a deficit of 1.0 p.c. of GDP in 1997 to a surplus of 4.25 p.c. of GDP in 2003.

While spreads in Argentina remained at a very high level – reflecting the general lack of progress in dealing with the country's deep financial and economic problems –, the positive impact of the November elections on investor confidence in Turkey gradually gave way to a new increase in the risk premium, due to concerns

CHART 5   EMERGING MARKET BOND SPREADS [1]
(Percentages)

- Composite Index
- Argentina
- Turkey
- Brazil
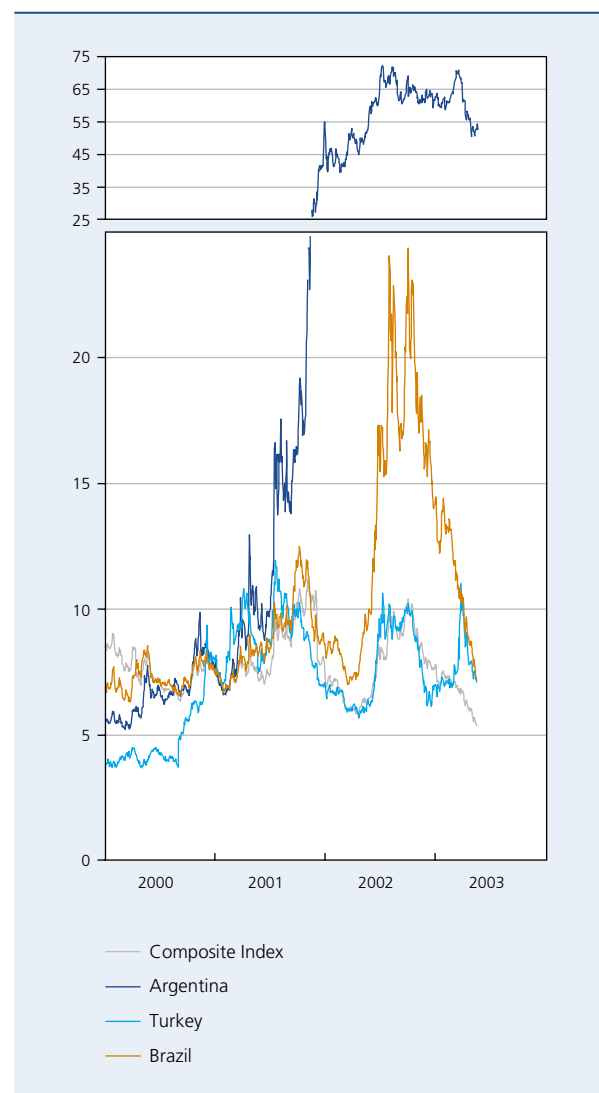
Source : JP Morgan (EMBI-+ emerging market debt indices).
(1) Spreads relative to US Treasuries.

over the war in Iraq and doubts concerning the readiness of the new government to swiftly implement the policies demanded by the IMF. Yet, following the resolution of the military conflict and the conclusion of the fourth review of the Turkish IMF programme in April, spreads declined again to levels that were prevailing at the beginning of the period under review.

Bearing in mind the presence of an important Belgian bancassurance group in the Czech Republic, Hungary, Poland, the Slovak Republic and Slovenia, Chart 6 gives an overview of a number of macro-prudential indi-

cators for these countries' banking systems, whose development was fostered by extensive restructuring efforts, enhancements to the regulatory and supervisory framework and the substantial involvement of foreign strategic investors. Although recent developments have been less favourable in Poland, standard macro-prudential indicators suggest that these factors have helped lay the basis for sound and stable banking systems. Yet, the need to increase financial intermediation from low levels and the still comparatively low financial strength ratings suggest that safeguarding the hard-won stability will require careful

CHART 6 INDICATORS FOR BANKING SYSTEMS IN SELECTED ACCEDING COUNTRIES
(Percentages, unless otherwise stated)
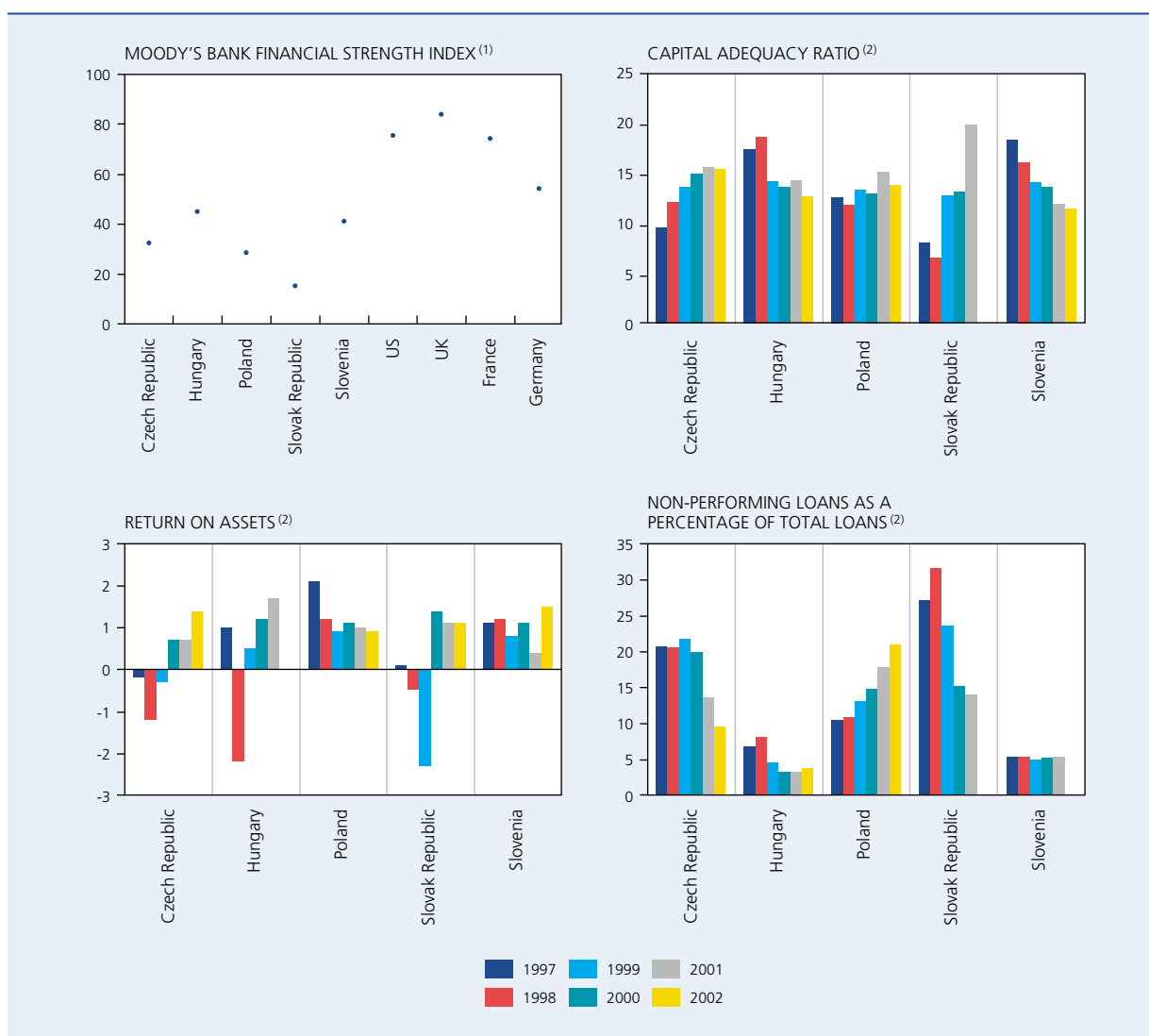
Sources : IMF, Moody's.

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

(2) Figures for 2002 are the latest available.

management of the challenges ahead as well as the continued commitment of foreign parent banks to their subsidiaries in these countries.

Banks' credit policies in these countries were until recently often characterised by a reluctance to lend to all but the most creditworthy companies. However, recent developments suggest that banks are starting to cater for lending to new customers and market segments, in particular by expanding their lending to SMEs and households. This entails new challenges for the risk management systems of banks, as this credit expansion sometimes seems to be occurring despite persistent weaknesses in crucial support structures, such as effective bankruptcy and collateral recovery procedures, or credit and collateral registers. Moreover, in a number of countries, a significant share of lending to the private sector has also taken the form of loans denominated in foreign currency, which implies an additional credit risk for the bank if the borrower is insufficiently hedged against the foreign exchange risk assumed through foreign-currency denominated loans.

Apart from these credit-related issues, the financial systems in these countries may also remain vulnerable to macroeconomic turbulence, especially as a number of the acceding countries continue to record large fiscal and external deficits.

2. Financial position of the private domestic sector

Being small and very open to international trade, the Belgian economy did not escape the consequences of the weaker than expected recovery of global growth. Indeed, while the expansion of real GDP in 2002 remained limited to a modest 0.7 p.c., the trend in business and consumer confidence indicators during the first months of 2003 suggests that the momentum of growth has also remained weak in the most recent period (Chart 7).

In the light of this rather unfavourable macroeconomic context, this chapter will focus on recent developments in the financial position of Belgian households and corporations. Their creditworthiness is in fact an important parameter for assessing the credit risk on Belgian banks' balance sheets, as domestic households and corporates each still account for about 30 p.c. of Belgian banks' total loans. Moreover, as financial institutions continue to play a dominant role in the Belgian financial system as intermediaries between savers and borrowers – notwithstanding the steady growth of direct (market intermediated) financing

CHART 7 CONFIDENCE INDICATORS
(Seasonally adjusted data)

— Business confidence : smoothed series

—○— Business confidence : gross series

— Consumer confidence [1]
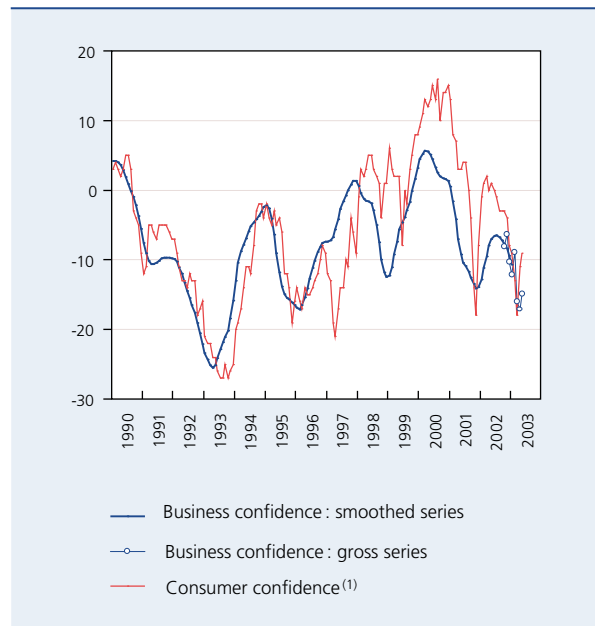
Source : NBB.
(1) New composition as from November 2001.

over the last decade –, their operating environment can be significantly affected by changes in the financial behaviour of households and corporates.

2.1 Household sector

While the figures for 2002 do not indicate that the real economic slowdown had a major impact on households' disposable income, the strong financial position of Belgian households has allowed them to remain resilient to the decline in equity prices. As can be seen in Chart 8, the balance between Belgian households' financial assets and liabilities stands at a (comparatively) high level, suggesting that, in aggregate terms at least, a significant financial margin was available to absorb the adverse price shocks on the financial asset side.

Given the very high level of financial assets, however, it is not surprising that the downturn in equity markets has affected the attitude of households towards risk, leading to changes in asset allocation. In this connection, Chart 9 shows the relative importance of three broad types of investment instruments in Belgian households' financial assets: deposits and bank bonds, claims on institutional investors (covering claims on insurance companies, mutual funds and pension funds) and securities (including listed and unlisted equities and fixed income securities issued by sovereigns or corporations).

CHART 8 · HOUSEHOLDS' FINANCIAL ASSETS AND LIABILITIES : INTERNATIONAL COMPARISON

(Percentages of gdp, data end-2001)

financial assets
financial liabilities

Source : Eurostat.

Although the trends observed in the chart are partly the reflection of asset price changes – and associated revaluations in the statistical stock measures –, the data nevertheless suggest that the secular shift from bank deposits and bank bonds to claims on institutional investors came to a (temporary) halt in the most recent period. The renewed appetite of households for more traditional (but low yield) savings products, such as saving deposits, at the expense of more risky financial instruments, is of course not surprising in a context of significant declines in equity market prices. To some extent, this new inflow into deposits was also encouraged by temporary promotions run by domestic and foreign banks trying to increase their market share for this product.

This renewed interest in traditional saving products also contributed to a significant decline in the amount of net new inflows into investment funds (upper panel of Chart 10). Notwithstanding this small inflow, investment funds witnessed a significant fall in the value of their assets under management, due mainly to the impact of lower stock prices on the value of mutual funds with equity exposures.

Apart from direct investments in listed and non-listed shares, the exposure of Belgian households to equity markets very often takes the form of claims on insurance companies, mutual funds or pension funds. However, the extent to which households bear the underlying investment risk varies for these different types of financial assets. Defined contribution pension schemes or traditional mutual funds usually

transfer the investment risk to the end-investor. Mutual funds with capital protection, however, limit (or preclude) the risk of losses on the invested capital, while providing the investor with an option on the upward potential of the underlying assets (most often equity). Such mutual funds with capital protection – which are part of the aggregate "other" mutual funds shown in the lower panel of the chart –, currently account for about one quarter of the investment funds distributed in Belgium, suggesting that Belgian households have recently been eager to insure themselves against investment risk. Yet, in other instances, households demonstrated a greater appetite for risk, as reflected in their demand for reverse convertibles.[1]

As such, these various developments tend either to mitigate or to reinforce the transfer of financial risks from the financial sector to households. They contribute to a change in the nature of the relationship between banks and their retail clients. In this perspective, the marketing of new products, often more complex than traditional bank bonds and deposits, could entail operational and reputational risks for banks if they are offered to unsophisticated investors without appropriate information or warnings. In this respect, it is symptomatic that Belgium is not the only country where consumer protection considerations have become an important dimension in the activities of supervisory bodies.

CHART 9 · SELECTED INSTRUMENTS OF BELGIAN HOUSEHOLDS' FINANCIAL ASSETS

(Percentages of total)

Deposits and bank bonds
Securities
Claims on institutional investors
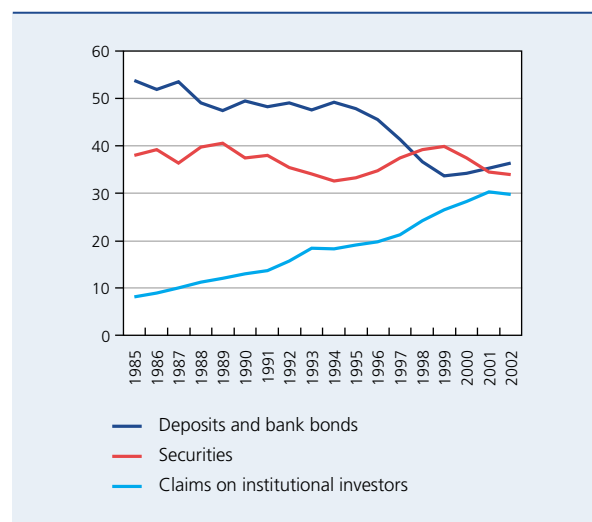
Source : NBB (Financial Accounts).

(1) A reverse convertible is an interest-bearing financial security that gives the issuer the choice, at maturity, to reimburse 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 this financial security is the premium for the put option that the investor writes on a corporate security.

CHART 10 INVESTMENT FUNDS

INVESTMENT FUNDS DISTRIBUTED IN BELGIUM
(EUR billions)

- Net inflow (LHS)
- Revaluation (LHS)
- Outstanding amount (RHS)

INVESTMENT POLICY OF INVESTMENT FUNDS
(September 2002, percentages)

Euro area   Belgium

- Other [1]
- Real Estate
- Mixed
- Bonds
- Equity
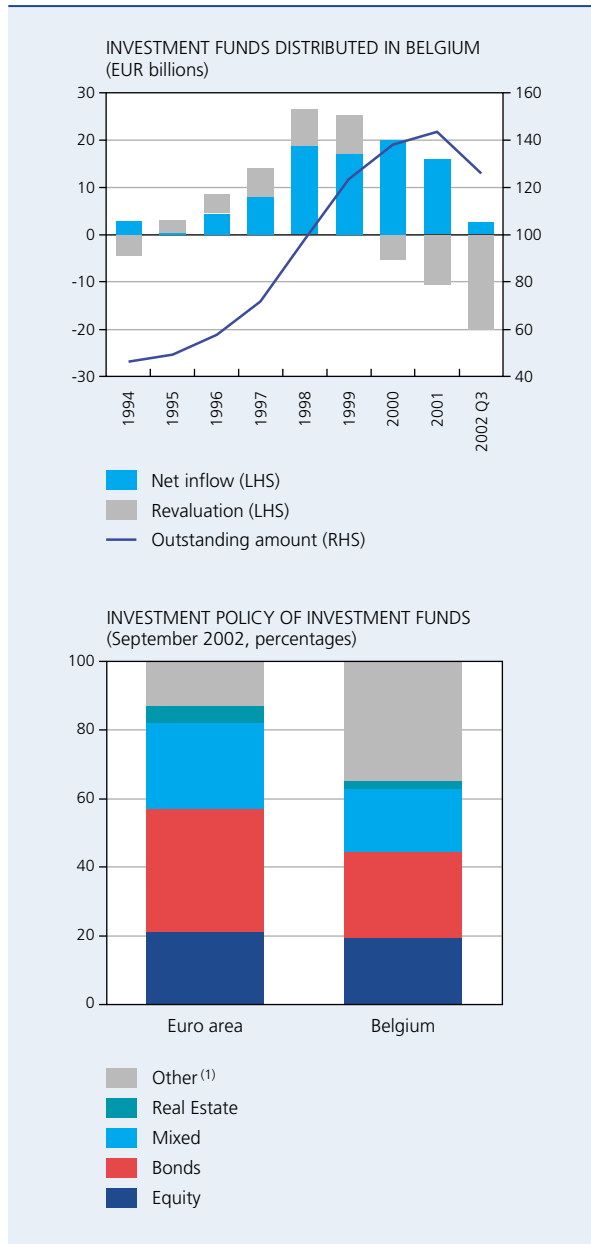
Sources : BAIFC, ECB, NBB (Financial Accounts).
(1) For Belgium mainly mutual funds with capital protection.

Although the average risk profile of Belgian households' financial assets may have risen over the last decade, the above considerations suggest that, as a whole, Belgian retail investors were not excessively exposed to the sharp declines in equity markets. Moreover, the fall in the value of households' financial assets was partly compensated by a further increase in the value of households' sizeable housing assets. In 2002, house price inflation in Belgium is estimated at 6.6 p.c., which is slightly above the 5.6 p.c. average annual house price inflation rate recorded in the

period 1995 - 2002. As shown by Chart 11, this puts Belgium in the group of countries that have experienced relatively moderate and stable house price inflation rates in recent years. In some other European countries, notably the UK, Spain, Ireland and the Netherlands, real estate market prices have risen comparatively faster, prompting some concern over the potential emergence of asset price bubbles in these markets.

Turning to the liabilities' side of households' balance sheets, the key indicators of indebtedness depicted in Chart 12 also suggest that the financial position of households remained strong during the period under review. The further decrease in the debt-income ratio, in combination with lower interest rate levels, led to a further decline in the share of disposable income devoted to gross interest payments (income gearing ratio). And, although the level of debt as a percentage of households' assets (capital gearing ratio) showed a small increase in 2002, this ratio remains at a very low level (9.5 p.c.).

However, when considering this reassuring picture for the household sector as a whole, one should not forget that a sizeable proportion of the population has difficulty in regularly servicing its debts. An indication about the size of the left-hand tail of the distribution

CHART 11 HOUSE PRICE INFLATION : INTERNATIONAL COMPARISON

(Percentages)

House price change 2002

UK

Spain [1]

France [1]
Italy   Sweden
           Belgium [1]
Canada   US
                    Ireland
                    The Netherlands

Germany
Japan

Average house price change 1995-2002
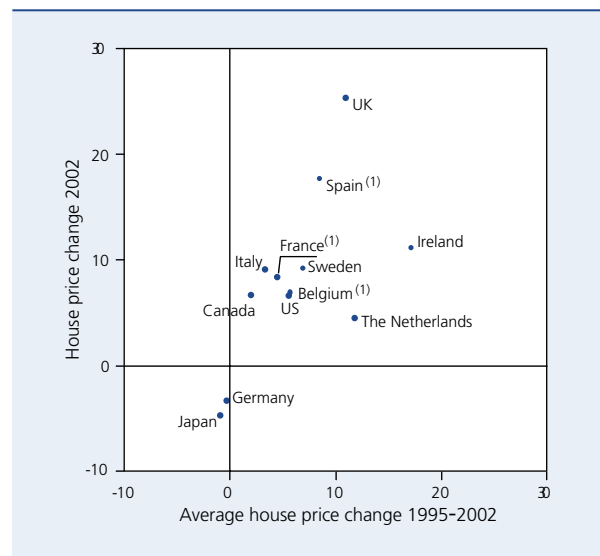
Sources : NBB and The Economist.
(1) Figures for Belgium, France and Spain are based on data for the first three quarters of 2002 (annualised figures).

CHART 12   BELGIAN HOUSEHOLDS' KEY RATIOS
                OF INDEBTEDNESS
                (Percentages)

CHART 13   MORTGAGE DEBT OF BELGIAN HOUSEHOLDS
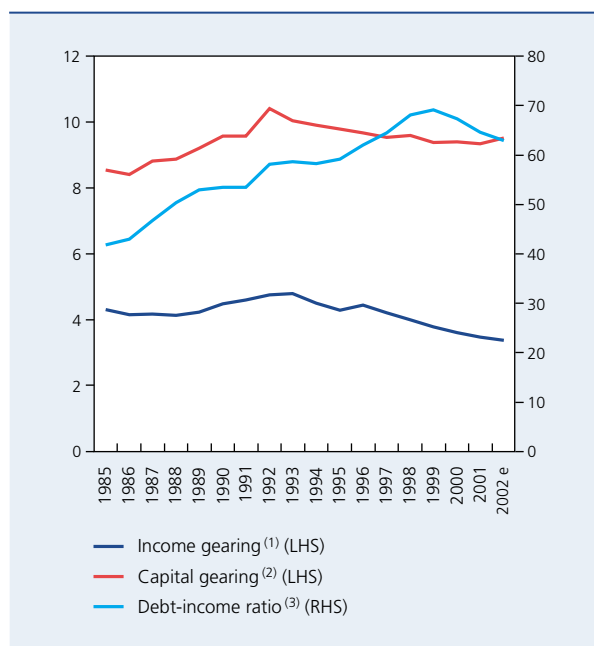
Source : NBB.
(1) The income gearing is calculated as gross interest payments over disposable
    income.
(2) The capital gearing is calculated as financial liabilities over housing and financial
    assets.
(3) The debt-income is calculated as financial liabilities over disposable income.

Income gearing (1) (LHS)
Capital gearing (2) (LHS)
Debt-income ratio (3) (RHS)

New mortgage refinancing loans
(deseasonalised, EUR billions, LHS)

New mortgage credits, excluding refinancing
loans (deseasonalised, EUR billions, LHS)

Interest rate on standard-contract mortgage
credit (p.c., RHS)

Source : NBB.

of households' financial position can be found in the
credit register for loans to households, which is kept
at the NBB. These data show that, at the end of 2002,
some 400 000 people were registered on this database
as having payment problems with one or more loans,
for a total amount of 1.9 billion euro, which is about
2 p.c. of the outstanding amount of loans extended to
households.

A large share of Belgian households' debt consists
of mortgage loans, which are generally granted by
domestic credit institutions. Currently, almost 50 p.c. of
all new mortgage loans are concluded at a fixed inter-
est rate for the entire lifetime of the contract, mostly
with constant monthly payments. This percentage is
significantly higher than the corresponding figure for
the euro area, and tends to rise when long term rates
are low.

As can be seen in Chart 13, the level of new mortgage
loans extended to households has shown a slightly
increasing trend since the second half of 2000, in line with
the decline in mortgage rates. However, it has remained
well below the levels reached in 1997 – 1999, when there

were also substantial flows generated by refinancings of
existing mortgage loans.

Recent data suggest that there has been further growth
in mortgage borrowing and refinancing activity in the first
months of this year. In this connection, however, it has
to be noted that, contrary to the experience with home
equity withdrawal in the US for example, Belgian house-
holds do not seem to use refinancing as an opportunity
to increase the underlying amount of their mortgage loan;
instead the main purpose of the operation is to reduce
debt service levels or to shorten the maturity of the loan.

2.2   Corporate sector

As highlighted in Chart 14, the slowdown of economic
growth since 2000 has had a significant impact on the
profitability of the Belgian corporate sector.

The share of non-financial corporations' gross primary
income in gross national income – a measure of cor-
porate profits which covers both listed and unlisted
corporations and for which data are available for
2002 – dropped to an estimated 15.6 p.c. last year,
showing a rapid decline from the peak of 17.2 p.c.
reached in 1998. As this profit measure shows a rela-
tively strong correlation with the figures for corporations'

CHART 14 PROFITABILITY OF BELGIAN NON-FINANCIAL
CORPORATIONS
(Percentages)

RETURN ON EQUITY

- RoE Large enterprises (LHS)
- RoE Small and medium-sized enterprises (LHS)
- Gross primary income of non-financial corporations to gross national income (RHS)
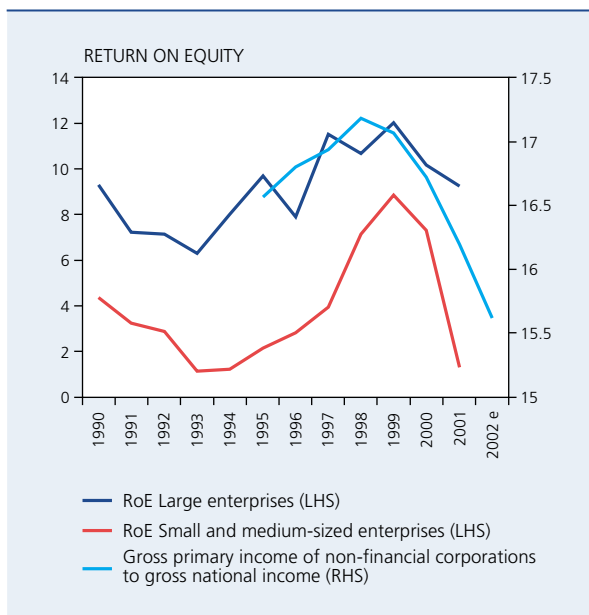
Sources : NAI, NBB (Central Balance Sheet Office).

return on equity (RoE) obtained from the Central Balance Sheet Office, when the figures from the latter source become available, they are likely to confirm the slowdown of non-financial corporations' profitability in 2002.

A detailed analysis of the balance sheet data per branch of activity – as published most recently in the November 2002 issue of the Bank's Economic Review – indicates, however, that the movement in the average RoE differs significantly from one type of corporation to another. The chart shows that the fall in corporate profitability in 2001 was most pronounced for small and medium-sized entreprises (SMEs), with large enterprises apparently being more resistant to the adverse economic climate. However, since these large entities account for the major part of Belgian corporate net profits, the decline in the profitability of the full population of Belgian non-financial corporations remained limited during 2001: before extraordinary elements, net profits were down by 3.9 p.c. The decrease may have been much more marked in 2002.

While the negative impact of slow growth on the financial position of the corporate sector was also reflected in a further increase in the number of corporate bankruptcies in 2002 and the first months of 2003, Chart 15 shows that the rate of increase in the number of defaults was much

less pronounced than in a number of other European countries. Moreover, as no very large company has defaulted over the past year and a half, the total amount of corporate assets falling under bankruptcy procedures declined from the high level registered in 2001, when the national airline, Sabena, filed for bankruptcy. The failure of this company – with a balance sheet total of about 1.5 billion euro – explains almost the entire difference between 2001 and 2002 in the balance sheet total of firms in default.

As about half of the total financial debt of Belgian non-financial corporations consists of bank loans – with an even higher figure of 80 p.c. for SMEs –, models

CHART 15 NUMBER OF BANKRUPTCIES

INTERNATIONAL PERSPECTIVE
(Indices 1998=100)

- Belgium [1]
- Germany [2]
- France
- The Netherlands
- UK

BELGIUM

- Number of bankruptcies (LHS)
- Balance sheet total of firms in default (RHS, EUR billions)
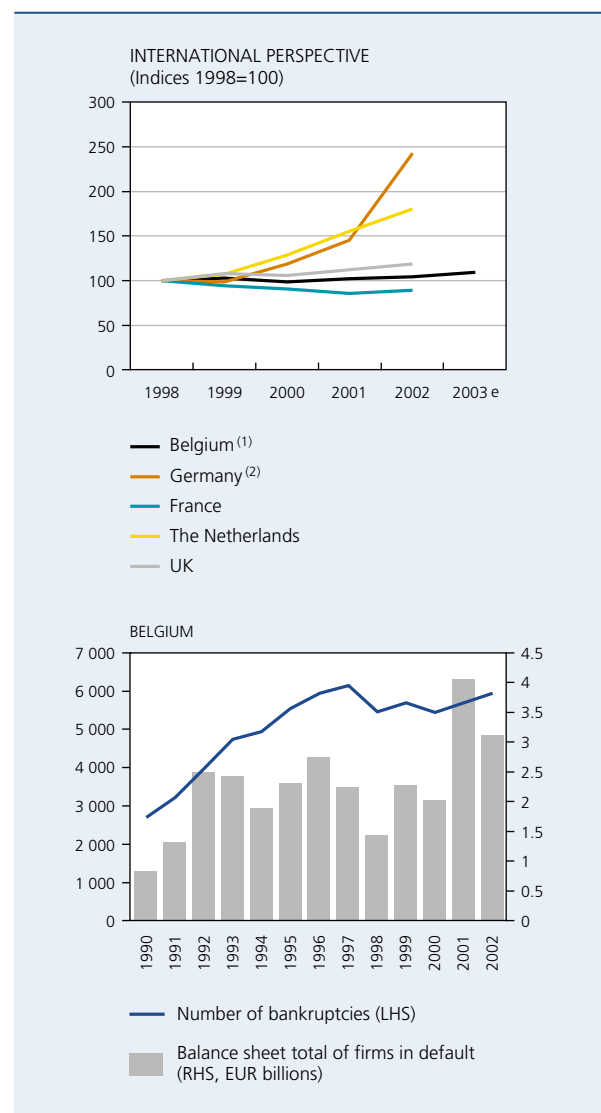
Sources : Graydon, NBB.
(1) Projection for 2003 for Belgium based on January-April figures.
(2) Figures for Germany include personal bankruptcies.

that help predict the financial vulnerability of a particular company can be an invaluable instrument in the credit risk management of banks. In this connection,

Box 1 reviews some results of recent work by the NBB on default models based on accounting data.

Default modelling

As domestic credit risk constitutes an important part of Belgian banks' total risk, it is important to be able to correctly assess the creditworthiness of Belgian obligors. Although enormous progress has been made in recent decades in credit risk measurement and management[1], the task of assigning a default probability to customers in a bank's credit portfolio remains far from easy. This Box gives an overview of default modelling on quantitative data and presents a first exercise by the NBB to develop a failure prediction model.

Overview

There are two main ways of deriving probabilities of default from quantitative data. The first approach uses market data. The most famous representative of this first type of default probabilities is the concept of "Expected Default Frequencies" (EDF) from Moody's KMV. They marketed the idea of applying the Black and Scholes (1973) option pricing model to the valuation of firms which has been in the literature at least as far back as Merton (1977)[2]. Three input factors are needed for the model: the value of the firm's assets, which is derived from the firm's equity value, the asset risk, which is derived from the volatility of the firm's equity price, and finally, the firm's leverage. Another method of calibrating default probabilities from market data is based on credit spreads of traded products bearing credit risk, e.g. credit derivatives and corporate bonds.

The second approach uses accounting data to estimate default probabilities. Models of this type were first developed at the end of the sixties (see in particular Altman E. I. (1968)) and have been refined continuously since then. The most well-known models on accounting data are the credit scoring models. In essence, these models identify certain key (quantitative) factors that determine the creditworthiness of a firm and weight them into a quantitative score. There are three main methodological forms of multivariate credit scoring models: the logit model, the probit model and the discriminant analysis.

Default model on Belgian accounting data

As market data are not available for many Belgian firms, the NBB has explored the development of a default prediction model on the basis of data from the Central Balance Sheet Office (CBSO)[3], which keeps a central record of the balance sheet and income statements of about 250 000 Belgian companies. The methodology consists in taking the information contained in the annual accounts of a given year as the basis for analysing differences in the financial profile between two types of companies: those that fail and those that do not fail within the following three years. The default definition used is based on a legal criterion: a failed firm is a firm which has gone bankrupt or which has requested legal protection, the other firms being considered as non-failed. This definition may be refined, for example, by taking bank loan defaults into account. Moreover, the first analysis focused on the population of industrial companies.

(1) The current interest in the fine-tuning of credit risk methods has been supported by the Basel Committee on Banking Supervision, which will allow an internal ratings-based approach as a basis for setting capital requirements for credit risk.
(2) As equity holders have a residual claim on a firm's assets and have limited liability, Merton (1977) has shown that equity can be modeled as a call option on the assets of the firm, with a strike price equal to the book value of the firm's liabilities.
(3) In Belgium, similar scoring models have been developed by Ooghe and Verbaere (1985) and by Ooghe, Joos and De Vos (1991). However, they used a smaller sample and an older dataset.

A univariate analysis was first carried out in order to get a better understanding of the failure mechanisms. For a given accounting year N, the population of companies studied was divided into four groups : the firms that did not fail within the following three years (NF), the companies failing in N + 1 (F1), the companies failing in N + 2 (F2) and the companies failing in N + 3 (F3). This analysis showed, among other things, that a company's financial profile deteriorates progressively as failure approaches. Chart 1 illustrates the increased time taken to pay suppliers and the declining profitability, both for large firms and for SMEs[4].

CHART 1 SOME INDICATORS OF CORPORATE DEFAULT
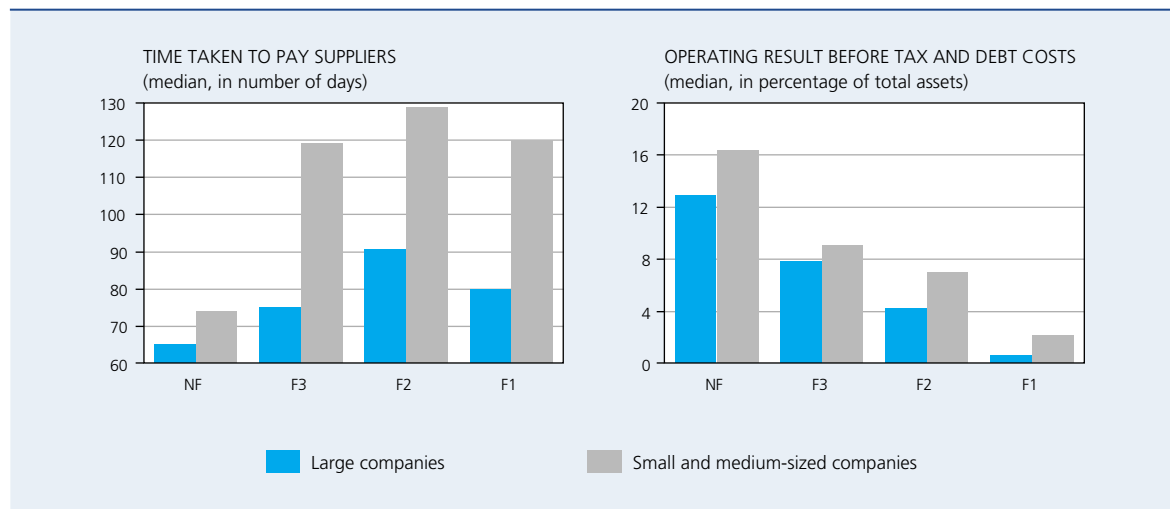
Source : NBB (Central Balance Sheet Office).

Compared to the univariate analysis, the multivariate analysis allows several variables to be taken into account simultaneously. The model is based on a logistic regression. With this econometric technique, it is possible to give each company studied a risk score expressing its default risk. The logistic regression also has the advantage of posing relatively few hypotheses on data, in particular compared with the discriminant analysis. The independent variables take the form of financial ratios. Several competing models were tested on a sample of companies and then validated on the whole industrial population from 1991 to 1998. The model that was finally chosen contains eight variables, the majority being liquidity and solvency variables. This is closely connected with bankruptcy and legal protection laws, in which the main point of concern is the suspension of payments. In particular, the extent of overdue tax and social security liabilities, which is an indicator of acute cash-flow problems, is a variable which has proved very good at discriminating between failed and non-failed companies. This variable is typical for Belgium, since it is not available in the annual accounts of most other countries. Other variables are in line with variables used in similar studies.

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(4) Companies are considered as large or as small and medium-sized depending on whether they have to submit their annual accounts to the Central Balance Sheet Office in accordance with the full or the abbreviated presentation scheme.

The model takes the following form:

$$
\begin{aligned}
L = \quad & - 1.12 \\
& + 21 \text{ (overdue tax and social security liabilities/total assets)} \\
& + 9.7 \text{ (debt costs/total assets)} \\
& - 6.3 \text{ (operating result before tax and debt costs/total assets)} \\
& - 2.5 \text{ (cash/current assets)} \\
& + 1.9 \text{ (total debt/total assets)} \\
& + 1.4 \text{ (short-term bank loans/short-term debt)} \\
& - 1.2 \text{ (cash-flow/total debt)} \\
& - 0.01 \text{ (age of the enterprise, in number of years)}
\end{aligned}
$$

Note: all coefficients are significant at the 95 p.c. significance level (t test).

The model makes it possible to transform the information provided by the different indicators of each company's financial health into a single value, the L score. The higher this score, the higher the financial risk of the company. The change in the risk score due to a change in only one of the independent variables is given by the coefficients. For example, if the ratio (total debt/total assets) increases by 0.1, the L score will increase by 0.19.

On the basis of this L score, a probability of default can be calibrated and a threshold can be chosen; under this threshold the companies are considered as sound by the model, and over this threshold the companies are considered as distressed. As expected, the model does not allow all enterprises to be classified correctly. The rates of correct classification are the main measures of the model's discriminatory power[5]. There are two rates of correct classification to be considered: first, the percentage of companies actually failing and classified as distressed by the model, second, the percentage of non-failed companies classified as sound by the model. Chart 2 shows the rates obtained by the model on the validation populations from 1991 to 1998. On average, the rates of correct classification are about 77 p.c., which is in line with empirical results obtained in other studies.

CHART 2   VALIDATION POPULATIONS – RATES OF CORRECT CLASSIFICATION
(Percentages)
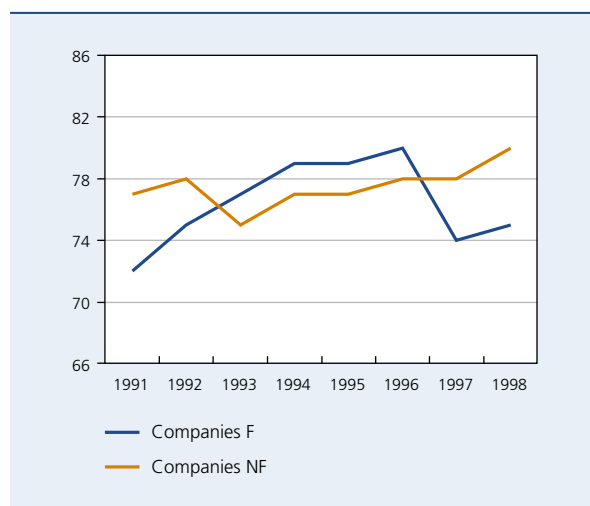
Source: NBB (Central Balance Sheet Office).

(5) The rates of correct classification are not the only measure of discriminatory power. The ROC (Receiver Operating Characteristic) curves are a very accurate tool; they generalise the threshold technique by showing the rates of correct classification for all possible thresholds. ROC curves were used in order to validate this model and they produced satisfactory results.

However, the model is not free from shortcomings, since more than 20 p.c. of the companies are not correctly classified. These errors can be found in every default model and have multiple and complex origins. A first cause is methodological : a model cannot take all the aspects of reality into account. This is why the results of the model can be usefully complemented, for example, by an expert system based on analysis of the errors. Second, accounting data alone do not permit an understanding of the whole economic environment of an enterprise, and additional data can be used, both quantitative (for example, market data if available, or business cycle data) and qualitative (for example, the quality of management or the competitive position). Finally, the results of the model clearly depend on data availability and quality. Annual accounts are published with a long time lag and they are not available for all companies (especially failing ones). Furthermore, they do not always give an accurate image of the financial profile of the companies. In particular, companies using creative accounting or fraud can distort the classification made by the model.

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The degree of leverage – the ratio between debt and equity – on the liabilities' side of a firm's balance sheet can be an important determinant of a company's ability to remain solvent in the face of an adverse development. In this connection, the discussion in Chapter 1 has already shown that US and euro area non-financial corporations tended to increase their leverage ratios in recent years, by relying more heavily on debt financing than on equity financing to meet their external financing requirements. In order to see whether Belgian non-financial corporations adopted similar financing patterns, Chart 16 compares the financing gap and the net incurrence of financial liabilities for Belgian and euro area non-financial corporations.

The chart highlights a number of similarities, relating primarily to the widening financing gap – i.e. the difference between corporations' capital spending and internal funds – and the rising overall external financing requirements in the period 1995 – 2000. Yet, it also brings out a number of important differences in the financing patterns of Belgian and euro area non-financial corporations. From the perspective of Belgian corporates, these include the less pronounced reduction in the level of capital spending since 2000, and the dominance of equity financing – relative to debt financing – in the period 1999 – 2001.

As can be seen in Chart 17, this increase in the relative importance of equity reflected an upsurge in external financing through both listed and non-listed shares. While the latter has traditionally been an important source of external financing for Belgian non-financial corporations, the marked increase in the amount of public equity issues in 1999 and 2000 mainly reflected two large initial public offerings, by Agfa-Gevaert and Interbrew respectively. The Belgian securities market has however also had to cope in recent years with a number of important delistings, including the buy-out of GIB shares, the absorption of Gevaert by Almanij and the delisting of Ontex.

CHART 16 CORPORATE FINANCE INDICATORS FOR EURO AREA AND BELGIAN NON-FINANCIAL CORPORATIONS
(Flows ; percentages of gdp)

FINANCING GAP

EURO AREA — Capital spending — Internal funds

BELGIUM

NET INCURRENCE OF FINANCIAL LIABILITIES

EURO AREA — Debt financing [1] — Equity financing

BELGIUM
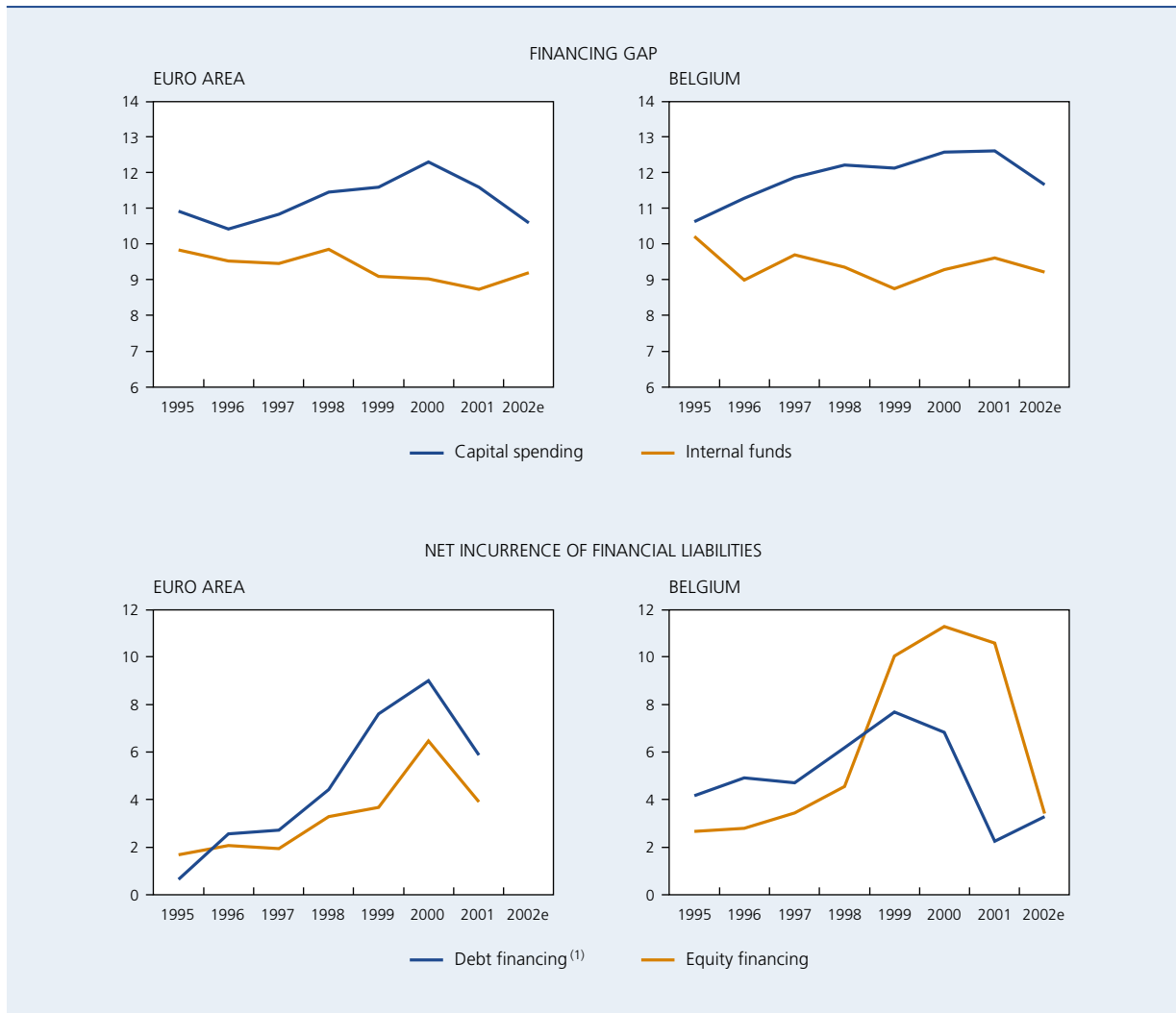
Sources : ECB, IMF, NAI, NBB.
(1) Debt financing through bank loans or issues of securities.

The above-mentioned comparatively heavy reliance of Belgian non-financial corporations on equity financing in the period 1999 – 2001 also helps explain why leverage ratios in Belgium have evolved relatively more favourably than in the euro area (or the US, for that matter). Chart 18 analyses the leverage of Belgian non-financial corporations in three steps.

The first panel compares leverage ratios in Belgium and the euro area on the basis of Financial Accounts data at market value, which are the only available data for international comparison. At first sight, these data suggest a lower degree of corporate leverage in Belgium.

The second panel, which focuses on Belgium only, compares the leverage ratio using market values for debt and equity with the leverage ratio obtained for those aggregates at book value. The latter is the more traditional concept of leverage, and the one that is usually taken in financial analysis. This ratio, calculated on the basis of Central Balance Sheet Office data also shows a decline in corporate leverage, albeit from a higher level, as the value of equity is not adjusted to market prices.

The third panel compares the book leverage ratio reported in panel two for three sub-sets of enterprises. This comparison shows a major difference in the degree of corporate leverage between corporations with a financial character and other corporations. For the latter, the leverage

**CHART 17   EXTERNAL FINANCING FLOWS OF BELGIAN
NON-FINANCIAL CORPORATIONS**[(1)]

(Billions of euro)

SELECTED INSTRUMENTS OF EXTERNAL
FINANCING OF BELGIAN NON-FINANCIAL
CORPORATIONS

- Non-quoted shares
- Bank loans
- Public issues

PUBLIC ISSUES BY BELGIAN
NON-FINANCIAL CORPORATIONS

- Listed shares
- Short-term debt securities
- Long-term debt securities
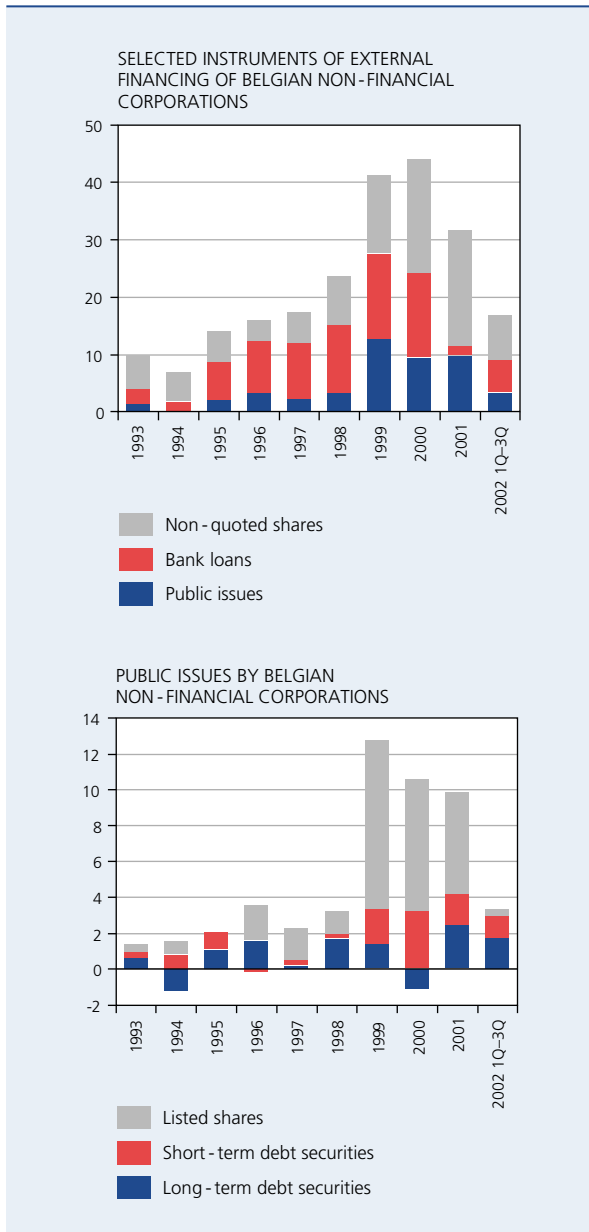
Source : NBB (Financial Accounts).
(1) The lower panel of the chart breaks down the aggregate "public issues" reported
     in the upper panel into its components.

ratio has fluctuated since 1995 in a narrow band rang-
ing from 60 p.c. to 70 p.c. The lower degree of leverage
of financial corporations – which include holding com-
panies – can be partly explained by the nature of their
activities and the associated balance sheet structure,
typically registering a high level of financial participations
on the assets' side and a large weight of shareholder
equity on the liabilities' side.

Although the developments described above argue for a
careful analysis of the aggregate corporate finance indicators
– as the latter may sometimes combine quite heterogeneous

CHART 18   CORPORATE LEVERAGE AND CAPITAL GEARING

(Percentages)

DEBT OVER TOTAL LIABILITIES AT MARKET
VALUE : INTERNATIONAL COMPARISON

- Belgium
- Euro area

DEBT OVER TOTAL LIABILITIES
IN BELGIUM : MARKET VERSUS BOOK VALUE

- Book value (LHS)
- Market value (RHS)

DEBT OVER TOTAL LIABILITIES AT BOOK
VALUE IN BELGIUM PER FIRM CLASS

- Large enterprises
- Small and medium-sized enterprises
- Financial enterprises [(1)]
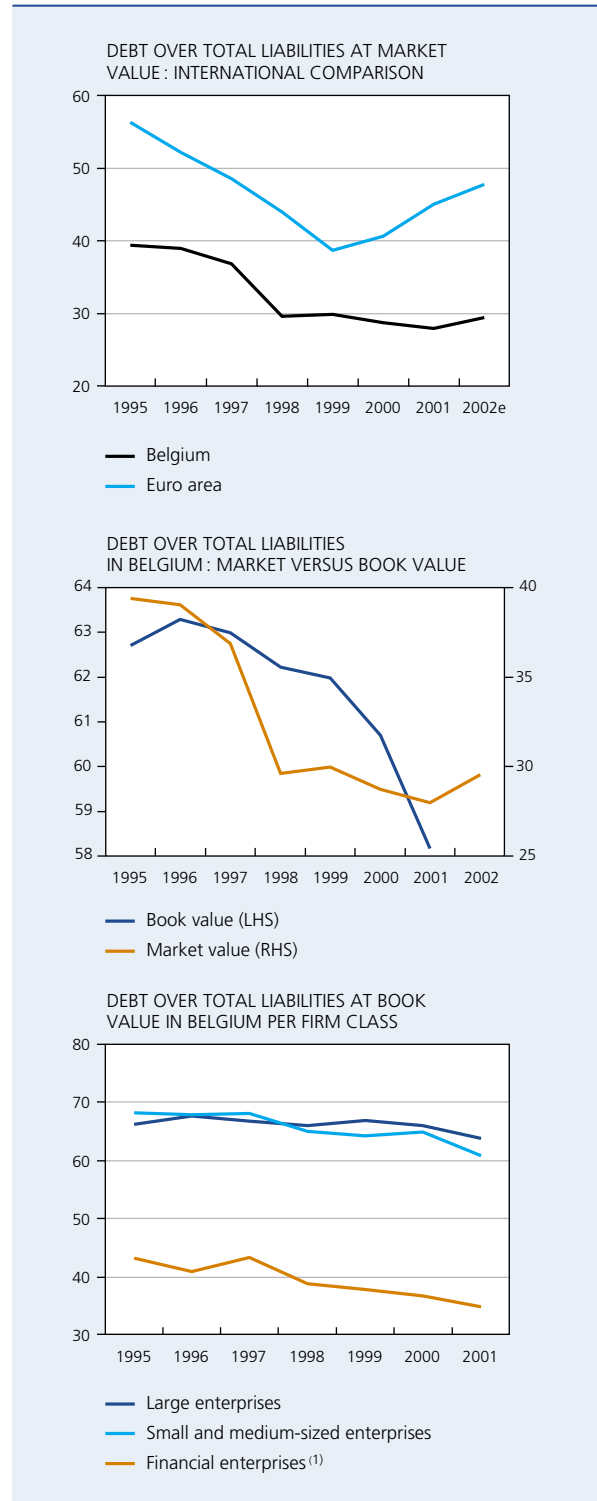
Sources : ECB, NBB (Central Balance Sheet Office and Financial Accounts).
(1) Excluding credit institutions.

companies –, the data nevertheless suggest that the leverage (at book value) of Belgian non-financial corporations showed a regular downward trend in recent years, avoiding some of the excesses witnessed in other countries.

3. Banking sector

The four large Belgian bancassurance groups form a key group of players in the Belgian financial system, fulfilling an important role both on Belgium's financial markets and in its banking and insurance sector. In most cases, the banking arm of these financial conglomerates still dominates the groups' activities, although the insurance subsidiaries are growing in importance. After the wave of consolidation in recent years, the Dexia, Fortis, ING and KBC banking groups and their affiliates now form the axis of the Belgian banking sector, accounting for more than 80 p.c. of the sector's aggregate balance sheet total and comprising 12 of the total of 65 credit institutions governed by Belgian law. This chapter focuses on the recent performance and resilience of the Belgian banking sector and examines the major risks confronting it; this allows a wider assessment of the bancassurance groups' risks in the next chapter.

In 2002, the Belgian banking sector's profitability was weakened by the economic downturn and the turmoil on financial markets, in line with what happened in most of the neighbouring countries. The quality of the loan portfolio deteriorated, leading to an increase in the amount of provisions charged to the profit and loss account. The effect of the sharp decline in equity prices manifested itself indirectly through a reduction in the fee income earned by Belgian credit institutions via their asset management, securities transactions and investment banking activities, but also directly through an increase in losses on the sale of equities which – all in all – represent only a very limited portion of Belgian banks' total assets. As in 2001, the income from intermediation activities proved to be the mainstay on the income side of Belgian banks' profit and loss accounts but could only partly compensate for the decline in non-interest incomes. In addition, cost-cutting efforts limited the impact of this overall income reduction through tighter control over staff costs and, more fundamentally, a sharp cutback on other expenses. Up to now, the decline in banks' profits does not seem to have affected the banking sector's solvency, which remains at a satisfactory level.

This chapter will explore the above developments in further detail and draw the attention to the chief current and future risks facing Belgian credit institutions. A first section will cover credit risks while other major risks that Belgian banks incur as a direct result of their banking activities, such as liquidity and interest rate risks, will be discussed in a second section. The subsequent two sections will then analyse the trend in the profitability and solvency of the Belgian banking sector, which form two important lines of protection against the said risks. The profitability of Belgian stockbroking firms and asset management companies will also be briefly discussed in the section on the banking sector's profitability, because of the close ties between these institutions and the banking sector and the common factors affecting their profitability.

3.1 Credit risks

The importance of credit risks in the risk spectrum of Belgian banks was underscored in 2002 by the sizeable impact of credit risk provisions on the results of these institutions. Credit risks are, in principle, a function of the nature and characteristics of the assets on a bank's balance sheet. Two features of the Belgian banking sector's activity stand out when we compare the aggregate asset structure with that of other banks in the euro area. Belgian banks seem to be more internationally diversified, on average, since the proportion of claims on non-EMU counterparties accounted for over 22 p.c. of total credit risk bearing assets at the end of 2002, compared to an average of 14 p.c. for the euro area (Chart 19). The potentially higher or more difficult to assess credit risks related to these foreign claims might, however, be counterbalanced by the still substantial share of nearly risk-free claims on the government on Belgian banks' balance sheets. Indeed, bonds and other claims on the government of Belgium and other EMU countries still constitute the most important asset category of Belgian credit institutions, representing almost 24 p.c. of total credit risk bearing assets at the end of 2002, whereas this category only averaged 11 p.c. of total assets for euro area banks.

However, credit risks related to on-balance sheet claims tend to differ not only from one asset category to another, but also within each category. The new approaches proposed by the Basel Committee on Banking Supervision intend to take greater account of this diversity of credit risks in the different portfolios by prescribing a closer relationship between the assets' riskiness and the banks' capital requirements for credit risks. This link has to be based on external ratings in the standardised approach and on individual banks' internal estimates for default parameters in the internal ratings based approaches. It is important to note that two major components of banks' assets, i.e. mortgage loans and claims on SMEs, are viewed by the Basel Committee as being on a portfolio level less prone to credit risks, due to diversification effects, and

CHART 19 STRUCTURE BY COUNTERPARTY OF BELGIAN AND EURO AREA CREDIT INSTITUTIONS' ASSETS

(End-2002 data on a territorial basis ; expressed as percentages of total assets excluding fixed and other remaining assets)

External assets (with non-EMU counterparties)
Government
Banks (Monetary and Financial Institutions)
Corporates
Households
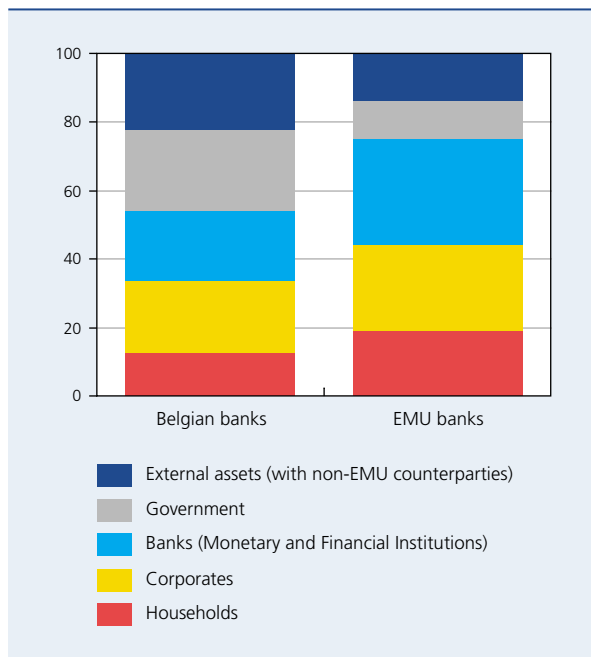
Sources : ECB, NBB.

CHART 20 BELGIAN CREDIT INSTITUTIONS' CLAIMS ON EURO AREA HOUSEHOLDS AND CORPORATIONS

(End-2002 data on a territorial basis ; expressed as percentages of total assets excluding fixed and other remaining assets)

Households

Mortgage credit
Consumer credit
Other

Corporates

Counterparties < 1 million euro total exposure

Counterparties > 1 million euro total exposure and < 50 million euro turnover

Counterparties > 50 million euro turnover
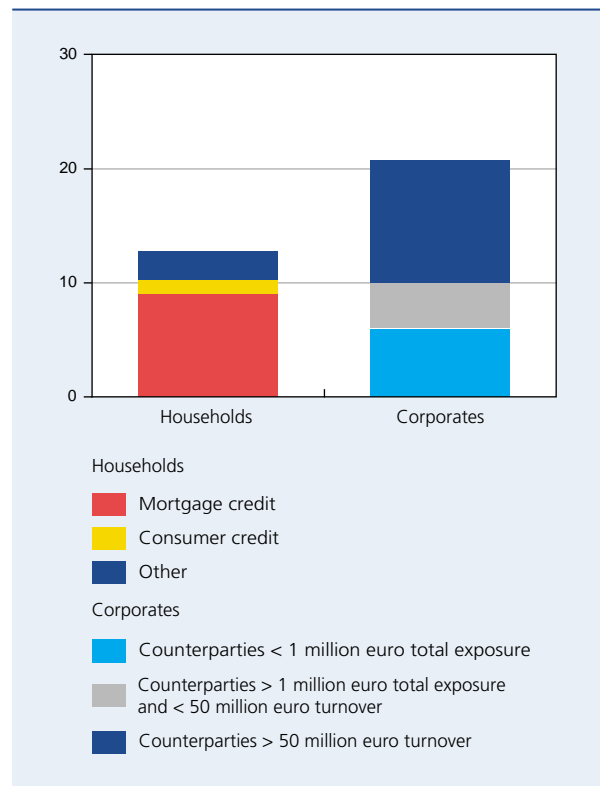
Source : NBB.

will therefore benefit from a more favourable capital treatment. This is particularly relevant for Belgian banks, as mortgage credit amounts to 9.0 p.c. of banks' total assets, while claims on SMEs take up 10.1 p.c. of total assets when the Basel definition of SMEs is applied (SME exposures are defined as claims on corporate counterparties with a turnover of less than 50 million euro or counterparties to which the total exposure does not exceed 1 million euro ; the latter category will receive the most favourable capital treatment). A more extensive analysis of the impact of the new capital requirements on credit to SME counterparties is contained in the thematic article on "The Basel II Capital Accord, SME loans and implications for Belgium" in this FSR.

In addition to the size of the overall corporate loan portfolio, the degree of diversification of those loans across economic sectors is also of great importance for risk assessment. For 2002, data from the national credit register do not seem to indicate that, in percentage of their regulatory own funds, Belgian banks have increased their lending towards sectors gauged as being potentially more prone to credit risk. Although the selection is subjective, the reduction in credit lines to the technology, media and telecom (TMT) sectors, which were recently affected by the bursting of the "new technology" bubble, and to the

construction and real estate sectors, that have proved to be closely linked to the economic cycle in the past, might illustrate this observation (Chart 21).

Nevertheless, the decline for those sectors mirrors a more general decrease, in 2002, in credit lines to all corporations, when expressed in percentage of banks' regulatory own funds. This indicates that Belgian banks are adopting a more cautious approach to their lending. However, those lines represent maximal exposures and have to be analysed in conjunction with their actual degree of utilisation. For most Belgian firms, the rate of credit line utilisation saw only a modest increase or remained stable in 2002, which seems to indicate that the recent trend in the supply of credit has been accompanied by weak demand for bank loans in the context of subdued economic growth (Chart 22).

As already discussed above, a significant part of Belgian banks' credit risk exposures concerns foreign counterparties. Expressed in percentages of regulatory own funds, those exposures are continuing to rise for most regions

CHART 21   BELGIAN BANKS' SECTORAL LOAN EXPOSURES [1]

(Data on a company basis ; expressed as percentages of regulatory own funds [2] ; logarithmic scale)
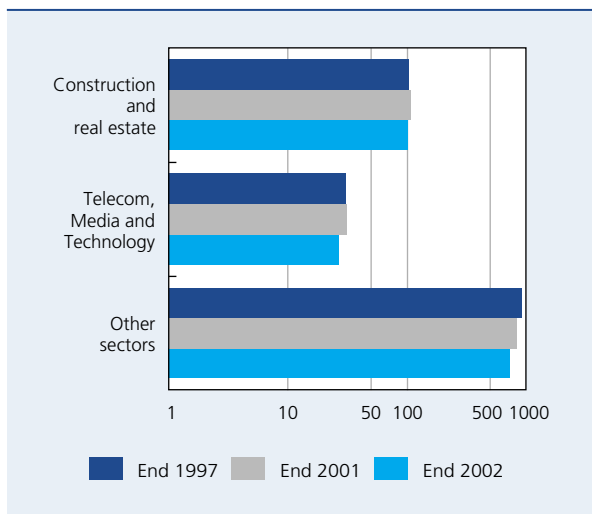
Sources : BFC, NBB (Credit Register).

(1) Total of both drawn and undrawn credit lines of Belgian credit institutions to resident and non-resident corporates.

(2) Regulatory own funds as defined for the calculation of the risk asset ratio.

CHART 22   DEGREE OF UTILISATION OF CREDIT LINES GRANTED BY BELGIAN CREDIT INSTITUTIONS TO RESIDENT ENTERPRISES

(Data on a company basis ; percentages of total credit lines)

Source : NBB (Credit Register).

(1) Turnover of more than 37.2 million euro over two consecutive years.

(Chart 23). However, claims on Latin America and Japan were significantly reduced in 2002. While this could point to an improved risk awareness on the part of Belgian banks, a large part of this reduction is also to be explained by the decision of some international banking groups to rebalance international claims between their various entities, leading to a reduction in the foreign exposures of their Belgian subsidiaries.

The involvement of Belgian banks in Central and Eastern Europe increased further in 2002, reaching around 60 p.c. of the regulatory own funds base of these institutions at the year end. The creation of a second home market by one Belgian bank in this region largely explains those exposures. KBC, along with a number of other, mainly Western European, foreign banks has played a substantial role in the privatisation process of former state-owned banks in Central and Eastern Europe. The decision to expand in that region was mainly driven by the growth potential of these countries, their geographical proximity and cultural compatibility, and the still limited degree of penetration of banking and insurance products. As a consequence, subsidiaries of foreign banks now account for a major share of total bank assets in the region, as on average 69 p.c. of those assets are foreign-owned compared to the euro area average of around 20 p.c. (Chart 24). Through their subsidiaries, the Western European banking groups involved are now important players on some of the local

markets, fulfilling a central role in the region's financial system and financial stability.

The involvement of Belgian banks is concentrated on a handful of subsidiaries in Central and Eastern European countries, namely Poland, Hungary, the Czech Republic, the Slovak Republic and Slovenia. Other important players in the region include Austrian, German and Italian banks. The subsidiaries in these countries mostly specialise in retail and corporate banking activities which explains why a large part of the foreign banks' exposures in the region is made up of local claims denominated in the local currency.

CHART 23   BELGIAN BANKS' FOREIGN CREDIT EXPOSURES[1]

(Data on a consolidated basis; expressed as percentages of regulatory own funds[2])
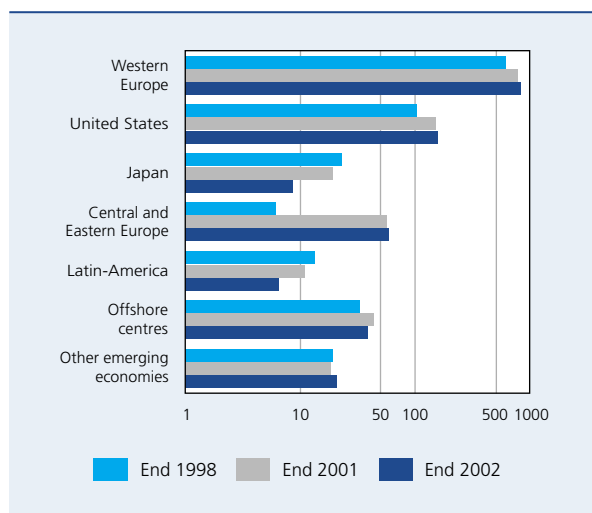
Sources: BFC, NBB.
(1) Total of loans and securities holdings after risk transfers via guarantees.
(2) Regulatory own funds as defined for the calculation of the risk asset ratio.

CHART 24   RELATIVE SHARE OF BANK ASSETS HELD BY BELGIAN AND FOREIGN BANKING GROUPS IN EU ACCESSION COUNTRIES

(Foreign-owned bank assets expressed as a percentage of total bank assets)
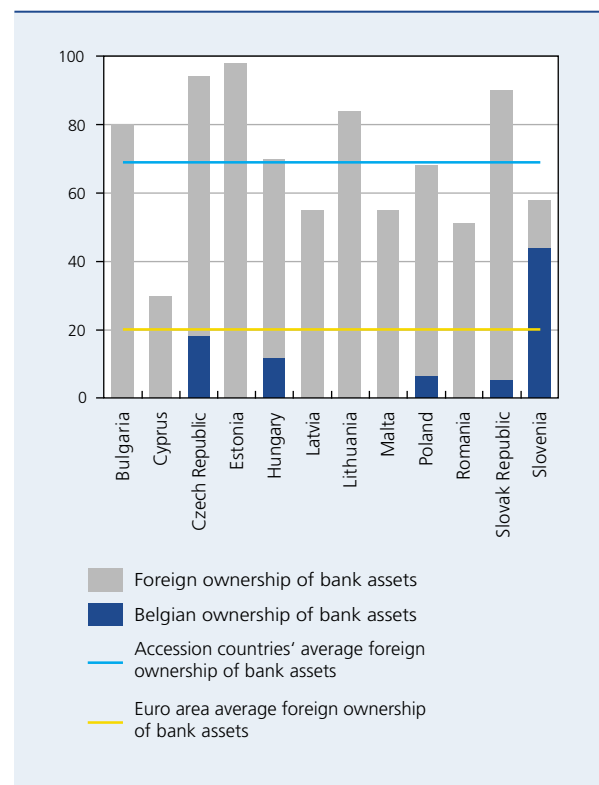
Sources: Banks' published accounts (end-2002 data) for Belgian ownership, national sources (end-2001 data) for foreign ownership.

To manage their position in relation to corporations, banks increasingly resort to credit risk mitigation techniques. The incentives foreseen in the new Basel Accord could further stimulate developments in this area, as capital requirements will become more sensitive to the true level of risks borne by banks. In 2002, the notional amounts of total return swaps, credit default swaps and credit spread options on the books of Belgian banks rose by more than 60 p.c. (Table 1). While the gross figures are inflated by the large-scale activities of a US specialised subsidiary of a major Belgian banking group, active as an arranger, market maker and trader of credit derivatives, net positions are also substantial.

They indicate that, in general, Belgian banks use credit derivative techniques to mitigate their risk through a net transfer of credit risks from their balance sheets to other market participants. However, some small individual Belgian banks are also net sellers of protection.

TABLE 1   USE OF CREDIT DERIVATIVES BY BELGIAN CREDIT INSTITUTIONS

(Data on a consolidated basis; notional amounts in billions of euro)

	December 2001		December 2002	
	Protection bought	Protection sold	Protection bought	Protection sold
Total Return Swaps	6.0	0.2	3.1	0.3
Credit Default Swaps	23.7	14.6	40.0	28.8
Credit Spread Options	0.3	...	0.2	...
Total	30.0	14.8	43.3	29.1

Source: BFC.

This corroborates a recent analysis of the credit derivatives market, performed by FitchRatings[2] which concluded that banks are significant buyers of protection through the credit derivatives market but that net purchases by the larger banks are partially compensated by net sales of protection by smaller regional banks.

The recent economic downturn has resulted in an increase in banks' credit risk provisions for loans and securities (Chart 25). Those provisions grew by some 59 p.c. during 2002, depressing Belgian credit institutions' net operating profits (see Box 2 for a more extensive discussion of the provisioning practices of Belgian banks). Any postponement of the revival in economic activity could further prolong this building up of provisions, possibly well into the first stage of the next upturn, as there is often a time lag between the economic cycle, materialisation of the credit risk and the constitution of provisions.

CHART 25   NET PROVISIONS FOR CREDIT RISKS[1] AND THE BUSINESS CYCLE
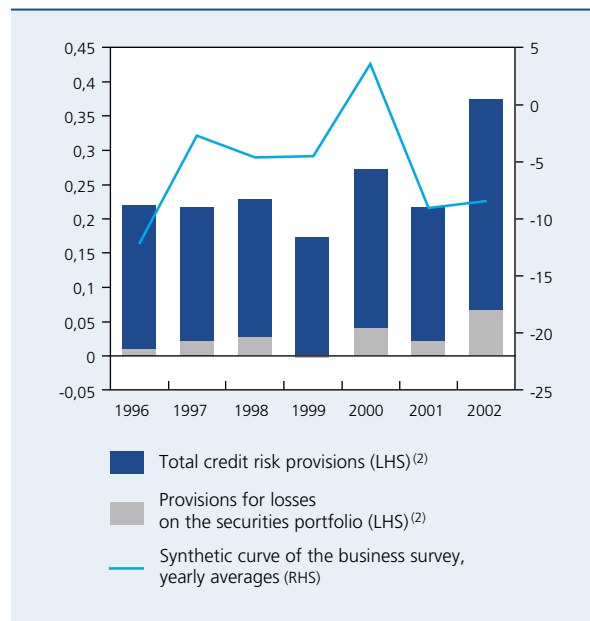
(Data on a consolidated basis)

■ Total credit risk provisions (LHS)[2]

■ Provisions for losses on the securities portfolio (LHS)[2]

— Synthetic curve of the business survey, yearly averages (RHS)

Sources: BFC, NBB.
(1) Net provisions for credit risks charged to Belgian banks' profit and loss account.
(2) Expressed as percentages of the yearly average of the outstanding amounts of loans and advances to customers and securities on Belgian banks' balance sheets.

Box 2

Provisioning for credit risks in Belgium

Provisioning can be defined as an accounting practice that enables firms to allow for potential risks and foreseeable future losses (or expenses) in the profit and loss account and to establish precautionary buffers on the balance sheet before the losses have actually occurred or the actual payments have to be made. For prudential reasons, credit institutions are allowed and/or encouraged by their supervisors to build up provisions for the risks and expected losses that are specific to the banking profession, in addition to the more universal provisions for future pension payments or taxes. In this respect, bank provisions can be viewed as a complement to the banks' capital, the latter being essentially intended to cover unexpected losses.

Whereas the fund for general banking risks and the internal security fund are intended to cover a broad spectrum of more general banking risks, credit risk provisions are set in anticipation of the potential irrecoverability of a bank's claims. In Belgium, credit risk provisions can be distinguished according to two characteristics: the extent to which the claim is irrecoverable (a distinction can be made between provisions for bad debts where default is certain, and provisions for doubtful debts, i.e. claims where the outcome is uncertain) and the possibility of identifying the individual claim for which the provision is made (a distinction can be made between general provisions that establish a buffer for a group of similar claims with foreseeable credit problems, and specific provisions, set up to cover an individually identified claim). Moreover, a mandatory system of fixed percentage country risk provisions requires Belgian credit institutions to take into account the particular risks related to the debtor's country of origin; this provision is separate from provisions for commercial or business risks intended to cover risks related to the activities of the debtor.

There are differences in both accounting and tax treatment between the above categories. Thus, the amount of provisions for bad debts is immediately deducted from the value of the assets on a credit institution's balance sheet and may, in principle, be charged as a tax-deductible expense. In contrast, provisions for claims with an uncertain character cannot be deducted from a bank's income for tax purposes and are recorded as a liability on the balance sheet. A subsequent correction to the asset value and to the provisions on the liabilities' side of the bank's accounts is only made once the loan's non-performing character becomes certain at a later stage. To sum up, the net amount of provisions charged to the profit and loss account during a specific period equals the sum of three items: the change in the asset item bad debts, the change in the liability item value reductions and provisions and the amounts that were deducted immediately from the value of the claim on the assets side during that period.

3.2 Other banking risks

Apart from credit risks, other important risks incurred by credit institutions as a direct result of their banking activities are liquidity, interest rate and market risks. This section examines the situation regarding these other risks, leaving aside some less tangible risk categories such as operational, legal or reputational risks (see Box 3 for a typology of banking risks).

Box 3

Typology of banking risks

The Basel Committee on Banking Supervision has defined the most important types of risks faced by credit institutions in its 1997 publication on the Core Principles for Effective Banking Supervision.

Credit risk: Risk of a failure of a counterparty to perform according to a contractual arrangement.

Country risk: In addition to the counterparty credit risk inherent in lending, international lending also includes country risk, which refers to risks associated with the economic, social and political environments of the borrower's home country.

Market risk: The risk of losses in on- and off-balance sheet positions arising from movements in market prices. Established accounting principles cause these risks to be typically most visible in a bank's trading activities. One specific element of market risk is foreign exchange risk.

Interest rate risk: Interest rate risk refers to the exposure of a bank's financial condition to adverse movements in interest rates.

Liquidity risk: Liquidity risk arises from the inability of a bank to accommodate decreases in liabilities or to fund increases in assets. In extreme cases, insufficient liquidity can lead to the insolvency of a bank.

Operational risk: The most important types of operational risk involve breakdowns in internal controls and corporate governance. Such breakdowns can lead to financial losses through error, fraud, or failure to perform in a timely manner. Other aspects of operational risk include major failure of information technology systems or events such as major fires or other disasters.

Legal risk: Legal risks include the risk that assets will turn out to be worth less or liabilities will turn out to be greater than expected because of inadequate or incorrect legal advice or documentation. Additional risks could be linked to shortcomings in existing laws preventing the resolution of legal issues involving a bank; to a court case involving a particular bank with possibly wider implications for other banks in a similar situation; or to changes in laws governing banks or other commercial enterprises.

Liquidity risks

Liquidity risks are essentially linked to the maturity transformation activity of banks. Credit institutions collect liquid resources from their customers in the form of deposits and bank bonds. They use them to provide stable financing through the provision of mostly illiquid loans and advances and the acquisition of securities. This function requires banks to closely scrutinise their liquidity position to ensure that they can fulfil all their obligations at every moment in time. A closer look at the consolidated balance sheet of Belgian credit institutions at the end of December 2002 reveals the structural characteristics of the liquidity position of Belgian banks (Chart 26).

On the assets side, the main potential source of liquidity comes from the large portfolio of securities and government bonds – 28 p.c. of total assets – which can be mobilised when liquidity is needed.

On the liabilities side, Belgian banks can use the interbank market which provides a quarter of their total funding, although the difference between interbank liabilities and assets amounts to only 3.9 p.c. of total liabilities, which implies that Belgian banks are only limited net liquidity takers on the international interbank market (see article "The Belgian interbank market : interbank linkages and systemic risk" in this FSR). In addition, a large proportion of the funds collected from customers is relatively inert. This is especially true for saving deposits and bank bonds, which, together, represent 17 p.c. of total liabilities, limiting the banks' reliance on more volatile money and interbank markets.

This inertia does not prevent the outstanding amount of bank bonds and saving deposits from fluctuating according to market circumstances and changes in household asset allocations. Recently, the combination of an uncertain environment, increased financial market volatility and renewed price competition on the market for saving deposits has revived the attractiveness of those deposits as a safe haven product. This increased demand

CHART 26   BALANCE SHEET ITEMS OF BELGIAN BANKS CLASSIFIED ACCORDING TO THEIR LIQUIDITY
(End - 2002 data on a consolidated basis ; expressed as a percentage of the balance sheet total)
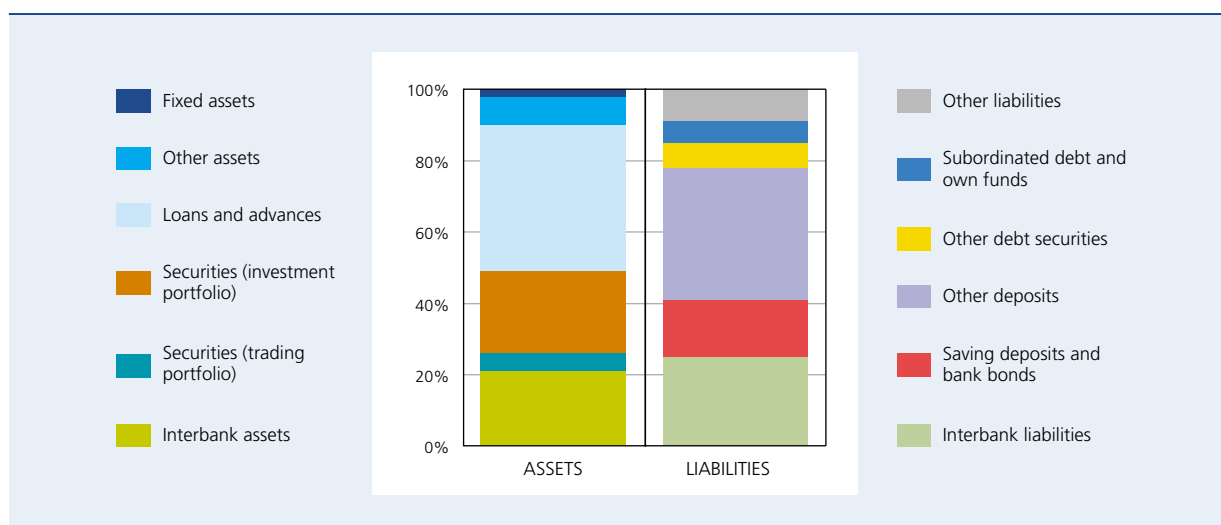
Source : BFC.

CHART 27 LOAN DEPOSIT RATIO [(1)] AND NET RECOURSE TO THE INTERBANK MARKET [(2)] BY BELGIAN CREDIT INSTITUTIONS

(Data on a consolidated basis ; percentages)

Recourse to interbank financing as a percentage of total assets (LHS)

Loan deposit ratio (RHS)
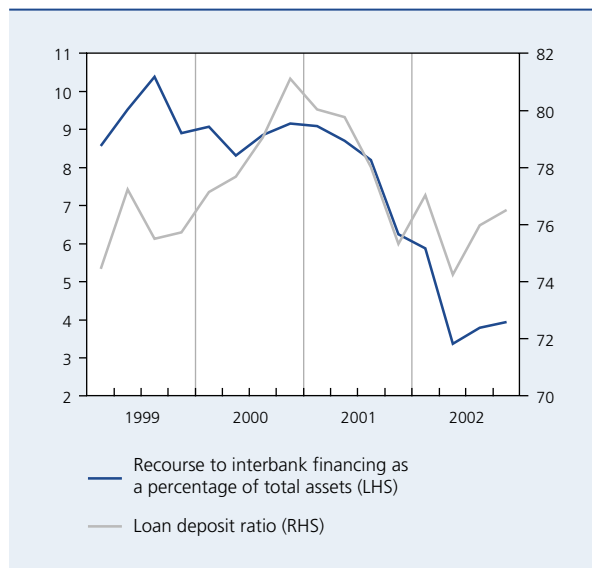
Source : BFC.
(1) Defined as loans and advances to customers as a ratio of deposits and bank bonds of non-bank clients.
(2) Defined as the difference between interbank liabilities and assets expressed as a percentage of the balance sheet total.

CHART 28 YIELD CURVE IN EUROS [(1)]

(Percentages)

Average 1995-2001   End 2002
End 2001   May 2003
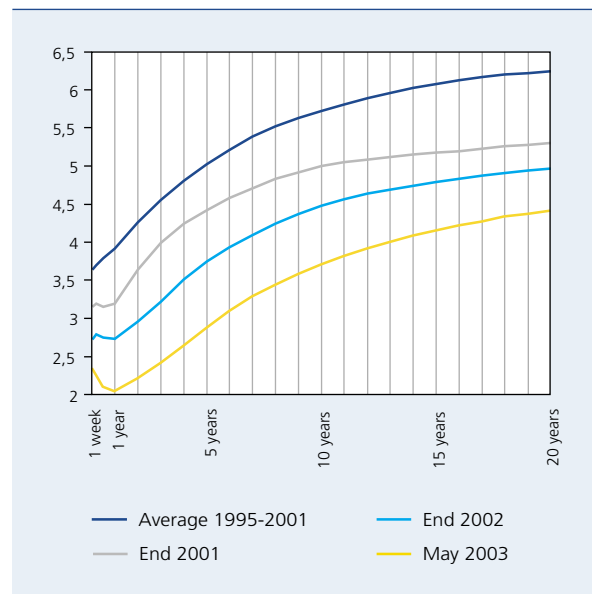
Source : NBB.
(1) Monthly averages of the reference rates on the secondary market for Treasury certificates issued by the Belgian state for periods of up to one year and for linear bonds for the other maturities.

for saving deposits has more than compensated for the gradual reduction in the outstanding amount of bank bonds due to the historically low level of long term interest rates. Combined with the limited growth of loans and advances to customers, this has caused the loan deposit ratio to decline from 81.1 p.c. at the end of 2000 to some 76.5 p.c. at the end of 2002 (Chart 27). As a corollary, Belgian banks have been able to reduce their net reliance on the interbank market from 9.2 to 3.9 p.c. of total liabilities over the same period, bringing their net position on this market closer to equilibrium.

Interest rate and market risks

In recent months, the yield curve has shifted downward. Between December 2001 and May 2003, the yield on three-month Belgian Treasury certificates has decreased by 1.01 p.c. while the corresponding reduction for 10-year Belgian government linear bonds reached 1.29 p.c. (Chart 28). This trend has been quite conducive to the maturity transformation activity of banks which are using their predominantly short term liabilities to finance longer term assets (Chart 29). Indeed, a simultaneous decline in short and long term interest rates will, on average, cause the cost of bank debts to fall faster than the return on their assets.

While a fall in long term interest rates tends to boost banks' profitability, this is mainly a temporary effect. Once rates have stabilised at a lower level, banks usually face two difficulties. First, the so-called endowment benefits that banks get by lending, at market rates, their non-remunerated or low-remunerated sight deposits, will shrink or disappear altogether. Second, when interest rates are at an historically low level, banks are more exposed to an upward shift.

Given the sizeable securities portfolio owned by Belgian banks, an upsurge in long term rates will quickly induce large capital losses. According to the prevailing accounting rules, those losses have to be recognised immediately only in the case of securities belonging to the banks' trading portfolios, which represent just 5 p.c. of banks' total assets. The major part of Belgian banks' securities, which are supposed to be acquired in a long term perspective (the so-called investment portfolio amounting to 23 p.c. of total assets) has to be valued at the lower of historical cost and market value. As Belgian banks still have a large quantity of fixed income securities which they subscribed when long term rates were at a much higher level, most of them benefit from large unrealised capital gains. Those gains are neither included in their balance sheet nor incorporated in their profit and loss account but they nevertheless form an important buffer against the occurrence of future risks.

NET MATURITY POSITIONS IN NATIONAL AND FOREIGN CURRENCY ACCORDING TO THE RESIDUAL TERM TO THE NEXT INTEREST RATE REVIEW DATE

(Net positions on a company basis expressed as percentages of the regulatory own funds [1])

CAPITAL GAINS [1] ON SECURITIES HELD IN BELGIAN BANKS' INVESTMENT PORTFOLIOS AND LONG TERM INTEREST RATES

(Data on a consolidated basis ; end of period figures ; billions of euro unless otherwise stated)

Assets

Liabilities

Off-balance sheet net position

Overall net position December 2002

Overall net position December 2001

Source : BFC.

(1) Regulatory own funds as defined for the calculation of the risk asset ratio.

Unrealised capital gains (LHS)

Reference rate on 10-year linear bonds (RHS, in percentages)

Realisation of capital gains on the securities portfolio

Net operating results excluding the realisation of capital gains on the securities portfolio

Unrealised capital gains as a percentage of the regulatory own funds [2]

Unrealised capital gains as a percentage of banking income

Sources : BFC, NBB.

(1) Defined as the difference between the market value and the historical cost of quoted long term securities (initial maturity over 1 year) in the credit institutions' investment portfolios.

(2) Regulatory own funds as defined for the calculation of the risk asset ratio.

The overall amount of those latent reserves is quite sensitive to any changes in market conditions, as can be inferred from the upper panel of Chart 30 which shows that the decrease in long term rates (from 5.45 p.c. at the end of 1999 to 4.48 p.c. at the end of 2002) resulted in an upsurge in the outstanding amount of unrealised gains (from 3.1 billion euro at the end of 1999 to 7.6 billion euro at the end of 2002).

However, the level of those implicit reserves is affected not only by market circumstances, but also by banks' behaviour. By staggering the realisation of those capital gains, banks can smooth out fluctuations in their overall results. This seems to have been more specifically the case in 2002 when a fall in current operating results was partially compensated by an increase in the realisation of capital gains. At the end of 2002, the total latent gains in banks'

TABLE 2   MAJOR COMPONENTS OF THE INCOME STATEMENT OF BELGIAN CREDIT INSTITUTIONS

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

	2000	2001	2002	Percentage changes	
				Between the first two periods	Between the last two periods
Banking income	25.47	25.79	24.59	1.3	–4.7
Net interest income	11.73	12.26	12.67	4.5	3.3
Non-interest income	13.74	13.53	11.92	–1.5	–11.9
Operating expenses (–)	18.38	19.09	18.36	3.9	–3.8
Personnel expenses	7.68	8.17	8.13	6.4	–0.5
Other expenses	10.70	10.92	10.23	2.1	–6.3
Gross operating results	**7.09**	**6.70**	**6.24**	**–5.5**	**–6.9**
Value adjustments (–)	1.51	1.57	2.17	4.0	38.2
Net operating results	**5.58**	**5.13**	**4.07**	**–8.1**	**–20.7**
Exceptional results	1.97	0.15	0.54	–92.4	260.0
Taxes and transfers (–)	1.98	1.47	1.07	–25.8	–27.2
Portion of the result of undertakings included in the consolidated accounts according to the equity method	0.38	0.34	0.01	–10.5	–97.1
Third-party interest in the result of consolidated subsidiaries (–)	0.40	0.38	0.35	–5.0	–7.9
Consolidated results [(1)]	**5.55**	**3.77**	**3.19**	**–32.1**	**–15.4**

Source : BFC.
(1) Group share.

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investment portfolios amounted to 14.3 p.c. of regulatory own funds and 33.8 p.c. of the 2002 banking income.

3.3 Profitability

The income from intermediation activities of Belgian banks continued to increase in 2002 as it grew by 3.3 p.c. (Table 2). However, in contrast to 2001, this growth of interest income was unable to compensate for the sharp decline in incomes from other activities. As a result, banking income was down by 4.7 p.c. At the same time, Belgian banks reaped the first benefits of their efforts to control costs as they managed to stabilise staff costs and cut back other expenses by 6.3 p.c. in 2002. As this overall reduction in operating expenses was not enough to keep pace with the contraction in banking income, gross operating results fell by 6.9 p.c. As already highlighted in the section on credit risks, Belgian credit institutions additionally witnessed a significant increase in net value corrections and provisions. In particular the provisions for credit risk saw an increase in 2002. The materialisation of credit risks hence trimmed even more off the net operating results, which decreased by over 20 p.c.

CHART 31   WEIGHTED DISTRIBUTION OF BELGIAN BANKS' RETURN ON EQUITY

(Data on a consolidated basis ; percentages of total assets of Belgian banks)
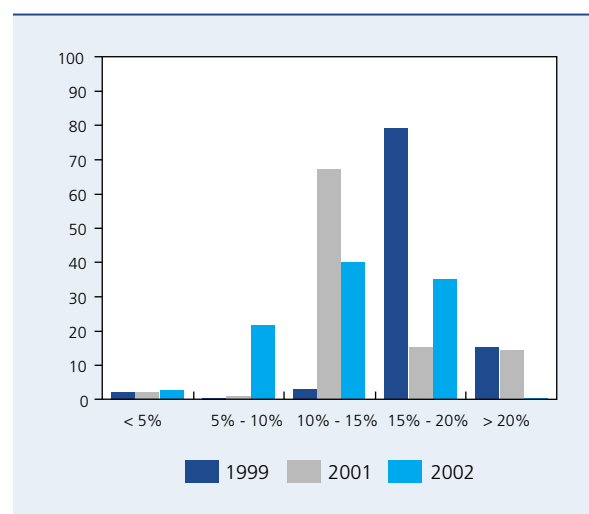
Source : BFC.

CHART 32 PROFITABILITY OF THE LARGEST CREDIT INSTITUTIONS[1] IN SOME COUNTRIES

(Percentages)

RETURN ON EQUITY

COST-INCOME RATIO

UK   Belgium   Netherlands
France   Germany
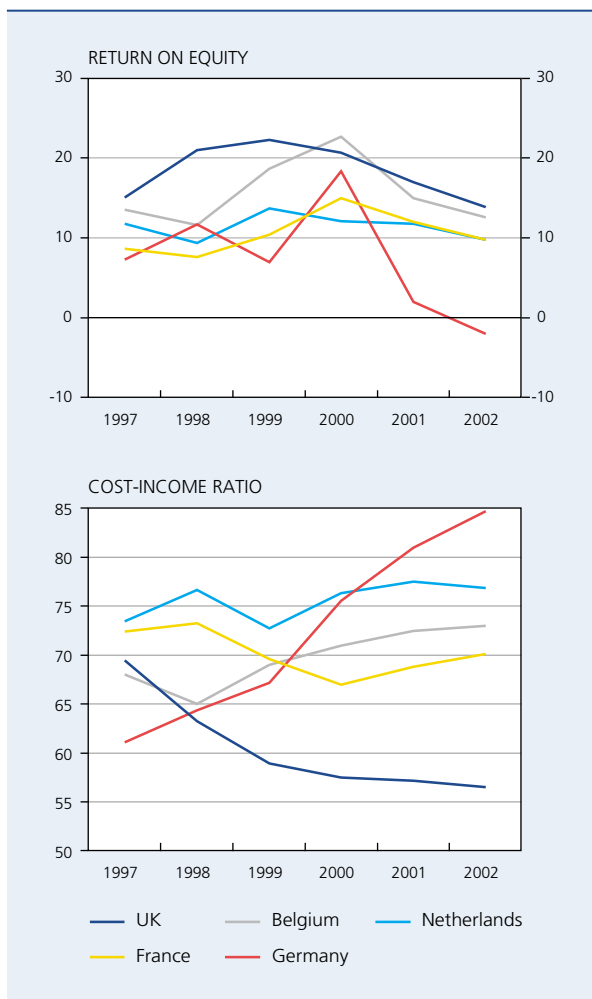
Sources : Annual reports of banks, Bankscope, BFC.
(1) The 2002 sample of large banks for Belgium includes BBL /ING, Dexia, Fortis and KBC.

CHART 33   MARGINS BETWEEN BELGIAN BANKS' DEBTOR RATES AND RISK-FREE RATES[1]

(Percentages)

Margin on overdrafts
Margin on consumer loans
Margin on investment loans
Margin on fixed-term advances
Margin on mortgage loans
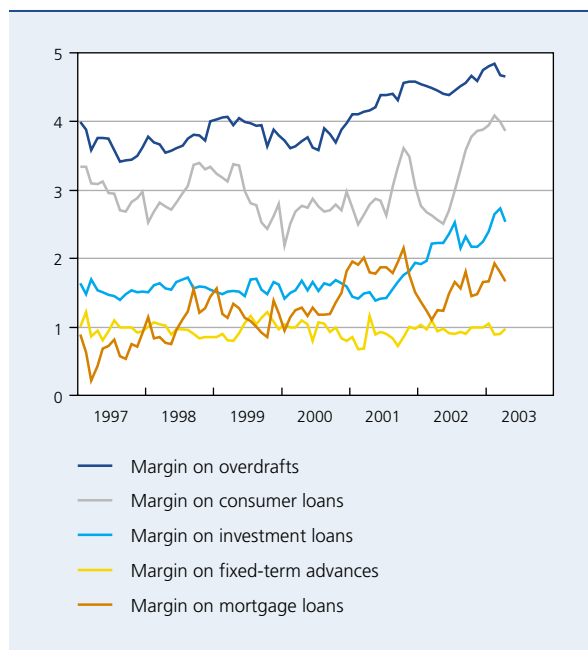
Source : NBB.
(1) The interest rates on three- and six-month Belgian Treasury certificates were used as risk-free rates to calculate the respective margins on overdrafts and fixed-term advances granted to corporate clients. The reference rates for three- and five-year linear bonds were used as risk-free rates to calculate the margins on consumer loans and both investment loans and mortgage loans respectively.

As a result, the average RoE of Belgian banks weighted by the relative importance of the individual institutions' assets in the sector's total assets fell from 13.7 p.c. in 2001 to 11.8 p.c. in 2002. On the same weighted basis, the distribution shifted to the left, the percentage of total assets held by banks with a profitability lower than 10 p.c. increasing from 3.0 p.c. to 24.6 p.c. (Chart 31). Nevertheless, the average RoE for the four largest Belgian banking groups remained relatively high at 12.6 p.c.

Belgium is not the only European country where the profitability of the banking sector came under pressure for the second consecutive year in 2002. The economic slowdown and financial market turbulence also depressed profitability in the Netherlands, France,

Germany and the United Kingdom, as witnessed by a reduction in the average RoE of the largest banks in these countries (Chart 32). Although cost-cutting efforts also proved fruitful in some of these neighbouring countries, the reductions in personnel costs and other expenses could not make up for the drop in banking income and therefore did not result in a significant decrease in average cost-income ratios.

Net interest incomes remained the mainstay of banking income for credit institutions in Belgium as well as in other European countries. Although the growth of Belgian banks' lending to residents remained subdued, loans and advances to foreign customers, and in particular those outside the euro area, expanded further in 2002, in line with the continued international expansion of Belgian banks. In addition, the interest margins of Belgian banks increased during 2002.

This increase has been rather general, as it has been observed for most credit products except for fixed-term advances to corporate clients (Chart 33). The margins on mortgage loans and investment loans to corporate clients went up to 1.7 and 2.3 p.c. at the end of 2002,

INTERMEDIATION MARGIN OF BELGIAN CREDIT INSTITUTIONS BEFORE AND AFTER CREDIT RISK PROVISIONS [1]

(Basis points)
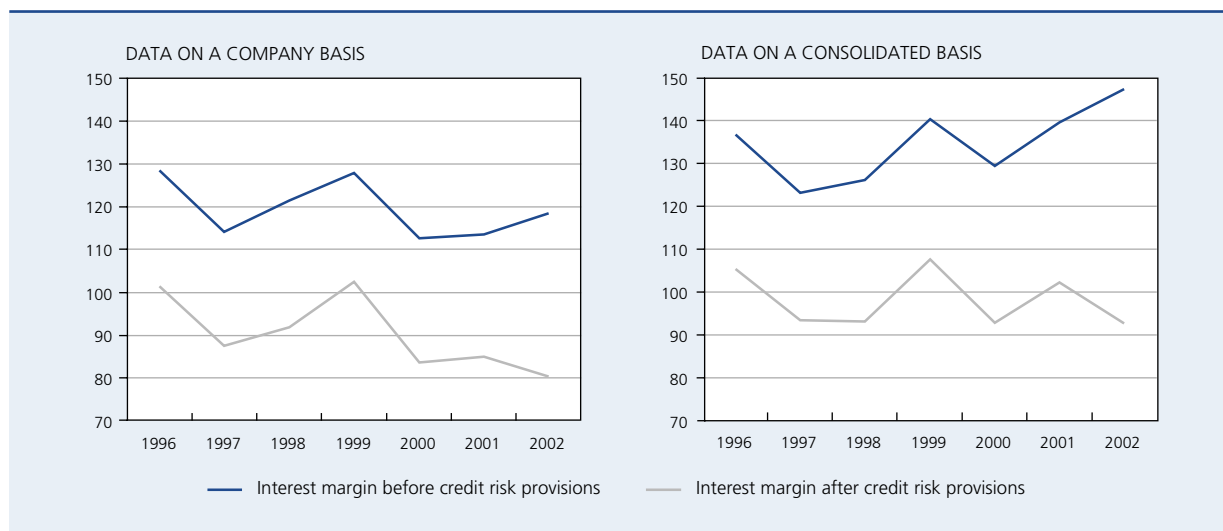
Source : BFC.

(1) Intermediation margins are calculated as the difference between the implicit interest rate received and paid on interest-bearing assets and liabilities respectively.

while margins on consumer loans and overdrafts were, at the same date, close to 3.9 and 4.8 p.c., respectively. However, these margins are not adjusted for risk and the increase in margins might therefore also have been triggered by a higher average risk premium.

The results of a new interest rate survey recently launched by the ECB indicate that this tightening of credit standards is tending to take place throughout the euro area. Over the three months to March 2003, participating euro area banks mentioned the worsening of the economic outlook as a main contributing factor for the

overall net tightening of credit standards. The euro area increase in margins seems to be affecting both SMEs and large enterprises, although the tightening applied more significantly to large enterprises.

The recent rise in the intermediation margin of Belgian banks has been more pronounced on a consolidated than on a company basis (Chart 34). This difference, which is due to intermediation income of foreign subsidiaries, seems to indicate that interest margins increased earlier and more sharply in those subsidiaries than on the Belgian credit market. Two possible factors could be at

NON-INTEREST INCOME OF BELGIAN CREDIT INSTITUTIONS

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

	2000	2001	2002	Percentage changes	
				Between the first two periods	Between the last two periods
Fee income	8.20	7.82	7.12	−4.7	−9.0
Net profit or loss on trading and foreign exchange operations	1.94	1.81	1.08	−6.5	−40.4
Other income	3.60	3.90	3.72	8.3	−4.6
Total non-interest income	13.74	13.53	11.92	−1.5	−11.9

Source : BFC.

CHART 35   EQUITY PRICES AND FEE INCOME

(Data on a consolidated basis, percentage changes against the preceding semester)

Fee income

DJ Eurostoxx 50
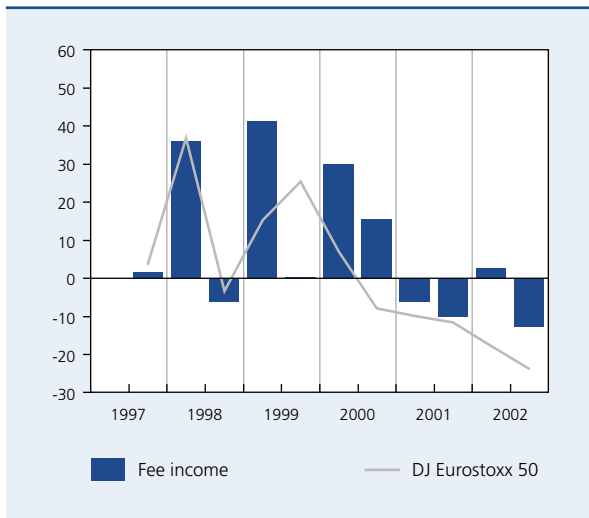
Sources : BFC, Thomson Financial Datastream.

CHART 36   STOCK MARKET ACTIVITY ON EURONEXT BRUSSELS

(Monthly data in the upper panel ; annual data in the lower panel)

Turnover on Belgian shares (LHS, EUR billions)

Turnover on foreign shares (LHS, EUR billions)

Market capitalisation of Belgian listed companies (RHS, EUR billions)

Number of trades (LHS, index 1996 = 100)

Number of listed companies [1] (RHS)

Source : Euronext.

(1) Listed domestic companies on the first market of Euronext Brussels.

the root of this divergence. First, competition could be less fierce on some of the foreign markets where Belgian banks operate. Second, credit risks on those foreign assets could be, on average, higher than on domestic claims. In line with the latter argument, the difference between the gross margins adjusted to take account of provisions is much higher on a consolidated basis than on a company basis. The intermediation margin net of credit risk provisions actually decreased on a consolidated basis in 2002.

After years of sustained growth, Belgian credit institutions' non-interest income levelled out in 2001 and fell by almost 12 p.c. in 2002 (Table 3). While all components of non-interest income have declined in 2002, the decrease was particularly strong for the net results on trading operations and fee income.

The impact of the latter reduction on Belgian banks' profitability was all the greater since fee income makes up the lion's share of non-interest income (59.7 p.c. in 2002). This category of income has been strongly affected by turbulences on financial markets as there is a close relationship between movements in equity prices and the trend in fee income from asset management and investment banking activities (Chart 35). This shows that the sensitivity of Belgian banks' income to market risks is not only expressed directly through trading results but also indirectly through commission generating activities.

The consequences of financial market turbulences were also strongly felt in other segments of the financial sector. The turnover on Euronext Brussels fell sharply and, at the end of 2002, the market capitalisation was reduced to about 50 p.c. of GDP, just half its end-1998 level (Chart 36). For the first time since 1997, the number of domestic companies listed on the first market of Euronext Brussels decreased slightly in 2002. While trading activity, expressed in number of trades, stabilised at the 2001 level, it remained well beneath the 1998 and 1999 peaks.

This depressed environment has hit the activities of financial intermediaries whose income is dependent on the climate prevailing on stock markets. This group includes stockbroking firms and asset management companies, both of which are often subsidiaries of banking groups.

CHART 37 PERFORMANCE OF BELGIAN STOCKBROKING
FIRMS AND ASSET MANAGEMENT COMPANIES
(Data on a company basis)

STOCKBROKING FIRMS

■ Number of companies (LHS)
— RoE (LHS, percentages)
— Turnover (RHS, EUR billions)

ASSET MANAGEMENT COMPANIES

■ Number of companies (LHS)
— RoE (LHS, percentages)
— Managed funds (RHS, EUR billions)
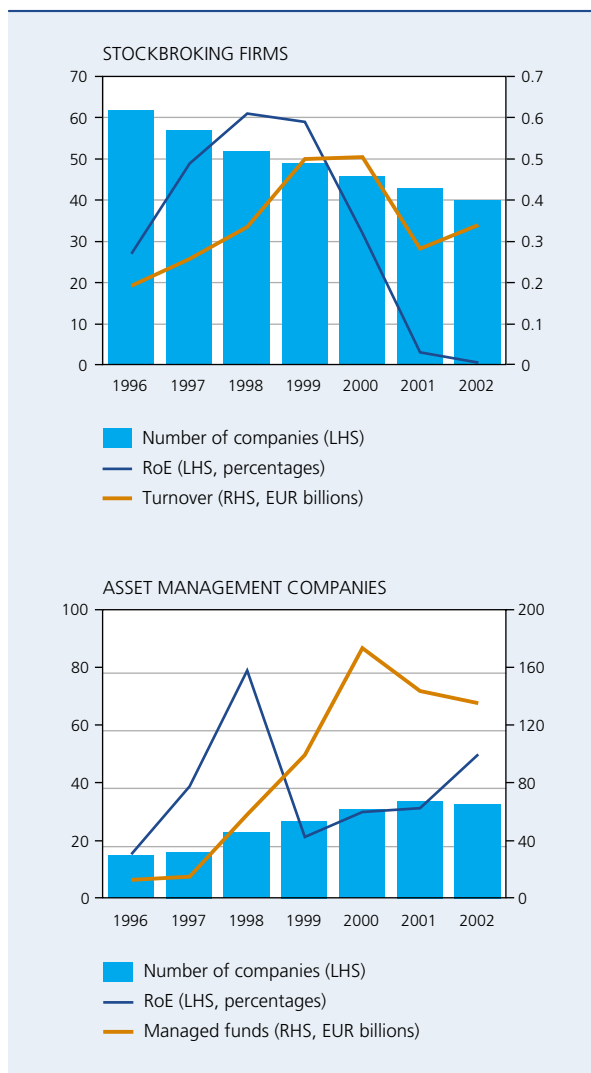
Source : BFC.

For stockbroking firms, the average RoE, which exceeded 30 p.c. in 2000, went down to 2.9 p.c. in 2001 and 0.6 p.c. in 2002 (upper panel of Chart 37). While the sector managed to increase its turnover slightly in 2002, this was exclusively due to operations for own account as transactions for the account of customers declined further.

On the other hand, despite the difficult environment, asset management companies generally managed to improve their profitability further, as the decline in the market value of the funds under management was more than compensated for by a significant cut in operating expenses (lower panel of Chart 37). However, this

decrease in costs is almost entirely attributable to the real-location of costs, within a large Belgian financial group, between the asset management subsidiary and another entity of the same group.

3.4 Solvency

The risk asset ratio of credit institutions governed by Belgian law increased slightly in 2002. This situation resulted from the quasi stabilisation of the volume of eligible own funds and a reduction in banks' credit risk requirements which outweighed the rise in market risk requirements (Chart 38). The strong capitalisation of Belgian credit institutions is illustrated by the current level of the risk asset ratio which amounted to 13.1 p.c. at the end of 2002, well above the 8 p.c. minimum required in the Basel Accord. When weighted by the relative importance of the various banks in terms of total assets, the distribution of this ratio indicates a strong concentration above 10 p.c. All systemically impor-tant institutions have a ratio above that threshold.

The composition of the eligible own funds also improved in 2002. The share of tier 1, or premium quality capital, which includes the paid-up share of the common stock and the disclosed reserves, rose to about 67 p.c. of the eligible own funds for credit risk. While tier 1 capital kept growing, tier 2 capital decreased, due to the repayment of some subor-dinated debts and perpetual bonds.

CHART 38 BELGIAN BANKS' RISK ASSET RATIO AND
REGULATORY OWN FUNDS [1]
(Data on a consolidated basis; percentages unless otherwise stated)
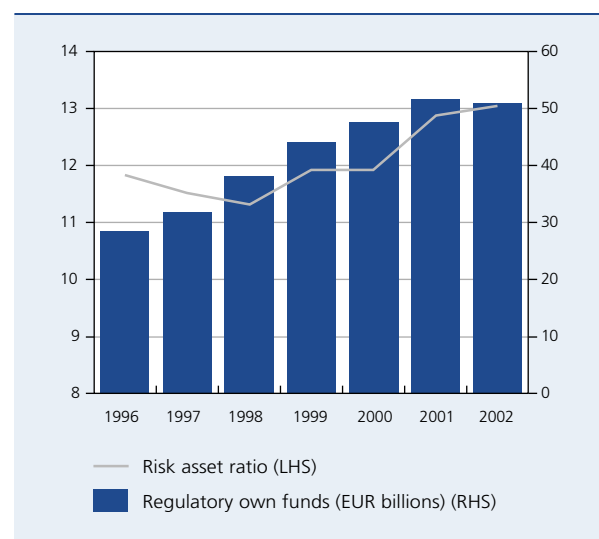
— Risk asset ratio (LHS)
■ Regulatory own funds (EUR billions) (RHS)

Source : BFC.
(1) Regulatory own funds as defined for the calculation of the risk asset ratio.

WEIGHTED DISTRIBUTION OF BELGIAN BANKS'
RISK ASSET RATIO

(Data on a consolidated basis; percentages of total assets of
Belgian banks)
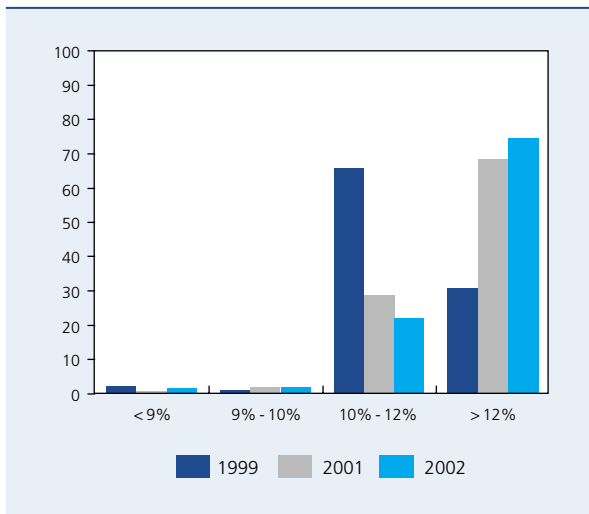
Source : BFC.

By far the largest share of total capital requirements was
needed to cover credit risks (92 p.c. at the end of 2002).
Nevertheless, requirements for market risks increased
from 6 to 8 p.c. While the slowdown in traditional bank-
ing activities and the greater use of collateral reduced the

relative importance of credit risk requirements, market risk
requirements rose, due to the increased volatility on finan-
cial markets. Chart 40 and Chart 41 present a further
breakdown of those two categories of requirements.

For credit risk, the share of assets carrying a zero risk-
weight [3] amounted to about one third of total assets
at the end of 2002 and those attracting a 100 p.c.
weight [4] represented about 28 p.c. of total assets. During
the last few years, there has been a gradual shift from low
risk-weight categories to higher risk-weight categories.
The strongest decrease has been recorded for the share
of assets with a 10 to 20 p.c. risk-weight which includes
most interbank positions. On the one hand, banks have
reduced the relative importance of their interbank assets.
On the other hand, a much larger part of interbank trans-
actions now takes the form of repurchase agreements
allowing those transactions to be backed by securities
with a zero risk-weight. The latter development explains
why, in spite of the gradual reduction in government
bond portfolios held by banks, the proportion of the zero
risk-weight category has hardly decreased since 1996.
As a corollary, banks have increased their assets in the

(3) Assets in this category mainly include cash and claims on OECD central govern-
ments and central banks.
(4) Assets in this category mainly include claims on the private non-bank sector and
claims on banks incorporated outside the OECD with a residual maturity of over
one year.

CHART 40   WEIGHTING OF ASSETS FOR CREDIT RISK
REQUIREMENTS

(Data on a consolidated basis; percentages of total credit risk
bearing assets)
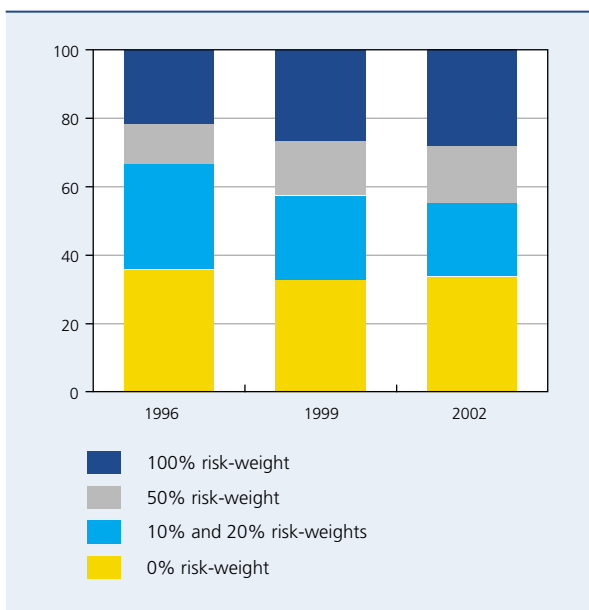
Source : BFC.

CHART 41   STRUCTURE OF BELGIAN BANKS' MARKET RISK
REQUIREMENTS

(Data on a consolidated basis; percentages of total market risk
requirements)
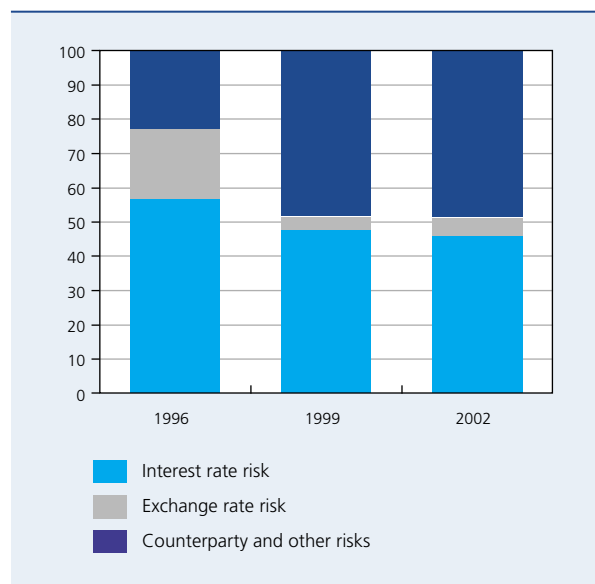
Source : BFC.

form of claims on households and corporations. In consequence, the category of 50 p.c. risk-weighted assets, which includes mortgage loans, increased in relative size, from 12 p.c. at the end of 1996 to 17 p.c. at the end of 2002, while the share for 100 p.c. risk-weighted assets went up during the same period from 22 to 28 p.c.

The breakdown of the market risk requirements of Belgian banks has stabilised since the introduction of the euro, which drastically reduced exchange rate risks. While, in 1996, requirements for exchange rate risk represented 20 p.c. of total market risk requirements, this share has fallen to about 5 p.c. The remaining is shared, in almost equal proportion, between requirements for interest rate risk and those for other risks which are basically composed of counterparty risks.

4. Financial conglomerates

4.1 Characteristics and financial stability issues

One of the recent key developments in the financial landscape has been the emergence of large diversified groups, i.e. institutions which are active in at least two of the following domains : banking, insurance and securities activities. [5] In Belgium, in particular, the four major financial intermediaries have widely diversified in bancassurance. [6]

Insurance companies are usually considered as raising fewer systemic issues than banks. They do not play a key role in the payment system, as their liabilities are not used as a means of payment. Although reinsurance contracts are

an important component in the functioning of this branch of activities, the network they create between the various companies is usually considered to be less prone to contagion mechanisms than the interbank markets. Nonetheless, insurance companies can indirectly pose a serious threat to financial stability. On the one hand, bancassurance groups are an obvious channel through which difficulties in insurance can spread to banks. On the other hand, insurance companies are major participants in financial markets, so that problems in this sector can affect other players, including banks, active in these markets.

Insurance and banking activities have very different characteristics as regards their balance sheet composition, the nature of the risks accepted, their maturity structure and their sources of income (Table 4).

In banking, assets generally have a longer duration than liabilities, while the reverse is true in insurance, especially in life insurance. Moreover, maturities are generally longer in insurance than in banking, on both the assets' and the liabilities' side. As regards the risks, credit activity is generally considered to be the primary source of risks in banking, while, in insurance, the main focus is traditionally on underwriting risk, i.e. the risk of underpricing insurance contracts and underestimating the adequate level of technical provisions. This difference of emphasis is mirrored in the different approaches adopted by regulators when fixing capital requirements. Those requirements

[5] According to the European Financial Conglomerates Directive, financial conglomerates are institutions combining insurance activities with banking and/or security activities.

[6] For more details on the reasons for the emergence of financial conglomerates and their implications for financial stability, see NBB (2002), "Financial conglomerates", *Financial Stability Review*, pp. 61-79.

TABLE 4   COMPARISON BETWEEN BANKS AND INSURANCE COMPANIES

	Banks	Insurance companies
Liabilities	Commitments with short maturities that can often be used as means of payment	Commitments depending on uncertain events (probability calculus), leading to the constitution of technical provisions
Assets	Basically acquired as a result of credit granting, which is a major bank function	Portfolio investments to cover the commitments
Risks	Primarily on the assets' side, linked to credit granting	Primarily on the liabilities' side, corresponding to risks underwritten by insurance companies
Maturity structure	Duration of assets higher than duration of liabilities	Duration of assets lower than duration of liabilities
Income sources	Interest income and other financial results	Technical and financial results

Source : NBB.

Box 4

Capital regulations for banks and for insurance companies

Both insurance companies and banks face the occurrence of expected as well as unexpected events. The former are covered by provisions while capital is the main buffer for the latter.

Capital versus provisions

A first difference between the two sectors concerns the relative importance of capital compared to provisions. In the banking sector, strict screening procedures are applied to minimise the probability of having to deal with defaulting customers. So, the level of provisions, whose main purpose is to cover expected credit loss, is usually low compared to capital, deemed necessary to prevent a large unexpected loss from wiping out a bank's own funds. Conversely, for an insurance company, provisions are a key component on the liabilities' side, as the purpose of the business is precisely to build up reserves in order to cover customers' insurance claims. To the extent that the amount of those claims can be reasonably well estimated, and that exceptional occurrence of claims can be covered through reinsurance, the level of own funds can be proportionally reduced.

Calculation of capital requirements

For banks, the regulatory capital requirements were originally designed to cover credit risks, which are inextricably bound up with banks' core business. Under the current Basel Accord, the amount of capital to be held is a function of the type of asset (i.e. type of debtor), with the characteristic that more capital will be required for asset classes that are judged to be riskier than others. This means that capital regulation in banking is risk sensitive. The Accord fixes 8 p.c. as the minimum ratio of capital that a bank has to hold in proportion to risk-weighted assets.

As underwriting risk is considered to be the major risk factor in insurance, liabilities are used as the basis of calculation for the solvency requirements in this sector. According to EU rules, the amount of capital that must be held by an insurance company (i.e. the *required solvency margin*) is derived from criteria which are related to the overall volume of insurance business. Those rules do not discriminate according to a company's specific risk profile, i.e. they are not risk sensitive.

The calculation methods are different in life and non-life insurance. In non-life insurance, the amounts of premiums and claims are used as inputs, while in life insurance the inputs are the amount of mathematical provisions and the capital at risk. The observance of the solvency margin is measured through the coverage ratio. This ratio corresponds to the proportion of the available capital after deduction of intangible elements (the so-called *available solvency margin*) to the required solvency margin. This ratio, which must be greater than or equal to 100 p.c., typically exceeds 200 p.c. in most insurance companies, while in banking, values of about 150 p.c. would be more common (corresponding to a solvency ratio of 12 p.c. in proportion to the required level of 8 p.c.).

Further extensions

In the mid-nineties, the Basel Committee introduced additional capital requirements for market risk, applying them to net foreign exchange exposures per currency and to market risks associated with positions that are marked to market in the bank's trading portfolio. To satisfy those capital requirements, banks were allowed to add additional elements to their regulatory capital.

At present, the Accord is undergoing a more fundamental revision in order to make capital requirements more risk sensitive. The revised formula used to calculate the risk-weighted capital ratio takes greater account of the varying nature and complexity of banks' activities and introduces several levels of sophistication in the risk management techniques available to banks. An additional capital requirement for operational risk will also be introduced. The implementation of the new Basel II framework is planned for the end of 2006.

Up to now, the required capital in insurance has been linked exclusively to underwriting risk. Other regulatory instruments are used to manage the other risks. In particular, investment risks are addressed by rules concerning the diversification of assets. This could change when new rules, currently in preparation as a part of the "Solvency II" project, are introduced at the EU level. This new framework, which will introduce a completely new methodology for assessing insurance companies' solvency, will have a broader scope than the solvency rules currently applicable. It will take into account several characteristics of the insurance firm, such as size and possible diversification benefits, to assess the solvency position in order to calculate a capital requirement that is more in line with the true risks. There are several analogies with the evolution from Basel I to Basel II for banks' capital adequacy regulation, with for instance the same progress towards a more risk-based approach, the incorporation of all relevant risk factors and the greater use of internal risk models. The convergence in the capital regulations of the two sectors could contribute to the creation of a level playing field for financial services in the EU, avoiding regulatory arbitrage.

Insurance groups and financial conglomerates

If an insurance company is part of an insurance group[1] or a mixed financial conglomerate[2], additional adjusted solvency rules are applicable at the consolidated level, in order to prevent double gearing, i.e. a situation where the same capital is counted twice to fulfil solvency requirements. In particular, financial participations in other group members have to be deducted from capital in assessing the group's solvency.

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(1) See Directive 1998/78/EC.
(2) See "Financial Conglomerates" Directive 2002/87/EC.

are primarily established by reference to assets for banks and to liabilities for insurance companies. This point is discussed in more detail in Box 4.

Notwithstanding the differences mentioned above, there are also many similarities between the two activities. Both categories of institutions accept risk for the account of their customers, manage funds, are often selling similar products, and perform risk diversification.

The diversification strategy of the four major bancassurance groups active in Belgium can be evaluated by the relative share of banking and insurance in their income (Chart 42). The contribution to the operating result before taxes, including booked capital gains or losses and value corrections, indicates that banking income is generally the most important component, especially for Dexia, that entered into bancassurance fairly late and only on a limited scale. ING is the only large bancassurance group active on the Belgian market where insurance activities generate more than half of the profit. Over the last few years the contribution of banking activities has declined slightly for ING and Dexia, while for KBC and Fortis, banking income again became more important in 2001 and 2002 after an initial decrease between 1997 and 2000.

TABLE 5   AVERAGE PROFIT AND LOSS ACCOUNT
           OF INSURANCE COMPANIES

           (Figures for 1997-2001 in p.c. of the technical result,
           data on a company basis)

	Non-technical	Life	Non-life
Premiums		1,063.6	1,267.7
Cost of insurance claims . . .		463.0	1,010.6
Changes in provisions		778.6	28.0
Premiums after insurance costs		**−178.0**	**229.1**
Net operating cost		99.0	419.8
Results before investment income		**−277.0**	**−190.7**
Net investment income		377.0	290.7
Technical result		**100.0**	**100.0**
	100.0	62.9	37.1
Net investment income	54.5		
Extraordinary items and taxes	− 31.5		
Net result	123.0		

A major characteristic of insurance companies is their heavy reliance on investment income. This applies to both life and non-life insurance, as evidenced by Table 5 which summarises the structure of insurance companies' profit and loss accounts for the period 1997 to 2001. Results before investment income are strongly negative in both branches, so that to obtain a positive technical result of 100, it is necessary to achieve an investment income of around 380 in life insurance and 290 in non-life insurance. The comparison of those figures provides a clear indication of the high sensitivity of insurance companies to developments that could affect the return on their portfolio.

In such a context, it is no surprise that insurance companies have been vulnerable to the combined effect of a downward movement in capital market interest rates and a falling stock market. The implications of these two developments for insurance companies will be examined in the next two sections.

4.2 Sensitivity to interest rate evolutions

As already mentioned in Table 4, banks' and insurance companies' balance sheets have a quite different maturity structure, so that sensitivity to interest rate changes is not symmetric between the two sectors. While banks

have benefited from the recent fall in long term interest rates (see Chapter 3), this movement has had a more negative effect on insurance companies. Indeed, a major part of life insurance contracts still takes the form of defined benefit contracts whereby a minimum return has to be guaranteed, possibly complemented by a participation in the insurance company's profits. In Belgium, the ceiling for that guaranteed return is presently fixed at 3.75 p.c. Companies are not obliged to offer this rate and, indeed, an increasingly large number of firms offer lower rates of about 3.25 p.c. Nevertheless, the downward trend in interest rates makes it more difficult for insurance companies to get the return needed to fulfil the commitments linked to their defined benefit contracts (Chart 43).

In most European countries, the maximum guaranteed rates have been lowered in the past few years by between 0.5 and 1 p.c., to bring them more in line with bond yields. Although this also took place in Belgium, where this rate was reduced from 4.75 p.c. to 3.75 p.c. in 1999, the Belgian rate is still among the highest in Europe (Table 6). Furthermore it has to be remembered that the previous rate of 4.75 p.c. still applies to all contracts concluded before the date of the change.

CHART 43   MAXIMUM GUARANTEED RETURN ON DEFINED BENEFIT LIFE INSURANCE CONTRACTS

(Daily data, percentages)

— Long term interest rate [1]   — Maximum guaranteed return

Source : NBB.
(1) Rate on the secondary market for 10-year Belgian government bonds.

TABLE 6   TYPICAL GUARANTEED RETURN ON LIFE INSURANCE CONTRACTS

Country	Previous (p.c.)	End of May 2003 (p.c.)
Belgium	4.75	3.75
Denmark	3.00	2.00
Finland	4.50	3.50
France	3.50	3.00
Germany	4.00	3.25
Italy	4.00	3.00 [1]
Netherlands	4.00	3.00
Portugal	–	4.00
Spain	3.15	3.11
Switzerland	4.00	3.25
United Kingdom	–	1.00 [1]

Sources : European Commission "Report of the working group on life assurance to the IC solvency committee", NBB.
(1) Upper value of a range.

This specific source of vulnerability is a function of the relative share of contracts with a guaranteed return in the total life insurance business. Traditionally, these were the standard life insurance contracts. However, the stock market boom during the second half of the past decade fostered a gradual shift in demand, with customers favouring defined contribution contracts,

usually in the form of products linked to mutual funds (i.e. unit-linked products). These contracts do not guarantee a fixed return, but have a value which moves in line with the value of the underlying assets.

The share of these contracts in premium income increased to more than 50 p.c. in 2000. However, since 2001 this trend has reversed, in line with the deteriorating situation on the stock markets, so that in 2002 guaranteed return contracts again accounted for about 70 p.c. of premium income during that year (Chart 44).

4.3 Sensitivity to stock market developments

Besides the difficulties stemming from declining long term interest rates, insurance companies have recently had to cope with negative returns on their equity portfolios.

A key element in assessing the impact of falling equity prices on insurance companies' performance is the share of equity in total financial assets. As illustrated in Chart 45, bonds – largely government bonds – remain an important component of Belgian insurers' investment portfolios. However, this asset class has been gradually reduced over the last few years, mainly in favour of equities, acquired either directly or through mutual funds. The relative share of equities directly held by insurance

CHART 44   RELATIVE IMPORTANCE OF UNIT-LINKED LIFE INSURANCE IN PREMIUM INCOME [1]

— Relative market share of unit-linked life insurance contracts (LHS, percentages)

— Total return index of world stock markets (RHS, index 1997 = 100)
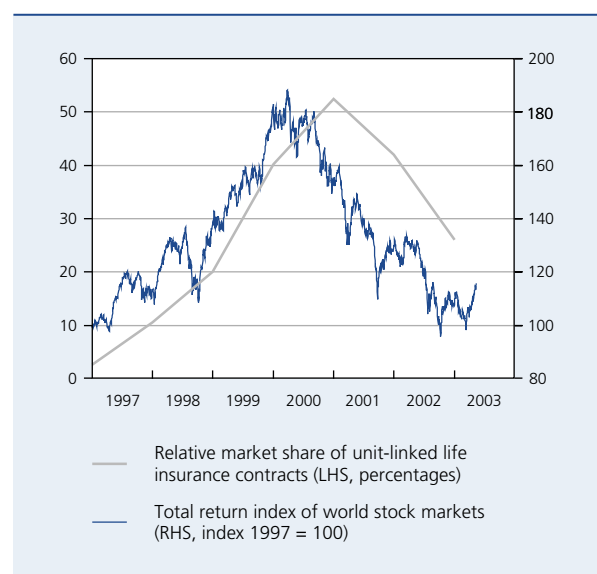
Sources : ISO, Professional Union of Insurers (PUI), Thomson Financial Datastream.
(1) 2002 data based on PUI estimates taking into account individual life insurance only.

companies increased from 13.6 p.c. in 1992 to 30.2 p.c. of the investment portfolio in 2000. Since then, the fall in stock prices, in combination with a reorientation of investment policy, has led to a reduction in this percentage, which dropped to 21.8 p.c. at the end of 2002. The exposure of Belgian firms remains lower than that in other EU countries.

This equity exposure depressed the recent financial results, even though capital losses on the equity portfolio have been partially compensated by capital gains on the bond portfolio resulting from the downward trend in long term interest rates. The total return on financial investment, including capital gains or losses and value corrections, fell steadily from 11.9 p.c. in 1998 to 4 p.c. in 2001 (Chart 46). While the 2002 figures are not yet known, an approximate estimate based on the yield of a portfolio with a structure comparable to that of the Belgian insurance sector as a whole, indicates a further fall in 2002.

These profitability problems eventually have an impact on the solvency ratios through the evolution of retained earnings. As discussed in Box 4, investment risks are not yet included in the rules governing the calculation of capital requirements. However, the available solvency margin is generally significantly higher than the required value, which seems to indicate that insurers took these risks into account on their own initiative, enabling them to withstand the current difficulties. Some indicators of the resilience of the large financial conglomerates are discussed in more detail in the next section.

Sources : ECB, NBB.
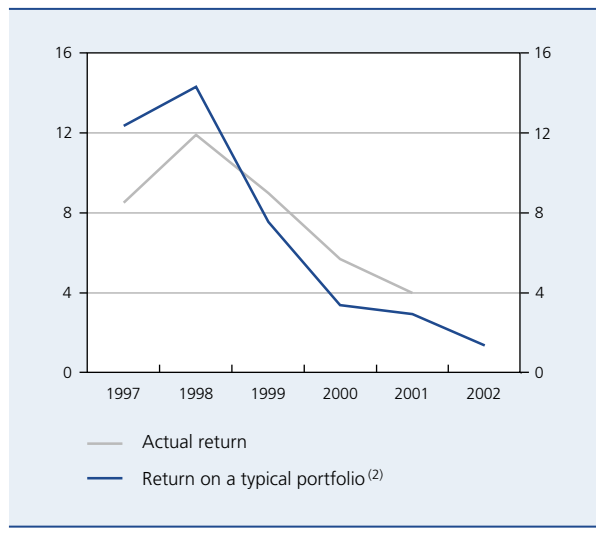
Sources : NBB, PUI, Thomson Financial Datastream.
(1) Including capital gains or losses and value corrections.
(2) Portfolio with 40 p.c. Belgian government bonds, 30 p.c. corporate bonds with a maturity between 7 and 10 years, 18 p.c. international shares, 5 p.c. Belgian shares and 7 p.c. liquid assets in euro at 2 months.

4.4 Financial situation of the large Belgian bancassurance groups

Share prices can be used as a first indicator to gauge the financial health of Belgian bancassurance groups. Chart 4 in Chapter 1 shows that the average stock price index of the four main groups fell midway between the banking and insurance indices, reflecting the mixed character of those financial intermediaries' activities.

Two major determinants of financial soundness – profitability and solvency – are presented in Table 7 for the entire banking and insurance sector as well as for the four large bancassurance conglomerates.

As regards profitability, three major factors stand out. First, the recent drop in profitability has been much more pronounced in insurance, albeit starting from a higher level. Second, the return on equity achieved by bancassurance groups is closer to the result in banking than in the insurance sector. This confirms the fact that banking remains prominent in the range of activities of those conglomerates. Third, the return on equity has apparently been more stable in bancassurance, although caution is required in the analysis of these data. Figures used for the four bancassurance companies (third column in Table 7) come from published accounts, so that they are not always comparable; and they are even less com-

TABLE 7   PROFITABILITY AND SOLVENCY OF BELGIAN FINANCIAL INSTITUTIONS

(Percentages)

	Return on equity			Solvency			
	Banking sector [1]	Insurance sector	4 large bancassurance groups [2]	Banking sector [1][3]	Insurance sector [4]	4 large bancassurance groups [2]	
						Banking entity [3]	Insurance entity [4]
1998	11.0	34.2	13.7	11.3	319	11.1	326
1999	17.1	26.9	15.9	11.9	267	11.8	307
2000	20.4	21.5	16.8	11.9	265	11.7	261
2001	13.7	12.1	17.1	12.9	276	12.7	231
2002	11.8	n.	13.7	13.1	n.	12.8	211

Sources : BFC, ISO, NBB, major bancassurance groups' annual reports.
(1) Credit institutions governed by Belgian law.
(2) Dexia, Fortis, ING, KBC.
(3) End-of-period ratio between own funds and risk-weighted assets, as defined by the Basel Committee on Banking Supervision.
(4) Coverage ratio : available solvency margin over required solvency margin (see also Box 4).

parable with the figures reported to the banking and insurance supervisory authorities respectively (first two columns in Table 7).

Those comparability problems do not exist for solvency ratios which have to be calculated according to well-defined criteria. As those criteria are quite different for banks and insurance companies (see Box 4), no aggregate figures can be presented for the bancassurance groups. The respective solvency ratios of the banking and the insurance arms of those groups closely mirror the corresponding ratios for the entire industry which is unsurprising given the very large market share of bancassurance groups in Belgium.

During the last 5 years, banks have consolidated their solvency ratios. In contrast, solvency ratios in insurance have constantly declined. For the four major groups, the coverage ratio went down from 326 p.c. in 1998 to 211 p.c. in 2002. In other words, the existing margin between available and required capital has been halved.

To measure the impact of the fall in equity prices on the profitability and solvency of insurance and bancassurance companies, it is necessary to bear in mind that the accounting rules prevailing in insurance require companies to record as a loss any decline in equity prices which is deemed to have a durable character. At micro-level, this principle requires close monitoring of the way the rules are applied by the various individual companies and, at macro-level, continuous assessment of the key factors influencing the long term trend in financial asset prices.

5. Corporate Governance

The new legislative act of 2 August 2002 modernises Belgian Corporate Law and introduces some new principles of Corporate Governance in Belgium.

The new rules aim at improving the accountability and the effectiveness of governance in the Belgian corporate sector : firstly, by strengthening the independence of the external auditors ; secondly, by creating a legal framework for a particular two-tier board regime with a Management Committee ; thirdly, by designing new rules for dealing with conflicts of interests within groups of companies ; finally, by redesigning some procedures for the annual general meetings of shareholders, mainly facilitating participation for investors.

5.1 The Corporate Governance Background

The new legislation in Belgium addresses some of the concerns that, with the emergence of global markets, have been growing in regard to the organisation of the relationships between owners and managers in the control of a corporation. Corporate governance structures specify the distribution of rights and responsibilities among different participants in the corporation, and spell out the rules and procedures for making decisions on corporate affairs. Through this structure, the company objectives are set and the means provided for attaining those objectives and for monitoring performance. [7]

(7) See OECD (1999), "OECD Report on Corporate Governance", Financial Market Trends 73, pp. 129-154.

According to an extensive economic literature, modern corporations face "agency problems" in their organisation. Conflicts of interest arise between owners and management and/or between controlling and minority shareholders. The challenge is to constitute an efficient monitoring structure for these conflicting interests. A good governance structure is one that selects the most able managers and makes them accountable to investors.[8] It concerns both the effectiveness and the accountability, including all the issues surrounding disclosure and transparency, of the governance of a company.

While good governance structures are important for the performance of all companies, they are crucial to the development of larger corporations needing access to substantial external financing. With the emergence of global markets, investors are demanding higher standards of accountability, behaviour and performance. Improving access to financial markets and confidence in Belgian financial markets is also the main motivation behind the recent changes in corporate law. The modifications are confined to some of the more urgent problems. Other issues concerning the functioning of the financial system in Belgium have been tackled in a wider ranging law of the same date, dealing with the organisation of financial markets and the supervision of the financial sector.[9]

The new Belgian corporate law can be seen as the immediate result of the Government Commission on Corporate Governance.[10] It also puts into effect some of the recommendations formulated in the late nineties by the Commission on Corporate Governance set up by the Brussels Stock Exchange, the Belgian Enterprise Federation and the Banking and Finance Commission.

These initiatives have to be seen in the perspective of the growing awareness of corporate governance issues worldwide. One may refer to the 1999 OECD report on corporate governance setting international standards with regard to the protection of shareholders rights, the equitable treatment of shareholders, the role of stakeholders, disclosure and transparency, and the responsibilities of the board.

The recent modernisation of Belgian corporate law therefore has to be evaluated in this light. At the same time, however, one should also take into account specific characteristics of the Belgian situation. Due to historical, economic and cultural differences, countries have adopted different corporate governance approaches. Many countries have specific rules, regulations and guidelines on corporate governance.[11] Given the high concentration of ownership, i.e. blockholdings by "reference" shareholders in Belgian stock listed companies, the focus of the changes in the new Belgian law is on issues of transparency, integrity and responsibility towards other shareholders.

5.2 The new legislative framework

In the aftermath of the Enron case and other accounting scandals, Belgium has passed legislation applicable to the external auditors of both listed and non-listed companies, in order to guarantee their independence and strengthen their credibility. A cooling-off period of two years is required before auditors are allowed to accept other functions within the audited company or its affiliates. They may not perform for the audited firm a number of non-audit services which could impair their independence. A list of these activities is supplied for matters of clarification. Other ancillary services performed by the auditors for the audited firm are limited, in the case of listed companies, to an amount equal to the value of the audit services. Some exceptions to the latter rule may be granted subject to a special procedure. A new independent external committee is to be installed in order to provide guidance and supervision in these matters.

These new procedures for auditors are in line with regulatory measures in other countries. They correspond to good corporate governance practices requiring that the audit should be conducted by independent auditors in order to provide an external and objective assurance on the way in which financial statements have been prepared and presented (see principle IV on disclosure and transparency of the 1999 OECD report).

The major part of the new law, however, covers the functioning of the Board of Directors. In order to improve the effectiveness of decision-making in the corporation, a legal framework is created for installing a Committee of Management Executives. It attempts to clarify existing ambiguities in corporate law with regard to the role of management by regulating the delegation of authority. The new law provides the option of installing a separate Management Committee consisting of executive members of the Board of Directors and other management executives. The supervision of the Committee as well as matters of general policy are to

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remain within the exclusive competence of the Board of Directors.

These new provisions cater for the need to clarify the division of responsibilities at the head of the company. According to international standards, the corporate governance framework should ensure the strategic guidance of the company and the effective monitoring of the board (see principle V on the responsibilities of the Board in the 1999 OECD report). As the board should be able to exercise objective judgement on corporate affairs independently from management, in particular, the introduction of this particular two-tier board regime may be a step in the right direction.

The fact that the law recognises the functioning of internal committees could further improve the operation of the Board of Directors. The law stipulates that these committees operate in an advisory capacity under the responsibility of the Board. However, it only makes explicit provision for an audit committee. This committee is derived from the framework of supervision over the independence of external auditors with regard to ancillary services, where a specific task may be given to an audit committee. Other committees are not explicitly mentioned, but obviously companies have the option within this framework of installing other committees such as an appointments committee and a remuneration committee. Such specialised committees are widely regarded as good practice in corporate governance, as specialisation may help the board to perform better in fulfilling its key responsibilities.

The new law does not go so far as to specifically address the composition of the Board of Directors, e.g. the number of directors, the proportion of non-executive directors etc. This is obviously left to self-regulation and codes of conduct relating to corporate governance. However, the new legal framework for dealing with conflicts of interest implies that the Board of Directors should contain at least three independent directors. Moreover, it explicitly proposes several criteria which must be met in order to qualify as an independent director.

In the case of listed companies, the new law gives a Committee of at least three independent directors a specific role in dealing with conflicts of interest within large groups. Whereas the former rules on fair decision-making and transparency proved to be ambiguous in practice, the new law provides for a specific transparency procedure for transactions between one company and other companies belonging to the same group (with the exception of non-listed subsidiaries). When transactions are not conducted "at arm's length", it may involve a transfer of wealth to other group companies, and that may harm the interests of certain groups

of shareholders. The committee of independent directors relying on a report by an independent expert has to give advice to the Board on transactions that may involve such conflicts of interest.

The Belgian procedure which relies on independent directors may appear to be somewhat more stringent than international standards, which stipulate that boards should consider assigning a sufficient number of non-executive board members capable of exercising independent judgement to tasks where there is a potential conflict of interest (see OECD principles V on the responsibilities of the Board). The Belgian situation, however, is also a special case, as corporate structures may be more conducive to the occurrence of such conflicts of interest. Most Belgian companies listed on the stock exchange have a concentrated ownership. A few dominant shareholders quite often exert their control by a system of shareholding cascades or pyramidal ownership structures through a system of business groups.[12] This explains why corporate governance concerns in Belgium are focusing more on the influence of such powerful control blocks.

Finally, some minor changes to corporate law aim at facilitating participation in the general meetings of shareholders. The new procedures are mainly inspired by the concern in corporate governance to increase the importance of the annual general meetings of shareholders. Shareholders, and in particular foreign institutional investors, are not playing an active role as delegated monitors in overseeing company management and performance. The new law gives listed companies the option of lengthening the periods of notice for announcing and convening general meetings of shareholders. Also, to determine the shareholders' rights to participate in the general meetings, companies may introduce a "registration/record date system" comparable to what already exists in Anglo-Saxon countries. For general meetings of shareholders, the law also offers non-listed companies the option of following a written procedure. This simplified procedure may be of interest not only for small companies, but also for subsidiaries within groups of companies.

The changes that are introduced already go some way in the direction of international standards. One may refer to the so-called "Winter Report" that addresses the problem of cross-border shareholdings in the EU, in particular: the entitlements to control the voting rights, the determination of the time at which one has to be

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(12) See Becht, M., A. Chapelle and L. Renneboorg (2001) "Shareholding Cascades: The Separation of Ownership and Control in Belgium", in The Control of Corporate Europe, ed. by F. Barca and M. Becht, Oxford University Press, pp. 71-105.

shareholder in order to be able to vote, and the disclosure of information.[13] The new arrangement determining a registration date facilitates the participation of (foreign) institutional investors in the general meetings of shareholders. Finally, the Belgian legislator recognises that there is a need for a more thorough review of the functioning of the general meetings of shareholders; this will be tackled later.

5.3 Broader issues and challenges

Whereas the recent changes to corporate law address some of the more urgent problems regarding corporate governance, the legislator is aware of the need for additional legislative work in several areas in the longer term.[14] In this context, the question arises whether corporate governance reform should not be assigned to the EU legislative level.

Company law is often considered to be an essential part of national economic and social traditions. Hence, harmonisation measures have been delayed for a long time on account of the subsidiarity principle.[15] Moreover, the introduction of good corporate governance practices is not necessarily a legislative matter, but might be better left to self-regulation by formulating codes of conduct. Such an initiative then should be taken by the European corporate world.

However, the creation of a single European market relies very much upon the removal of legal barriers by a European approach to corporate governance. In line with the single market approach, based upon a free establishment for companies, mutual recognition of regulation, and the adoption of essential standards, key harmonisation proposals have already been launched, e.g. on cross-border mergers, take-over bid procedures, and in particular on a European Company statute (Societas Europa). Also, more specific EU legislation on financial market integration, such as the legislation on capital market transparency, and insider dealings, has a strong impact on the convergence of corporate governance standards.[16]

The introduction of good corporate governance practices may present varying challenges for different EU countries. Some authors argue that countries having adopted the French civil law system appear to be confronted with certain weaknesses in the protection of the rights of shareholders and other creditors.[17]

Corporate governance practices are also to be looked upon as being part of a system that is characterised by path dependence. Due to crucial complementarities in the elements of a system, a partial change as e.g. in

creditor rights, does not necessarily lead to an overall improvement.[18] In this respect, a more general distinction is to be made between an insider system of corporate control, which is typical for the European continent, and the Anglo-Saxon outsider system.

Belgium belongs to the group of French civil law countries having adopted the insider system. Fewer companies are listed on the stock exchange and ownership is highly concentrated. This private control bias by owners helps to reduce agency problems that arise from the separation of ownership and control. Such a management control bias is typical for the Anglo-Saxon outsider system of corporate control. In the Belgian corporate structure, however, interests of holders of large voting blocks[19] may diverge from those of minority shareholders, which creates other agency problems.

Specific issues are also raised by groups of companies with a pyramidal structure. According to the definition adopted by a High Level Group of Company Law Experts appointed by the EU Commission to present a report on "A modern regulatory framework for company law in Europe", pyramids are chains of holding companies with the ultimate control based on a small total investment thanks to the extensive use of minority shareholders. This High Level Group has pointed out in its report that groups of companies, frequent in most, if not all, Member States, are to be seen as a legitimate way of doing business, but that they may present specific risks for shareholders and creditors in various ways.

In its recent communication to the Council and the European Parliament on "Modernising Company Law and Enhancing Corporate Governance in the European Union – A Plan to Move Forward", the Commission has endorsed this view. It is also suggesting that particular problems should be addressed through specific

(13) See Winter, J. et al. (2002), "Cross-border Voting in Europe", Final Report of the Expert Group on Cross-border voting in Europe.

(14) An explanatory memorandum added to the corporate governance law already mentions some areas: e.g., director's duties of loyalty to the company, accounting rules for financial consolidation, abuse of inside information by financial portfolio companies, etc.

(15) See Lannoo, K. (1999), "A European Perspective on Corporate Governance", Journal of Common Market Studies 37 (2), pp. 269-294.

(16) With respect to cross-border shareholding in the EU, the Winter Report further qualifies the issues involved. EU regulation is required to ensure that in all member states the same rule should determine who is entitled to control the voting rights. It is, however, not necessary nor opportune to harmonise company law as to determine at what time one has to be shareholder in order to have the voting right. With respect to information, the EU can limit its role to ensuring that member states enable listed companies to communicate with their shareholders via electronic means.

(17) See La Porta, R., F. Lopes de Silvanes, A. S Shleifer and R. Vishny (1998), "Law and Finance", Journal of Political Economy, 106 (6), pp. 1113-1155.

(18) See Schmidt, R.H. and G. Spindler (2002), "Path Dependence, Corporate Governance and Complementarity", International Finance 5 (3), pp. 311-333.

(19) See Becht, M., A. Chapelle and L. Renneboog (2001), "Shareholding Cascades: The Separation of Ownership and Control in Belgium" in The Control of Corporate Europe, ed. by F. Barca, M. Becht, Oxford University Press, pp. 71-105.

provisions concerning, in particular, information and disclosure with regard to the group's structure, implementation of a co-ordinated group policy protecting the interest of creditors and balancing burdens and advantages for shareholders, as well as due consideration of the characteristics of a pyramidal group before admitting it to listing on a stock exchange.

The outsider corporate control system, being dominant in the US and the UK, is characterised by dispersed ownership, strong protection for minority shareholders and performance-based contracts for top management. This Anglo-Saxon model of corporate governance is often perceived to be adequate in solving the ubiquitous principal agent problems in large companies. It also tunes in to the increasing role of financial markets due to globalisation and the growing importance of institutional money in the external financing of the growth of companies. Hence, conventional wisdom holds that the need to achieve an integrated single market in the EU involves increasing convergence of global corporate governance principles and practices. Recently,

however, it is also being argued that path dependence and the complementarity of elements within national corporate governance systems make a rapid convergence towards an EU best corporate governance system not very likely.[20]

From a supervisory perspective, good corporate governance is particularly important in financial institutions and, especially in banks. As emphasised by the Basel Committee on Banking Supervision [21], "banking supervisors have a strong interest in insuring that there is effective corporate governance at every banking organisation... Put plainly, sound corporate governance makes the work of supervisors infinitely easier".

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(20) Further implications, according to Schmidt, R.H. and G. Spindler (2002), are that any substantive change would have to be a very comprehensive one, requiring a supranational government. As, due to path dependence in the evolution of institutions, history and politics may matter more than pure economic efficiency, it might be not economic efficiency, but the ability to cope with a crisis that is the factor that determines the winner in the battle of systems (See Schmidt, R.H. and G. Spindler (2002), "Path Dependence, Corporate Governance and Complementarity", International Finance 5 (3), pp. 311-333).

(21) See Basel Committee on Banking Supervision (September 1999), "Enhancing Corpoater Governance for Banking Organisations".

Statistical annex

TABLE 1   NUMBER OF BELGIAN CREDIT INSTITUTIONS

	1996	1997	1998	1999	2000	2001	2002
Credit institutions governed by Belgian law with Belgian majority shareholding	68	63	54	48	45	38	36
Credit institutions governed by Belgian law with foreign majority shareholding	33	31	27	27	27	29	29
– EU Member States	18	16	17	21	21	22	21
– other States	15	15	10	6	6	7	8
Belgian branches of foreign credit institutions	40	40	39	44	47	46	46
– EU Member States	25	25	25	30	34	35	36
– other States	15	15	14	14	13	11	10
Total	**141**	**134**	**120**	**119**	**119**	**113**	**111**

Source : BFC.

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

	1996	1997	1998	1999	2000	2001	2002
Large credit institutions (including their subsidiaries)	20	21	18	17	15	14	12
Belgian financial groups	5	4	6	5	7	5	5
Financial groups from other EU States	17	16	18	21	19	18	19
Financial groups from third countries	14	14	8	5	6	7	5
Belgian or foreign non-financial groups	9	8	4	3	3	3	4
Family structure	13	12	14	13	10	8	9
Professional credit associations	17	12	11	9	9	9 [1]	9 [1]
Public authorities	4	2	2	2	1	1	1
Consortium structure	–	–	–	–	2	2	1
Limited partnerships	2	3	–	–	–	–	–
Cooperative companies	–	2	–	–	–	–	–
Total	**101**	**94**	**81**	**75**	**72**	**67**	**65**

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

TABLE 3 KEY FIGURES FOR THE BELGIAN BANKING SECTOR [1]

(Data on a consolidated basis)

	1996	1997	1998	1999	2000	2001	2002
A. Large banking groups							
Balance sheet total (billions of euros)	549.9	633.4	699.1	797.9	840.6	940.7	907.5
Customers' holdings (billions of euros)	312.5	341.6	380.5	415.2	440.5	477.0	465.4
Loans and advances to customers (billions of euros)	200.8	226.6	267.4	306.7	352.4	374.8	381.2
Off-balance-sheet forward operations (billions of euros)	998.6	1,751.7	1,870.9	2,377.3	2,451.7	3,113.6	3,639.3
Assets and deposits in trust (billions of euros)	319.8	406.3	586.2	647.7	927.6	961.7	932.7
Risk asset ratio (p.c.)	11.5	11.3	11.1	11.8	11.7	12.7	12.8
Net after tax results (billions of euros)	1.6	1.9	2.0	3.2	4.7	3.4	2.9
Return on average assets (p.c.)	0.3	0.3	0.3	0.5	0.6	0.4	0.4
Return on average equity (p.c.)	13.1	13.5	11.7	18.7	22.7	15.0	12.6
Cost-income ratio (p.c.)	66.7	68.1	64.5	69.3	71.5	72.9	73.2
Average yield on assets (p.c.)	6.1	5.8	5.6	5.7	5.9	5.8	5.0
Average cost of funding (p.c.)	4.6	4.5	4.3	4.3	4.7	4.5	3.5
Interest margin (p.c.)	1.5	1.3	1.3	1.4	1.3	1.4	1.5
B. Total of Belgian credit institutions							
Balance sheet total (billions of euros)	749.4	813.7	854.6	926.7	971.3	1,063.7	1,024.6
Customers' holdings (billions of euros)	378.7	403.1	444.2	477.4	504.2	545.0	535.3
Loans and advances to customers (billions of euros)	241.2	265.4	303.8	342.9	392.7	416.3	421.3
Off-balance-sheet forward operations (billions of euros)	1,533.7	2,107.2	2,116.3	2,507.2	2,611.5	3,237.5	4,297.7
Assets and deposits in trust (billions of euros)	2,173.3	2,715.8	3,063.3	4,197.2	5,429.7	9,478.0	12,020.3
Risk asset ratio (p.c.) [2]	11.8	11.5	11.3	11.9	11.9	12.9	13.1
Net after tax results (billions of euros)	2.0	2.1	2.6	3.7	5.5	3.8	3.2
Return on average assets (p.c.)	0.3	0.3	0.3	0.4	0.6	0.4	0.4
Return on average equity (p.c.) [2]	11.5	12.0	11.0	17.1	20.4	13.7	11.8
Cost-income ratio (p.c.)	68.8	69.2	65.8	69.9	72.2	74.1	74.7
Average yield on assets (p.c.)	6.0	5.7	5.6	5.6	5.9	5.8	4.9
Average cost of funding (p.c.)	4.6	4.5	4.4	4.2	4.6	4.4	3.4
Interest margin (p.c.)	1.4	1.2	1.3	1.4	1.3	1.4	1.5

Source : BFC.

(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 euros)

	1996	1997	1998	1999	2000	2001	2002
Assets							
Interbank assets	242.6	253.2	232.6	222.5	198.4	219.9	214.8
Loans and advances to customers	241.2	265.4	303.8	342.9	392.7	416.3	421.3
Securities and other negotiable instruments	224.9	248.8	264.6	294.9	296.5	316.9	291.6
Fixed assets	8.8	10.5	12.0	14.1	15.8	18.8	18.2
Other	31.9	35.8	41.7	52.4	68.0	91.8	78.6
Liabilities							
Interbank liabilities	283.3	303.1	289.6	304.9	286.8	284.8	254.9
Customers' holdings	378.7	403.1	444.2	477.4	504.2	545.0	535.3
– deposits	256.9	279.7	327.1	350.7	369.0	411.8	406.6
– bank bonds and other debt securities	121.8	123.4	117.1	126.7	135.3	133.2	128.8
Subordinated debts	12.1	14.8	16.8	20.4	24.0	27.5	25.8
Own funds	17.7	19.8	22.7	23.1	26.9	28.9	30.5
Other	57.7	73.0	81.4	100.9	129.4	177.5	178.0
Balance sheet total	**749.4**	**813.7**	**854.6**	**926.7**	**971.3**	**1,063.7**	**1,024.6**

Source : BFC.
(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 euros)

	1996	1997	1998	1999	2000	2001	2002
Liabilities with an original maturity of more than one year							
Term deposits	8.2	9.5	9.5	10.3	10.5	11.2	10.5
Bank bonds	81.4	72.9	65.4	60.0	57.5	53.0	51.9
Other customers' holdings [2]	7.6	7.7	8.8	8.7	5.6	5.2	4.8
Sub-total	*97.1*	*90.1*	*83.6*	*79.0*	*73.5*	*69.4*	*67.3*
Liabilities with an original maturity of up to one year							
Saving deposits	80.9	89.0	93.7	98.4	92.5	98.5	110.5
Sight deposits	36.9	40.2	48.0	52.9	57.0	60.1	61.9
Deposits with a term							
of up to one month	17.5	20.6	20.6	20.1	18.2	21.9	22.5
of more than one month up to one year	24.6	21.9	24.8	28.8	30.4	33.3	29.8
Bank bonds with a term of one year	3.0	2.1	1.6	1.5	1.5	1.9	1.0
Other customers' holdings [2]	5.1	5.2	5.6	8.2	10.6	7.8	8.1
Sub-total	*168.0*	*179.0*	*194.2*	*209.9*	*210.3*	*223.6*	*233.9*
Total liabilities collected in Belgium	**265.2**	**269.1**	**277.9**	**288.8**	**283.8**	**293.0**	**301.2**

Source : BFC.

(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 euros)

	1996	1997	1998	1999	2000	2001	2002
Installment loans	9.7	9.9	12.0	13.4	13.7	13.9	14.3
Mortgage loans [2]	45.8	52.0	63.1	74.4	79.5	85.0	93.6
Term loans	138.8	147.3	162.7	182.4	209.7	233.0	242.2
Current account advances	22.2	23.4	32.4	35.7	40.6	36.4	34.0
Trade bills and acceptance credits	21.6	27.8	27.8	29.2	38.2	34.5	26.5
Other	3.1	4.8	5.8	7.9	11.0	13.5	10.7
Total	241.2	265.4	303.8	342.9	392.7	416.3	421.3
of which on Belgium	176.9	184.1	192.6	209.1	218.0	220.5	219.3
of which on foreign countries	64.4	81.2	111.2	133.7	174.7	195.8	201.9

Source : BFC.
(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 euros)

	1996	1997	1998	1999	2000	2001	2002
Total investment portfolio	**206**	**225**	**243**	**268**	**254**	**265**	**239**
Government securities portfolio	*156*	*162*	*168*	*175*	*154*	*168*	*149*
Long-term Belgian government securities	107	107	111	101	86	76	67
Short-term Belgian government securities	23	19	20	11	7	7	8
Long-term foreign government securities	25	35	34	48	54	79	72
Short-term foreign government securities	1	1	2	15	7	6	3
Securities of credit institutions	*25*	*29*	*29*	*43*	*44*	*41*	*34*
Securities of other companies	*23*	*31*	*42*	*45*	*49*	*50*	*50*
Non-interest-bearing securities	*2*	*3*	*4*	*5*	*6*	*6*	*5*
Total trading portfolio	**19**	**24**	**22**	**27**	**43**	**52**	**52**
Government securities portfolio	*16*	*17*	*13*	*16*	*21*	*23*	*23*
Long-term Belgian government securities	7	6	6	5	5	4	5
Short-term Belgian government securities	4	4	2	4	5	4	3
Long-term foreign government securities	5	7	4	6	11	14	11
Short-term foreign government securities	0	0	0	0	1	2	3
Securities of credit institutions	*1*	*3*	*2*	*2*	*2*	*6*	*8*
Securities of other companies	*1*	*2*	*3*	*4*	*8*	*10*	*13*
Non-interest-bearing securities	*1*	*1*	*3*	*6*	*11*	*12*	*8*
Total portfolio	**225**	**249**	**265**	**295**	**296**	**317**	**291**

Source : BFC.
(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 euros)

	1996	1997	1998	1999	2000	2001	2002
Foreign exchange							
Forward exchange operations	541	598	536	328	268	266	297
Currency futures	0	0	1	1	1	1	0
Forward exchange rate contracts	1	1	12	0	0	3	6
Interest and currency swaps	36	48	46	47	51	57	61
Currency options	26	35	31	26	38	41	69
Sub-total	*603*	*682*	*626*	*402*	*358*	*368*	*432*
Interest rates							
Interest rate contracts	185	290	170	230	134	131	268
Interest rate futures	52	77	71	76	52	74	86
Deposit contracts	6	10	5	2	3	5	1
Interest rate swaps	615	951	1,010	1,525	1,507	1,880	2,528
Interest rate options	49	65	120	174	375	550	743
Sub-total	*906*	*1,393*	*1,376*	*2,006*	*2,071*	*2,640*	*3,627*
Others							
Other forward contracts, futures and swaps	12	10	55	25	25	29	23
Other options	12	22	60	73	157	200	215
Sub-total	*24*	*31*	*114*	*98*	*181*	*229*	*238*
Total	**1,534**	**2,107**	**2,116**	**2,507**	**2,611**	**3,237**	**4,297**

Source: BFC.
(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 euros, unless otherwise stated)

	1996	1997	1998	1999	2000	2001	2002
Own funds sensu stricto ("tier 1 capital")[1]	18.86	21.55	25.73	28.62	30.62	33.20	34.20
of which hybrid instruments	0.00	0.00	0.00	1.69	1.69	2.75	2.70
Additional items of own funds for credit and market risks ("tier 2 capital")	10.76	12.12	13.70	18.14	20.83	22.32	20.50
of which upper tier 2 [2]	3.68	4.35	3.70	6.29	6.98	7.20	5.90
of which lower tier 2 [3]	7.08	7.82	9.97	11.85	13.86	15.12	14.60
Deduction of participations	–1.05	–1.84	–1.58	–2.73	–3.80	–3.94	–3.70
Total	*28.56*	*31.83*	*37.85*	*44.03*	*47.66*	*51.58*	*50.90*
Additional items of own funds for market risks only ("tier 3 capital") [4]	0.26	0.77	0.99	1.04	1.64	2.56	1.90
Risk asset ratio (p.c.)	**11.8**	**11.5**	**11.3**	**11.9**	**11.9**	**12.9**	**13.1**

Source : BFC.

(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 euros)

	1996	1997	1998	1999	2000	2001	2002
Net interest income	9.79	9.61	10.31	11.40	11.73	12.26	12.67
Investment income other than net interest income [2]	2.06	2.43	3.50	2.97	3.30	3.52	2.73
Other income [3]	3.94	4.35	5.58	7.73	10.44	10.01	9.19
Banking income	15.80	16.38	19.39	22.10	25.47	25.79	24.59
Operating expenses (–) [4]	10.86	11.33	12.76	15.46	18.38	19.09	18.36
(of which personnel expenses)	(5.40)	(5.57)	(5.95)	(6.88)	(7.68)	(8.17)	(8.13)
Gross operating results	4.94	5.05	6.63	6.64	7.09	6.70	6.24
Value adjustments (–)	1.77	2.11	2.29	1.67	1.51	1.57	2.17
Exceptional results	–0.09	0.45	–0.18	0.06	1.97	0.15	0.54
Income taxes and transfers (–)	1.06	1.24	1.43	1.24	1.98	1.47	1.07
Portion of the result of undertakings included in the consolidated accounts according to the equity method	0.08	0.11	0.05	0.19	0.38	0.34	0.01
Third-party interest in the result of consolidated subsidiaries (–)	0.14	0.15	0.22	0.30	0.40	0.38	0.35
Consolidated results [5]	**1.96**	**2.11**	**2.56**	**3.68**	**5.55**	**3.77**	**3.19**

Source: BFC.

(1) Credit institutions governed by Belgian law and branches of foreign credit institutions.
(2) Income from equity 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 KEY FIGURES OF STOCKBROKING FIRMS
(Data on a company basis)

	1996	1997	1998	1999	2000	2001	2002
Number of companies	62	57	52	49	46	43	40
of which with a majority of institutional shareholders	12	10	9	10	12	11	12
Securities portfolio for own account (billions of euros)[1][3]	0.64	1.10	1.21	7.61	7.71	10.95	12.00
– equity	0.20	0.49	0.65	1.91	2.47	1.96	1.67
– debt securities	0.38	0.47	0.40	0.28	0.46	1.55	1.80
– other financial instruments[2]	0.06	0.14	0.16	5.42	4.78	7.44	8.53
Balance sheet total (billions of euros)[3]	1.86	2.35	2.73	6.59	6.94	9.71	9.88
Deposits in trust (billions of euros)[4]	0.33	0.56	0.82	0.99	1.16	1.17	0.90
Securities in trust (billions of euros)	4.95	8.04	10.00	15.53	16.15	20.70	19.73
Regulatory own funds (billions of euros)	0.14	0.15	0.17	0.34	0.45	0.38	0.33
Risk asset ratio (p.c.)	24.30	20.20	24.30	20.80	31.40	22.00	17.70
Income (billions of euros)[3]	0.19	0.26	0.33	0.50	0.50	0.28	0.34
– fees and commissions	0.12	0.15	0.18	0.18	0.23	0.12	0.10
– on trading for own account	0.05	0.07	0.09	0.26	0.23	0.11	0.19
Operating expenses (billions of euros)[3]	0.15	0.17	0.19	0.21	0.27	0.29	0.35
Net after tax results (billions of euros)[3]	0.04	0.09	0.12	0.28	0.23	0.02	0.00
Return on average equity (p.c.)[5]	26.50	49.10	60.80	58.60	31.80	2.90	0.60

Source: BFC.
(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 12   KEY FIGURES OF PORTFOLIO MANAGEMENT COMPANIES
(Data on a company basis)

	1996	1997	1998	1999	2000	2001	2002
Number of companies	15	16	23	27	31	34	33
of which with a majority of institutional shareholders	2	3	8	10	13	17	16
Assets under management (billions of euros)	13.29	15.64	58.36	99.64	174.09	144.19	135.63 [1]
Balance sheet total (billions of euros)	0.01	0.02	0.08	0.37	0.66	0.67	0.77
Own funds (billions of euros)	0.01	0.01	0.03	0.25	0.40	0.42	0.43
Income (billions of euros)	0.01	0.01	0.07	0.20	0.50	0.55	0.58
Operating expenses (billions of euros)	0.01	0.01	0.04	0.11	0.33	0.37	0.27
Net after tax results (billions of euros)	0.00	0.00	0.02	0.05	0.12	0.13	0.22
Return on average equity (p.c.)	15.50	38.90	79.10	21.50	30.00	31.50	50.20

Source : BFC.
(1) Assets under management on a consolidated basis amounted to EUR 197.1 billion as of 31-12-2002 (EUR 200.9 billion as of 31-12-2001).

TABLE 13 GROSS PUBLIC ISSUES OF SECURITIES IN BELGIUM

(Billions of euros)

	1996	1997	1998	1999	2000	2001	2002
1. Shares							
Belgian companies	1.65	1.58	1.05	2.01	7.03	0.19	0.35
Foreign companies	0.01	0.02	0.10	0.17	0.78	0.06	0.12
Total	*1.67*	*1.60*	*1.15*	*2.18*	*7.81*	*0.25*	*0.47*
2. Fixed income securities							
2.1 Bonds	*0.74*	*1.30*	*1.66*	*2.49*	*0.18*	*0.06*	*0.38*
Belgian companies	0.68	0.94	0.66	0.28	0.11	0.00	0.01
Foreign companies	0.06	0.35	1.00	2.21	0.07	0.06	0.37
2.2 Fixed income securities with capital at risk [1]					*3.19*	*1.34*	*1.50*
Belgian companies					0.14	0.11	0.00
Foreign companies					3.06	1.23	1.50
2.3 Total	*0.74*	*1.30*	*1.66*	*2.49*	*3.38*	*1.40*	*1.88*
3. Subordinated debt issued by credit institutions	**0.67**	**0.92**	**0.57**	**2.20**	**1.79**	**1.16**	**0.05**
4. Government debt							
4.1 Linear bonds (OLOs)	19.50	17.00	23.30	28.30	32.10	26.00	26.10
4.2 Other bonds and notes	1.11	1.18	1.59	1.05	1.22	1.04	1.30
4.3 Treasury certificates [2]	3.88	0.55	–5.83	–6.81	–3.48	1.38	0.06

Source: BFC (except for government debt issues, 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 14   BELGIAN UNDERTAKINGS FOR COLLECTIVE INVESTMENT

	1996	1997	1998	1999	2000	2001	2002-06
A. Number per legal form (end of period)							
Investment companies	64	79	90	96	103	108	109
Number of compartments	*431*	*636*	*1,139*	*1,499*	*1,851*	*1,951*	*1,977*
Investment funds	7	6	12	12	14	16	16
Pension savings funds [1]	13	13	12	12	11	10	10
Real estate UCIs [2]	3	3	8	13	13	12	11
Undertakings for investment in receivables [3]	2	7	9	9	9	9	10
Venture capital UCIs [4]			1	1	1	2	2
Total	**89**	**108**	**132**	**143**	**151**	**157**	**158**
B. Assets (billions of euros) [5]							
1. Net asset value end of preceding year	18.71	23.42	33.13	51.80	70.34	83.51	88.32
2. Subscriptions	6.73	12.05	19.92	24.28	33.65	26.43	10.93
3. Redemptions	4.86	6.66	8.45	11.34	16.58	14.53	7.28
4. Net amounts invested (4 = 2 − 3)	**1.87**	**5.38**	**11.47**	**12.94**	**17.08**	**11.90**	**3.65**
5. Costs	0.29	0.37	0.55	0.73	1.08	1.06	0.52
6. Capital gains or losses	3.13	4.70	7.76	6.32	−2.82	−6.03	−7.32
7. Net asset value end of period (7 = 1 + 4 − 5 + 6)	**23.42**	**33.13**	**51.80**	**70.34**	**83.51**	**88.32**	**84.12**

Source: BFC.
(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) Flow data for the first half of 2002 are not annualised.

TABLE 15   FOREIGN UNDERTAKINGS FOR COLLECTIVE INVESTMENT DISTRIBUTED IN BELGIUM

	1997	1998	1999	2000	2001	2002-06
A. Number of undertakings (end of period)						
per legal form						
Investment companies	165	177	178	188	198	201
Number of compartments	*1,254*	*1,487*	*1,721*	*1,901*	*2,029*	*2,074*
Investment funds	67	73	79	76	76	76
	232	**250**	**257**	**264**	**274**	**277**
per category						
Undertakings with UCIT-passport	188	206	219	227	239	242
Number of compartments	*1,036*	*1,282*	*1,530*	*1,732*	*1,880*	*1,922*
Undertakings without UCIT-passport	44	44	38	37	35	35
Number of compartments	*218*	*205*	*191*	*169*	*149*	*152*
	232	**250**	**257**	**264**	**274**	**277**
B. Net amounts invested (billions of euros)[1]						
Subscriptions in Belgium						
Investment companies	9.05	10.69	12.95	14.46	9.88	5.01
Investment funds	0.16	0.11	0.19	0.12	0.05	0.00
	9.21	**10.80**	**13.14**	**14.57**	**9.92**	**5.01**
Redemptions in Belgium						
Investment companies	7.25	9.15	9.66	15.34	10.70	5.92
Investment funds	0.12	0.09	0.11	0.11	0.04	0.00
	7.37	**9.24**	**9.78**	**15.45**	**10.73**	**5.92**
Net amounts invested in Belgium						
Investment companies	1.81	1.54	3.29	-0.88	-0.82	-0.92
Investment funds	0.04	0.02	0.07	0.01	0.01	0.00
	1.85	**1.56**	**3.36**	**-0.88**	**-0.81**	**-0.91**

Source : BFC.
(1) Flow data for the first half of 2002 are not annualised.

TABLE 16 BREAKDOWN OF UNDERTAKINGS FOR COLLECTIVE INVESTMENT DISTRIBUTED IN BELGIUM ACCORDING TO INVESTMENT STRATEGY

(Billions of euros)

	1996	1997	1998	1999	2000	2001	2002
Bonds	24.35	27.50	30.63	30.25	29.88	32.83	31.22
Medium term investments	2.62	1.83	1.41	1.34	1.04	1.44	1.75
Monetary investments	8.00	6.15	4.86	4.56	3.80	5.03	6.29
Equity	6.56	10.44	18.55	31.98	40.26	37.36	24.71
Index with capital protection	4.01	9.95	19.77	27.01	27.63	29.20	31.77
Mixed	4.81	7.33	12.30	17.76	24.65	27.00	21.95
Pension savings funds	4.60	5.81	7.98	7.95	7.68	7.41	6.40
Real estate	0.90	1.17	2.35	3.14	3.05	3.27	3.39
Venture capital	0.00	0.00	0.06	0.05	0.13	0.13	0.07
Miscellaneous	0.01	0.01	0.03	0.04	0.10	0.03	0.02
Total	55.87	70.19	97.94	124.08	138.22	143.70	127.57

Source : BVICB.

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Thematic Articles

New Structure for Clearing and Settlement Systems in the EU

Steven Van Cauwenberge

Introduction

The European Union (EU) has set itself the strategic goal of integrating its capital markets by 2005. Until recently, priority was given to streamlining trading operations. It has now been generally recognised that post-trade processing, i.e. the clearing and settlement of securities trades, is also an important strategic element in the integration of capital markets. For a given level of trading costs, lower post-trade transaction costs can be expected to increase market liquidity and thus to provide corporates with easier access to securities markets.

With the growing number of cross-border trades, concern has arisen about the overly fragmented nature of the EU securities clearing and settlement industry. Several studies have shown that the settling of cross-border trades within the EU is several times more expensive than the handling of a local trade between local participants[1].

Although there is today a general consensus that the solution should be market driven, public authorities must join in this debate. First, the organisation of an efficient infrastructure for settling cross-border trades throughout the EU will require the removal of existing barriers to competition. Second, cross-border settlements do raise specific financial stability issues. They are more complex and potentially more risky. Moreover, when the settlement of trades becomes more concentrated, overseers and supervisors need to keep a closer eye on the system involved, as any disruption could have a bigger systemic impact.

The debate on the future of the securities clearing and settlement industry is often animated, with players defending their own interests. Some custodians argue that (International) Central Securities Depositories ((I)CSDs) should not provide settlement services except for limited securities safekeeping and settlement functions, thus de facto advocating the splitting off of the settlement-enhancing banking functions exercised by these entities. Exchanges that own the settlement system through which their trades pass are said to be liable to let their own interests prevail over those of the settlement system users. In this paper we will try to discuss the legitimacy of such statements and see if adequate solutions are available for the issues raised.

This note is structured as follows. The first chapter looks at the current organisation of post-trade processing functions and identifies which institutions are involved in the clearing and settlement of both domestic and cross-border trades. The forces for change in the actual EU clearing and settlement environment are also described. Chapter two discusses efficiency criteria for an efficient EU securities clearing and settlement industry while chapter three looks at soundness criteria with regard to the industry. Finally, a conclusion is presented.
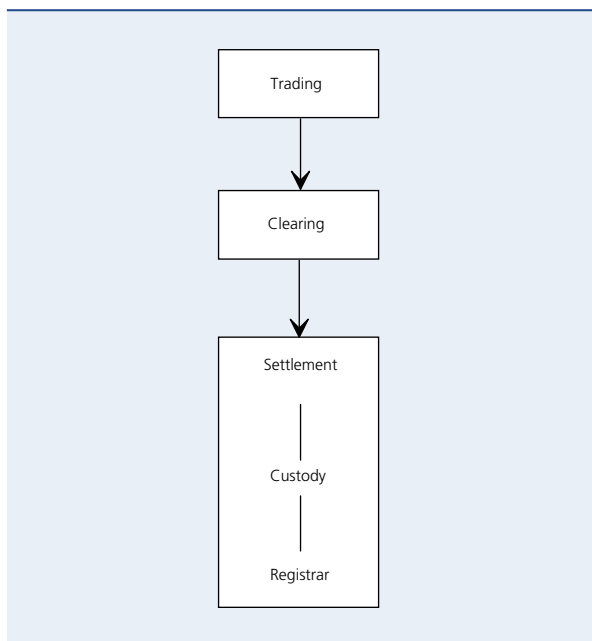
1. Current organisation of post-trade processing

1.1 Market functions

The processing chain of a securities transaction involves several steps (Chart 1). After the conclusion of a transaction, a number of post-trade operations takes place. They

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(1) See e.g. Lannoo, K. and Levin, M. (2001).

CHART 1   THE SECURITIES TRADE PROCESSING CHAIN

```
┌─────────────────────┐
│      Trading        │
└─────────────────────┘
           │
           ▼
┌─────────────────────┐
│      Clearing       │
└─────────────────────┘
           │
           ▼
┌─────────────────────┐
│                     │
│     Settlement      │
│         │           │
│         │           │
│      Custody        │
│         │           │
│         │           │
│      Registrar      │
│                     │
└─────────────────────┘
```

Source : NBB.

always involve settlement, but an intermediary phase, the interposition of a central counterparty, might also be foreseen. Settlement presupposes the holding of cash and securities, the latter requiring a registrar function.

1.1.1 Trading

A securities trade is concluded between a buyer and a seller by agreeing on the security's price and the volume sold. The trade can be executed in an exchange, a system that is designed to optimise the price-discovery process and to concentrate liquidity, and where the trading usually takes place anonymously. Sometimes, however, a market which functions bilaterally over the counter (OTC) proves to be the most effective solution. In both cases, buyers and sellers can act for their own account or for their client's account.

1.1.2 Clearing

The clearing of a trade generally means that the obligations of the buyer and the seller are established. The counterparty risk that the buyer and seller incur vis-à-vis each other can be standardised. To this end, a clearing house may interpose itself as a central counterparty (CCP) after the conclusion of the trade, becoming the buyer counterparty for the seller and the seller counterparty for the buyer.[2] Legally speaking, novation takes place. Both

original parties – either directly or indirectly via a CCP member – now have a claim on the CCP, a specialised entity that is subject to stringent risk management. This intervention is all the more important when the original counterparties have concluded the trade through an exchange or a trading system which guarantees anonymity and, consequently, did not provide the opportunity to include in the pricing of the trade the correct valuation of the counterparty risk incurred.

Besides this, the CCP facilitates efficient application of a multilateral netting mechanism, as it will always be the counterparty for each trade that the original counterparties have agreed to clear through the CCP. When netting takes place, by novation, a new claim replaces the accumulated claims between the CCP and its member, which are crossed out. This way, the use of the CCP reduces the capital requirements for the CCP-participant, which is usually a credit institution or an investment firm.

1.1.3 Settlement

After conclusion of the trade, settlement has to take place, i.e. the seller has to deliver the securities to the buyer and the buyer has to pay the agreed price to the seller. This usually takes place on a rolling basis two or three days after the trade day. Settlement takes place between the buyer and the seller, or between their respective settlement agents. When a CCP has intervened, settlement will take place between the buyer and the CCP, and between the seller and the CCP. Where the cash and the securities are held on accounts, the transfer of cash and securities, i.e. the settlement of the trade, takes place by debiting and crediting those accounts. A generally accepted counterparty risk mitigation technique is the Delivery versus Payment (DvP) procedure, implying that the final cash payment and final securities delivery between buyer and seller take place simultaneously.

1.1.4 Custody

Settlement presupposes that cash and securities are held somewhere. Unlike settlement, custody is a static process. The risk profile for holding cash differs from that for holding securities. When cash is deposited with a bank, the depositor has a claim on that bank, and not on the currency issuing central bank. In contrast, when securities are held with a depository, the depositor still has a proprietary claim vis-à-vis the issuer of the security. The depository merely acts as a safekeeper. Usually, this right of ownership is legally structured as a co-proprietary

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(2) Not all markets have a CCP arrangement for clearing. However, in this paper, clearing will be defined as the interposition of a clearing house as a CCP.

right on a securities pool to make the securities fungible, i.e. interchangeable. The depository usually also offers corporate event services, such as capital redemption or coupon payments.

1.1.5 Registrar function

The registrar is the entity that has a direct relationship with the issuer of the securities. It will also act as a "notary" in respect of the issue. It will hold in custody in its books all the securities of a given issue, and thus occupy the top place of the pyramid in the holding chain; this enables it to centralise and control the overall securities holdings position. The jurisdiction in which the registrar-depository is located will define the specific legal characteristics of the security, such as its form (bearer security or dematerialised security) or other specific points (rules on corporate actions such as dividend payments and rights issues, etc.). Indirectly, these characteristics can influence the efficiency of the settlement of this security and the risks involved. When the participants of the registrar in turn hold securities in custody for their clients, a multi-tiered ownership structure arises.

1.2 Institutions involved in the handling of domestic trades in a traditional structure

At each functional stage, specific infrastructures are involved in order to increase the efficiency and the soundness of the trading and post-trading process. In traditional domestic regulated markets the local trading, clearing and settlement systems involved in a securities transaction are often vertically integrated, i.e., there is one and only one chain of infrastructures for a transaction to pass through. The direct participant in these systems is traditionally a domestic institution, and the bulk of transactions is traded, cleared or settled by these institutions. In some cases, the trading, clearing and settlement systems are owned by different legal entities. In other cases, the post-trade systems are owned by the exchange itself.[3] Even in the case of private ownership, the public character of the systems is traditionally reflected in domestic regulation or approval by a public authority. This means of processing securities trades functioned very well in the pre-euro environment.

Trading takes place through the local exchange where the domestic securities are listed, or on the bilateral OTC market for these domestic securities.

Not all markets use a CCP. The intervention of a CCP is generally the rule for exchange-traded derivatives such as futures and options. However, it is much less so for cash market transactions, while only a very small fraction of overall OTC trades – and especially fixed-income markets – are cleared via a CCP.

Securities transactions are traditionally settled through the local Central Securities Depository (CSD), with the local central bank acting as the cash settlement agent for the CSD participants. Indeed, the most efficient settlement method supposes that participants centralise their cash and securities holdings. The cash is then held with the central bank, where most CSD participants have an account. Likewise, the domestic securities are held, by those same participants, in the CSD. Both the central bank and the CSD intervene during the settlement operation. In this case, the securities settlement process consists of the relevant procedures carried out by both the central bank and the CSD. The CSD/central bank combination is called a Securities Settlement System (SSS). Of course, both the buyer and the seller of the securities can have their securities accounts and their cash accounts with one and the same institution. This is the case if a central bank operates an SSS itself. Alternatively, settlement can take place internally in the books of an SSS-participant.

The CSD usually also acts as the registrar of the domestic securities, although the registrar function might be exercised by a separate local entity.

Table 1 lists the different national exchanges together with the clearing and settlement systems they are using, including ICSDs. Settlement institutions may also process OTC trades.

1.3 Handling of clearing and settlement of cross-border trades

In a cross-border trade, a non-domestic end-user has to settle the securities trade and the processing becomes more complex than for settling between domestic participants. This problem is not new, and various procedures have been developed in the past to handle the settlement of cross-border trades. This section briefly reviews the existing handling procedures which are illustrated in chart 2.

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(3) Examples of the former are the UK systems comprising the London Stock Exchange and Liffe at the trading level, the London Clearing House at the clearing level and CREST at the settlement level; the Deutsche Börse trade and post-trade systems are an example of the latter.

TABLE 1   CLEARING AND SETTLEMENT SYSTEMS IN EUROPE

Country/ICSD	Trading	Clearing	Settlement
BE	Euronext Brussels	Clearnet	CIK, NBB SSS
DK	Copenhagen Stock Exchange	FUTOP (derivatives)	VP, FUTOP
DE	8 stock exchanges	Clearstream Banking Frankfurt (no CCP), Eurex Clearing	Clearstream Banking Frankfurt
HE	HELEX Exchanges S.A. HDAT	No CCP for securities, ADECH is CCP for derivatives	BOGS, CSD S.A.
ES	4 stock exchanges, CADE, MEFF	No CCP for securities, MEFacts as CCP for derivatives	SVLV, SCLV, CADE
FR	Euronext Paris	Clearnet	Euroclear France
IE	Irish Stock Exchange		CREST (Euroclear UK)
IT	Borsa Italiana S. p A.	LDT, CCG (but no CCP)	Monte Titoli
LU	Luxembourg Stock Exchange	Clearstream Banking Luxembourg (but no CCP)	Clearstream Banking Luxembourg
NL	Euronext Amsterdam	Clearnet	Euroclear Netherlands
AT	Vienna Stock Exchange, NEWEX	OeKB Clearstream Banking Frankfurt (but no CCP)	OeKB Clearstream Banking Frankfurt
PT	BVLP, MTS Portugal	Interbolsa	Interbolsa, SITEME
FI	HEX	APK (but no CCP)	APK
SE	OM Stockholm Exchange		VPC
UK	9 regulated markets	LCH (CCP), OM	CREST (Euroclear UK)
Clearstream International		Clears and settles securities transactions in 33 markets through a network of links	
Euroclear Bank		Clears and settles securities transactions in 33 markets through a network of links	

Sources : Lannoo, K. and Levin, M. (2001); NBB.

1.3.1 Direct remote participation

An SSS/CSD or a CCP can be accessed from abroad. Nevertheless, directly accessing a remote clearing or settlement system still proves to be a costly approach, as the remote participant has to cope with a specific procedure and interface for each system accessed. The back-office costs involved can be substantial. So, the number of remote participants in clearing and settlement systems has only gradually risen over recent years, in spite of the 1993 European Investment Services Directive which requires EU Member States to implement non-discrimina-tory access to clearing and settlement systems by remote participants/trading members.

1.3.2 Indirect participation - Role of custodians

Since accessing an SSS directly from abroad does not offer the most efficient solution, many financial institutions use a custodian bank that acts as their transaction settlement agent. In some cases, the volumes settled by the custodian prove to be substantial. A custodian will usually settle the trades between its own participants internally in its own books. As a consequence, a tiered structure emerges,

CHART 2 HANDLING OF CROSS-BORDER SETTLEMENT OF A SECURITIES TRADE
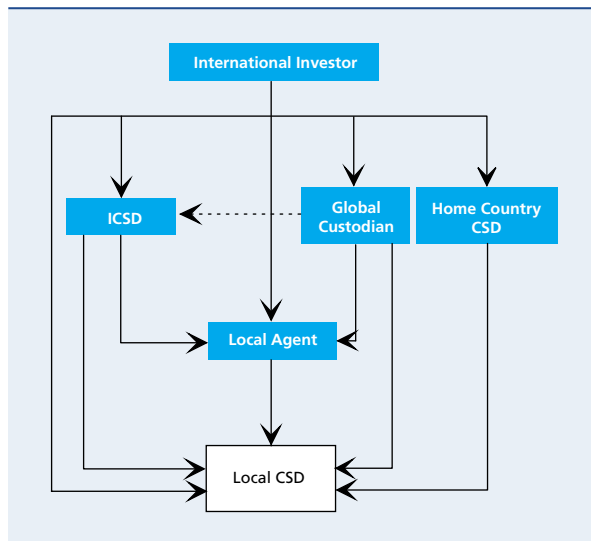
Source : Giovannini Group (2001).

whereby the settlement activity may be concentrated partly on the lower level of the holding chain. When a custodian internalises a substantial amount of settlement activity, it is often called a quasi-system. Custodian activities are not restricted to settlement services, as custodians also offer related products such as portfolio investment valuation services, and their customer base differs and routinely comprises pension funds, for example. Global custodians offer settlement services for securities held in central securities depositories world-wide, while local custodians provide access to their domestic CSD.

1.3.3 Role of ICSDs

The Belgium- and Luxembourg-based ICSDs are a special kind of SSS. ICSDs have the legal status of a credit institution and hold both the cash and securities accounts of their participants in their books. Contrary to what its name might suggest, an ICSD does not act as a central securities depository, except perhaps – in a specific way – through the use of "common depository" banks for eurobonds. Indeed, the original purpose of ISCDs was the settlement of eurobonds denominated in various currencies. Later on, their cross-border settlement activity in other fixed-income products, such as government bonds, became more important. Nowadays, the bulk of EU cross-border fixed-income trades is settled through ICSDs. Recently they became involved in the equities settlement business. Unlike custodians, ICSDs are de facto limited purpose banks, exclusively offering settlement services and closely related settlement enhancing services.

1.3.4 Indirect participation - Linked SSSs/ICSDs

Instead of accessing a foreign SSS through a custodian, a user can access the SSS through another SSS. The latter SSS, called the "investor SSS", will hold the securities for its client-user with the SSS that acts as the CSD, called the "registrar SSS". Those SSSs are then said to be linked.

1.4 Forces driving change in the EU clearing and settlement environment

The internationalisation of securities markets has greatly increased the number of cross-border trades. This in turn has revealed the drawbacks and costs of the fragmentation in the EU post-trade securities handling industry for its users, both investors and issuers.

1.4.1 Growing number of cross-border trades

Both the introduction of the euro and the development of new technologies have contributed to the internationalisation of the securities market. Before the introduction of the euro, the bulk of domestic securities were bought by local investors, and the market liquidity was logically concentrated on domestic traders. The best option for foreign investors was to use local traders to conclude a trade. The euro generated growing cross-border investment in both fixed-income products and equities, and remote traders gained a wider client base so that they could play a bigger role. Technological innovation has also influenced the operation of both exchanges and OTC securities markets. When information technology made it feasible to organise markets without requiring the physical presence of their trading members, it became cost-efficient for trading members to trade from abroad.

1.4.2 Euro area payment infrastructure

It can be argued that each currency zone needs its "own" payments infrastructure. With the introduction of the euro, from a currency perspective, the traditional distinction between domestic and foreign Securities Clearing or Settlement Systems (SCSSs) blurred, and several CCPs or CSDs became active within one and the same currency zone. So, the euro area should strive to obtain a euro payments infrastructure[4]. On the other hand, some SCSSs – particularly ICSDs – operate in a multi-currency environment and service participants that are mainly located outside the euro area.

(4) See in this respect e.g. the September 2001 ECB press release on the Eurosystem's policy line with regard to consolidation in central counterparty clearing.

1.4.3 Stock exchange requirements

Trade execution and the subsequent settlement of a trade are complementary services, and users are shopping for a package (trade conclusion and settlement) rather than an isolated service. This is reflected in the demand for straight-through-processing (STP), enabling the seamless conclusion and processing of a trade. Thus, exchanges do have an interest in the post-trade environment. Within the logic of the chain linking trading, clearing and settlement, a trading platform will seek an integrated clearing and settlement solution. So, with mergers taking place at trading level, this creates pressure to speed up integration at the clearing and settlement level.

1.4.4 Pressures to reduce costs of post-trade handling services

As a corollary of the ever-growing internationalisation of trading activity, investors are now demanding efficient and sound post-trade treatment of cross-border securities transactions. When accessing several systems, a participant wants the system interfaces and procedures to be as harmonised as possible. Not surprisingly, system participants ask for "interoperability" of the systems they use. In the current EU environment, some twenty securities settlement or clearing systems are in operation, and the objective will not be easy to achieve.

The amount of fees paid to settlement providers increases the longer the chain of intermediaries, but a chain is unavoidable for most investors wishing to access local payment systems and the local CSDs. A longer chain often requires manual handling of part of the process, which increases the number of errors. Apart from this, costs also include the so-called pipeline-costs, i.e. the cost of the capital or securities temporarily tied up in the settlement process.

Measuring the costs incurred by a settlement service user is not a straightforward issue. Lannoo, K. and Levin, M. (2001) have conducted such an exercise and their findings were cited in the Giovannini report (2001). The authors themselves warned that their study suffered from considerable methodological problems and a lack of clear data, preventing precise comparison. However, one clear result is that the highest costs are not the direct costs, such as fees to settlement providers, but the indirect costs, such as back-office costs borne by system participants. Hence, higher overall EU costs can be attributed to the fragmented nature of the EU clearing and settlement infrastructure. A second finding is that in-system settlement is always cheaper than cross-

system settlement. Finally, Lannoo and Levin compared EU to US settlement costs, using the operating income of settlement systems as a proxy. As can be inferred from table 2, the use of netting is much more extensive in the US Depository Trust and Clearing Corporation (DTCC) systems, leading to much lower settlement costs per transaction, on a pre-netted basis. The fact that netting is less used or less effective in the EU explains why the EU/US cost ratio is higher on a pre-netted basis. Also, they found that ICSDs have higher operating income per transaction, reflecting the complexity of settling international transactions whose costs are internalised by the ICSDs. It thus appeared that the in-system settlement costs charged by EU CSDs – excluding ICSDs –, when corrected for the less frequent use of netting, were found to be comparable to US settlement costs (ratio 1.08 : 1).

As the rationalisation of the SCSS industry should drive down the costs of post-trade handling, it will be beneficial for both investors in securities and securities issuers. However, as illustrated in box 1, the interests involved are quite diverse, which explains why progress is difficult to achieve in this field.

TABLE 2   FOUR OPTIONS FOR CALCULATING OPERATING INCOME PER TRANSACTION [1]

	Pre-netting		Post-netting	
with ICSDs	EU:	€ 3.10	EU:	€ 5.14
	DTCC:	€ 0.40	DTCC:	€ 2.77
	Ratio:	7.75 : 1	Ratio:	1.86 : 1
without ICSDs	EU:	€ 1.74	EU:	€ 2.98
	DTCC:	€ 0.40	DTCC:	€ 2.77
	Ratio:	4.35 : 1	Ratio:	1.08 : 1

Source: Lannoo, K. and Levin, M. (2001).

(1) The comparison of pre-netting to post-netting ratios reveals the consequences of the non-generalised implementation of netting in the EU. Inclusion of the ICSD figures adds complex international transactions, whose costs are internalised by the ICSDs.

Interests of SCSS industry participants

System operator
The operator is the administrator of the system responsible for its overall management. In its traditional domestic environment, a CSD/SSS has a quasi-monopoly. Generally, public regulation defines the limits of its activity. However, a CSD/SSS can also function within the framework of a co-operative structure that can therefore be influenced by its user-participants. In some cases, central banks – traditionally the operators of high-value cash payment systems – do also act as a CSD, usually for domestic public sector bonds. In that case, the central bank operates a CSD/SSS, holding both the securities accounts and the cash accounts of the system.

System service provider
A system service provider delivers services to the system operator or to its participants. As an obvious example, the system operator can use an IT-provider for the programming, the operation and/or the maintenance of the IT needed for the system to function. Likewise, software vendors provide interfaces enabling the system's participants to access the system. A specific service is the provision of cash accounts to SSS participants, as those are neces-sary for the SSS to function. Central banks can provide the cash accounts used to settle securities transactions in the SSS. Traditionally, the local central bank acts as the sole cash settlement agent for each direct SSS participant. Alternatively, the cash settlement accounts can be provided by a selection of settlement banks or by the system operator itself, provided it is a bank.

System participant
A system participant has the choice of becoming a direct SSS participant or accessing the system indirectly. Direct participants are mainly credit institutions and include investment firms. The specific character of their activities may create diverse needs: they may be active traders settling huge volumes, or they may hold securities for a longer period; they may operate mainly locally or be internationally oriented; they may have sufficient cash/collateral available or they may not, and so on. CCPs and other SSSs are specific categories of SSS participants. System users have an obvious interest in the soundness, efficiency and interoperability of the systems. They are also sensitive to the network effects of the systems used, which implies that size matters and they seek a "critical mass". On the other hand, system users may at the same time be in competition with the system by "internalising" clearing or settlement activity, so that their relationship with the system is ambiguous.
A specific system user is the central bank that uses the SSS to accept securities collateral when providing credit, e.g. for monetary policy operations. Central bank operations are only a minor part of the overall securities market transactions. Nonetheless, the central banks belonging to the European System of Central Banks (ESCB) are espe-cially concerned about the SSSs they use. In 1998, in the run-up to EMU, they promulgated the "Standards for the use by EU central banks of SSSs for ESCB credit operations".

Financial centre
Finally, it is clear that the SCSS industry is considered by most countries as a sensitive issue, related to questions of competition between financial centres. This seems to be particularly the case for "national" stocks traded on a national exchange, whereas there is much greater acceptance of the fact that OTC fixed-income trades are set-tled abroad. Of course, exchanges are bound to worry about trades being settled in a sound and efficient way. But part of the underlying reason might be the fear that the trading activity could relocate once the post-trade facilities are reorganised.

2. Efficiency

An SCSS which functions well has to meet the two funda-mental criteria of efficiency and stability. Although those two criteria will be reviewed successively in this and the next chapter, it is important to remember that they are closely linked. On the one hand, resilience to shocks is an obvious prerequisite for an efficient system. On the other hand, in the design of systems, trade-offs have sometimes to be made between cost-efficiency and stability.

In this chapter, we have a closer look at efficiency considerations. In order to arrange an efficient SCSS industry, it will first be necessary to create an environment ensuring proper access, compatibility and interoperability between the existing systems, so as to open up clearing and settlement systems to competitive pressures. This will require the removal of barriers. This new environment will then reshape the structure of EU clearing and settlement, possibly leading to a more integrated clearing and settlement industry. Finally, once this condition is satisfied, it is important to ensure that users get enough benefits from the new environment, in particular if dominant integrated systems emerge.

2.1 Removal of barriers to a single market for securities clearing and settlement services

International market players want to extend the reach of the SSS network. Any settlement services provider wishing to offer settlement services in a security for which it is not the registrar CSD will need to link directly or indirectly to the relevant registrar CSD. When these registrar CSDs are owned by different entities, questions of interoperability and co-ordination of service quality become very important. In this respect, the Group of Thirty, a body composed mainly of settlement system users and public sector officials acting in a personal, advisory capacity, has published a report[5] calling for the interoperability of securities clearing and settlement systems. Among other things, this implies harmonisation of SCSS messaging standards and communication protocols, to permit the seamless transfer of information between the different systems.

In addition, EU CSDs themselves have indicated that they want to make their services compatible with those of other CSDs. In this respect, the Central Securities Settlement Institution (CSSI), as described in Deutsche Bank Research (2003), should be mentioned. This project envisages the standardisation of messages between the CSDs involved, i.e. the Euroclear group CSDs, Clearstream Bank Frankfurt, Monte Titoli and the Swiss SIS. The project should facilitate the efficient cross-border settlement of equities. CSSI clients would be confined to the participating CSDs. Production-side economies of scale seem to be an important motive for this scheme.

At the same time, the European Commission itself has acknowledged that the existing clearing and settlement structure is itself a barrier to an integrated EU capital market. In the light of the European Commission (1999) action plan aiming at the creation of a single market for financial services by 2005, the Commission is considering the reorganisation of the securities clearing and settlement

industry, eventually by means of a legislative initiative. In its market consultation paper on clearing and settlement in the EU (2002), the Commission's starting point is the overly fragmented structure of the EU securities clearing and settlement industry and the consequent costs. Setting up a competitive environment would increase the degree of consolidation and reduce the costs. The Commission identifies two priorities: the removal of barriers to competition between systems, and the creation of a level playing field between institutions.

The November 2001 report of the Giovannini group – acting as an advisory body of market participants to the European Commission – enumerated fifteen barriers to efficient cross-system clearing and settlement in the following categories: national differences in technical requirements, in market practice and in tax procedures and, finally, issues relating to legal certainty. A second report of the group, issued in April 2003, defines a strategy for removing these barriers, taking into account their importance and their interdependencies, with due regard for both cost efficiency and risk minimisation. For the removal of each barrier, a time schedule and the responsible entity have been specified. As can be seen from chart 3, the Giovannini II report proposes an ambitious time schedule, indicating that all barriers should be removed within three years. The ultimate goal is to guarantee both the issuer and the investor the choice of location of clearing and settlement services. This should ultimately result in market-led integration of the clearing and settlement infrastructure. The path followed and the final outcome will depend on the market, but it is essential that issuers and investors reap the benefits of the changes. This integrated post-trade infrastructure should also take into account the public policy issues of cost efficiency, competition and systemic stability, and the regulatory and supervisory structure for enforcement should be able to function on a pan-European basis.

Another aspect addressed in the European Commission's market consultation paper mentioned above is the need to create a level playing field between institutions and to avoid regulatory arbitrage. Institutions active in the SCSS industry are increasingly entering the domains traditionally preserved for other categories of institutions. So, CSDs which do not have bank status and which, as a consequence, are not authorised to provide cash accounts or cash credit, feel at a disadvantage vis-à-vis custodians, which can offer these "core" settlement services. From another point of view, custodian banks which do offer these services, claim

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(5) Group of Thirty (2003), "Global clearing and settlement – A plan of action".

that they alone should be able to do so, while CSD and ISCD activity should be restricted to a very limited sub-field of core settlement services, excluding the extension of cash credit and the securities lending facility, for example. ICSDs in turn argue that custodian banks can propose settlement services comparable to the ones they offer without having to cope with similar standards, such as the need to be a limited purpose bank or to fully mitigate all extension of credit and securities lending.

Besides this specific consultation regarding EU clearing and settlement, the European Commission is addressing this issue in two other ways. The first is in the context of the Investment Services Directive upgrading which aims to forbid Member States to unnecessarily restrict investment firms' rights of access to and choice of clearing and settlement systems.

The second concerns an initiative of the Directorate-General for Competition which, as an investigative authority, is currently examining whether the system practices regarding access conditions and pricing policies comply with Articles 81 and following of the EU Treaty.

2.2 Building a more integrated clearing and settlement services industry

The removal of barriers will influence the consolidation process in the SCSS and, in particular, will stimulate the emergence of large service providers. This development is already taking place. The underlying factors are reviewed in this section. In such a context, it is important to prevent distortion of competition by ensuring adequate organisation and governance structures. These aspects are examined in the next section.

Further concentration of the EU clearing and settlement industry is very likely. One may refer to the US experience, where the equities markets moved from a system of seven CSDs owned by exchanges to one CSD and one CCP, so that clearing and settlement for the US equities markets now takes place through the single facilities of the DTCC. Separate facilities exist for other categories of products. US government bond transactions are mainly settled through two big US-based custodian banks. Separate single facilities also exist for mortgage bonds and exchange traded options.

CHART 3   Timeline for removing the barriers to an efficient clearing and settlement environment
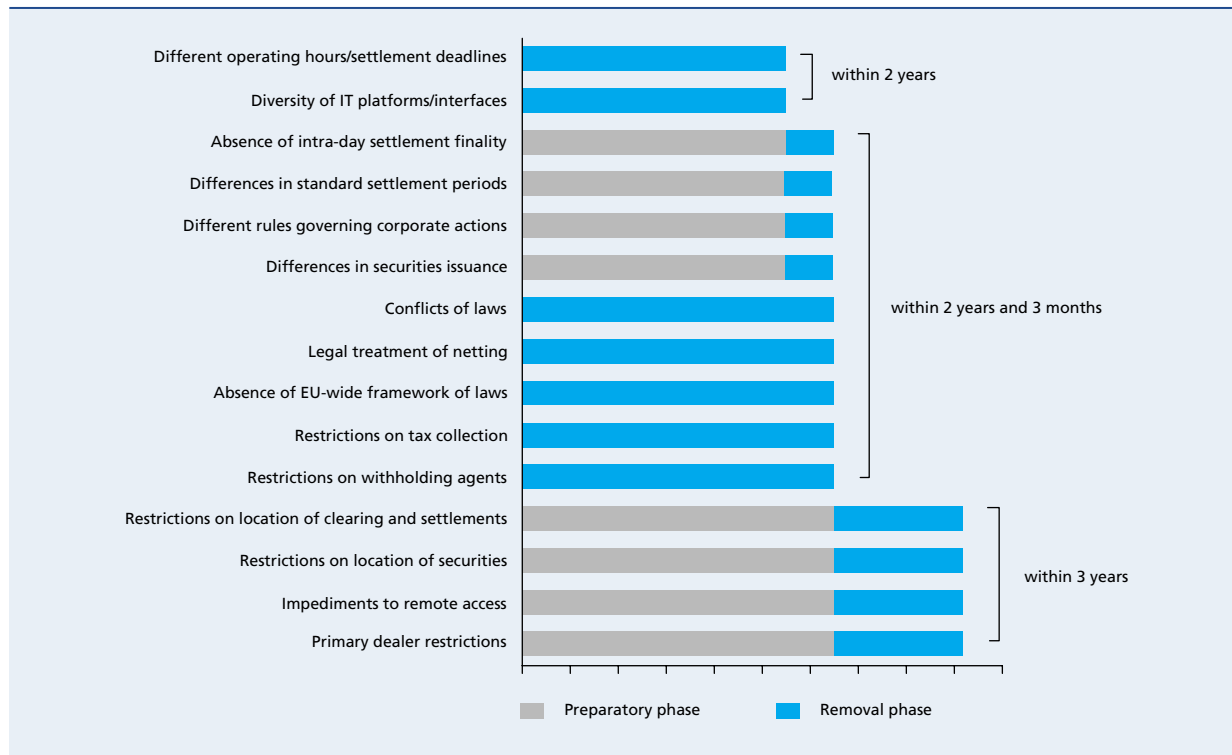
Source : Giovannini Group (2003).

In the EU, too, the existence of economies of scope and economies of scale will favour the emergence of very large service providers.

On the one hand, the settlement service is composed of a package of complementary services. The holding of cash accounts, the holding of securities accounts and a settlement mechanism constitute the basic complementary services (complements) of an SSS. Other relevant complements include the provision of cash credit and securities lending mechanisms to facilitate settlement. The potential benefit that might result from integrated provision of those various services is one factor that could shape the consolidation process in the industry.

On the other hand, SSSs are networks[6] that display positive consumption externalities and production economies of scale. As a consequence, a monopoly in the services provided tends to develop more quickly, in the absence of barriers. This might lead to the emergence of a fully integrated SCSS industry instead of a set of separate but interoperable systems.

Any single SSS – be it an ICSD or a CSD/NCB-combination – takes advantage of the existence of consumption network externalities. Just as nobody will buy a fax machine if he is the only one to do so, nobody will use a settlement system if he is the only one to use it. Settlement that takes place on accounts belonging to the same system is an entirely different operation from settlement involving accounts in two or more systems. For a given security, the utility derived from using an SSS will increase with the number of participants using the system. And for a given number of participants, the same applies for an increase in the number of securities processed and the number of trades settled.[7]

Economies of scale in production play a role in the operation of a SSS. Building a sound and efficient SSS may entail considerable fixed costs. These may consist of costs for construction and maintenance of the core system (IT, etc.) and costs (legal, etc.) for accessing foreign CSDs and thus increasing the number of securities that users are potentially able to hold and process in the system. But once the system and the links are in place, the cost of adding an additional user and/or security, supposing it belongs to a category already held/processed by the system, may be negligible.

An SSS can be considered as a network, but so can a group of SSSs. A logical question is whether SSSs have an interest in extending the network they use by making their services compatible with each other. Alternatively, locking-in users could be used as a strategy. Besides the fact that a user does not always have a choice with regard to the SSS it may use to settle a given security, the cost of switching one SSS for another can be significant. The system users are thus said to be locked-in. Switching costs are influenced by several factors. They may include contractual and loyalty costs, training and learning, data conversion and IT-system adaptation costs and search costs. Switching costs can affect price competition in two ways. Locked-in users may be subject to price increases, and new users may be offered discounts.

A distinction is often also made between vertical and horizontal integration models. Vertically integrated structures are said to derive efficiency (operational cost savings) from a STP mechanism, the smooth successive operation of trade and post-trade processing. One user-friendly element comprises the "single interface", where the instruction to generate the trade is automatically used as a feed for clearing and settlement purposes. For example, the exchange can, on behalf of the trading member, send the necessary instructions automatically to the clearing house and the clearing members involved, and so on. However, in the current technical environment, increasing standardisation and decreasing communication costs no longer require a single integrated silo to apply STP. Sending instructions to several systems becomes manageable, and the single and exclusive vertical chain in processing the trade is no longer an absolute value-added in this respect (Lannoo, K. and Levin, M., 2001). Possible settlement models in this context are presented in box 2.

On the other hand, horizontal integration makes it possible to clear and/or settle all trades in the same system. The "CCP as an hourglass"-model contained in box 2 is an example at clearing-level. At settlement-level, things will probably move faster for the investor than for the issuer, as it is likely that the "notary"/registrar CSD function will remain domestic in the short to medium term, due to legal complexities, and the issuer will not immediately be able to choose the location of the desired service, nor will these facilities be merged in the short term. Meanwhile, this will not necessarily preclude the integration of the settlement services activity of different CSDs/SSSs.

While the driving forces behind the consolidation process are clear, it is difficult at this stage to determine a priori in which direction it will evolve. Box 2 contains a short presentation of some of the models that could emerge from this process.

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(6) With regard to networks and network characteristics in general, see e.g. Shy, O. (2001), Economides, N. (1996), and Katz, M.L. and Shapiro, C. (1994).

(7) See, in this respect, Cruickshank, D. (2001), who defends on this basis a completely unified utility at EU level for clearing and settlement respectively.

Box 2

Models for an integrated clearing and settlement infrastructure

Directly linked SSSs – Spaghetti model

A direct link connects two SSSs. Here, the SSS labelled "investor SSS" is a direct participant of the "registrar SSS/CSD". This model was proposed by the European Central Securities Depository Association (2000) white paper that advocated direct bilateral links between CSDs. If each SSS wants to hold all securities, this model requires a maximum number of links. Dubbed as the "spaghetti model", it was never fully implemented.
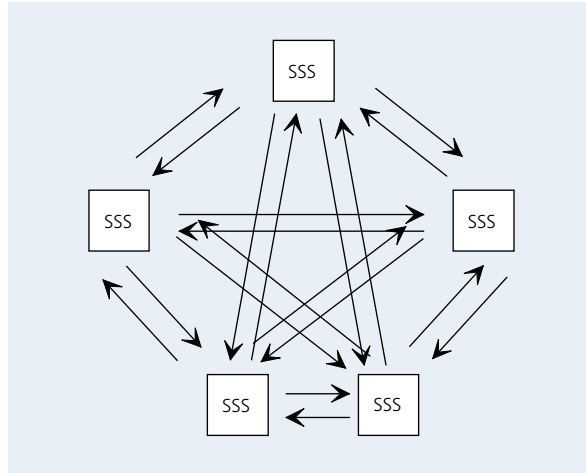

Directly linked SSSs – Hub and spokes model

A more concentrated model, requiring a minimum number of links, is the hub and spokes model. This model was presented by Euroclear (1999). Cross-border business would be concentrated in the hub and domestic business in the spokes, that also continue to act as a registrar CSD. A corollary of this model is that internal settlement of all the securities held in each registrar CSD will only be possible between direct hub SSS participants. Registrar CSD participants will only be able to settle the domestic securities held in their CSD. This model has also been abandoned.
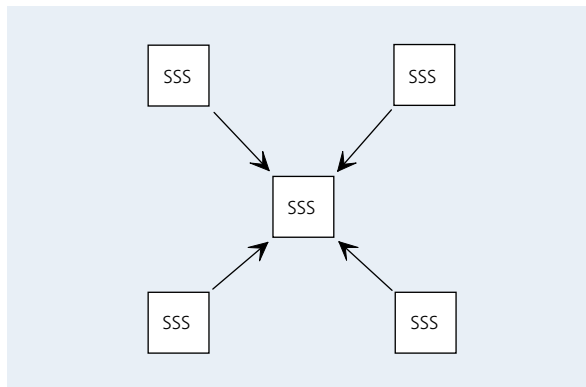
This proposal has been made by both CSDs and ICSDs. Here, an "investor SSS" is linked indirectly to a "registrar SSS" via a so-called "middle" SSS. In this model, the investor SSS only needs one link to the hub to indirectly hold the securities of each registrar CSD. The decision to link in this way to a registrar CSD is an investor SSS decision.
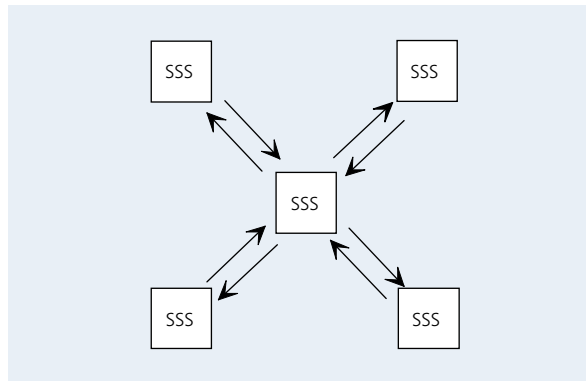
CCP as an hourglass between markets and SSSs

A CCP, interposing itself between the buyer and the seller, can act as a pivot connecting several domestic markets and several domestic SSSs. In principle, one or several such CCPs could co-exist. A "one CCP for the EU-zone"-project was presented in the European Securities Forum (2000) paper. The advantage at clearing level will be that a sole CCP nets its members' transactions irrespective of the market where the transaction is concluded. So, if a clearing member buys a security on the exchange, and sells the same amount of that security on another exchange or OTC, its net securities position vis-à-vis the CCP will be zero. This netting effect of the CCP will reduce the number of trades that has to be settled and thus cut the unit cost of overall settling.
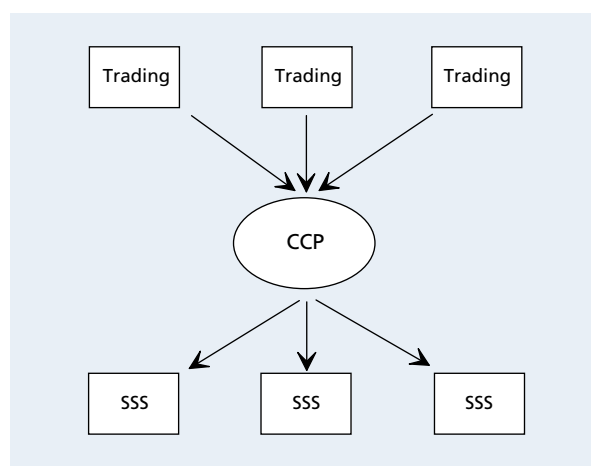
2.3 How to limit the power of a dominant utility

When dominant structures emerge, their power can be counterbalanced in two ways. First, the industry should be properly organised, guaranteeing strict conditions of access to the essential facility functions corresponding to the natural monopoly functions of the industry while opening all other aspects to competition. Second, adequate governance structures should ensure that the interests of users are genuinely taken into account.

2.3.1 Essential facilities and compulsory access

An essential facility is that part of a service considered sub-optimal to duplicate, given the existing technologies, and exclusion from that facility would place competitors in the "downstream" market at a significant disadvantage.

The experience of the telephony sector can provide an example. Until the 1980s, telephony was considered a "natural" monopoly. As a consequence, governments licensed a single company to deliver the service and regulated its price on a production cost basis. This approach was called into question recently, as it was recognised that the promotion of more competition would allow consumers to receive a better service or to pay less. At present, only the existing local wiring network is considered to be a natural monopoly, i.e. an essential facility. Compulsory access and access-pricing rules were imposed with regard to the essential facility, thus enabling rival long-distance connection companies to compete in their "downstream" market. At the same time, companies that are granted access to the local connection services provided by the local wiring network operators are able to offer substitute services or to develop complementary ones, such as ADSL services, so that innovation is not hampered. (Shy, O., 2001).

It would take too long to detail here the precise conditions for applying the essential facilities concept, but this concept is used in both US and EU competition law, although in different ways. EU courts usually analyse essential facility cases in terms of a refusal-to-deal, as envisaged under Art. 86 of the EU Treaty that prohibits the abuse of a dominant position (Harz, M., 1997).

Milne, A (2002) defends a similar approach for the securities settlement industry where some core functions, i.e. the core registrar CSD monopolies of both securities book transfer and communication of corporate actions, are treated as essential facilities. Because a security ultimately exists only in one depository, and because the issuer communicates solely with that depository, it is impossible to duplicate this service. Registrar CSDs should account

separately for these functions and allow access on a non-discriminatory basis to a wide range of eligible members. This unbundling of functions would avoid cross-subsidisation between essential facilities and other services. If this condition is fulfilled, the registrar CSD itself and all of its members should be able to compete for settlement services in the "downstream" market. Thus, the infrastructure itself should be entitled to compete with its users, once the essential facility functions which it operates can be accessed in a non-discriminatory and fair way.

In the specific context of SSSs, the fact that the infrastructure itself competes with its users might also be a way to avoid excessive tiering. An infrastructure offering an efficient service complying with strict soundness criteria might see its attractiveness reduced if it cannot compete on a reasonable basis with its participants. Reference could be made here to the settlement of US Treasuries where, due to the restriction of services at the level of the Fedwire SSS, the bulk of settlement activity is concentrated on a second tier with two big participants of this settlement system. This seems to have raised some concern as the Federal Reserve System and the Securities and Exchange Commission launched an industry consultation on the impact this has on the resilience of the overall Treasuries settlement infrastructure in their interagency white paper (May 2002).

2.3.2 Governance issues

The organisation of the governance of the system is an important tool and enables users to have their say in the design and management of the system.

Traditionally, many systems have been structured as joint ventures where system members have their say. Even today, when demutualisation takes place, this remains a valuable principle. Members can be expected to give more attention to the risk management of a system than non-member shareholders. Likewise, in a situation where the system has a monopoly position, the influence of users in the design and the management of the system should provide the necessary counterbalancing powers to the possibility of an excessive pricing policy. Both these elements favour the implementation of user governance, which is also the approach of the CPSS-IOSCO Recommendations for SSSs.

At the same time, it is clear that user governance also has its limits. As cross-border trade activity grows, the number of potential remote participants with specific interests in the design of the system will increase. But if remote participants access a system indirectly via a local intermediary they are, by definition, not represented in the system's governance

arrangements. This can be a problem to the extent that it is in the members' interest to restrict access and so to be able to act as intermediary for the services offered by the system. In this context, the demutualisation and listing of some EU exchanges, where it is no longer necessary for all exchange owners to be members, may have a beneficial impact on the restructuring of the industry. But non-member shareholders will try to maximise the profit for the system rather than the members. Thus, the genuine interests of members should be taken into account at the same time. It should also be recalled here that users are not a uniform category, and that, for example, users generating larger volumes will usually matter more.

When the post-trade systems are part of an integrated silo of trading-clearing-settlement, specific issues arise. Firstly, the exchange can more easily abuse its power by only accepting its own trades to be settled in its own settlement system. One argument sometimes presented in favour of such exclusivity is that other exchanges or alternative trading systems listing the same securities should not receive a "free lunch" by being able to access the post-trade system. However, should the post-trade system be independent of the exchange, its prime interest would be to attract as much settlement volume as possible, irrespective of the platform where the trade is concluded. Secondly, in the case of common ownership of a vertical integrated structure, cross-subsidisation of the trading, clearing and settle-

ment services offered might take place. Trade and post-trade handling costs should be split and assigned to the parties involved in a fair way.

3. Soundness considerations

3.1 CPSS-IOSCO Recommendations

Both securities commissions and central banks are paying great attention to the soundness of the post-trade processing of securities transactions in order to reduce the systemic risk, i.e. the risk that the inability of one institution to meet its obligations when due will result in other institutions becoming unable to meet their obligations. The CPSS-IOSCO Task Force has established a list of recommendations for securities settlement systems recorded in box 3. Those recommendations are now in the process of being adapted to the EU environment by the ESCB-CESR Task Force.

As can be seen from the CPSS-IOSCO recommendations, authorities are concerned not only with the soundness of settlement services but also with their efficiency. Furthermore, these recommendations target the settlement of both domestic trades and cross-border trades, the latter frequently involving more than one system.

Box 3

The CPSS-IOSCO Recommendations for SSS

Legal risk

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

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.

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.

Operational risk

11. Operational reliability

Sources of operational risk arising in the clearing and settlement process should be identified and minimised 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.

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.

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.

Both the co-operation between systems and their consolidation raise risk aspects as, in term of soundness, size will generally matter. When an individual system grows or when systems integrate, the probability of disruption may well decrease but its potential impact on systemic stability could become much more important. Supervisors and overseers will have to be particularly attentive when considering low probability risks of catastrophic events. At the same time, it could be argued that an integrated infrastructure will imply fewer service providers, and that it will be easier for the supervisor to monitor such a system.

As efficiency considerations have been discussed in the previous chapter, this chapter will concentrate on soundness issues related more specifically to cross-border trades, taking some selected CPSS-IOSCO Task Force Recommendations as a guideline.

3.2 Legal soundness (Recommendation 1)

Recommendation 1 requires SSSs to have a well founded, transparent legal basis in all relevant jurisdictions, setting a requirement that underpins all further recommendations. For cross-border settlement, conflict of law rules should clearly indicate the law applicable. This referencing law is specifically relevant in the current EU legal environment composed of sometimes very heterogeneous national jurisdictions. At the same time, further harmonisation of existing laws is highly desirable. In some specific fields relating to clearing and settlement, general principles have already been harmonised or are in the process of harmonisation, as is testified by the EU Settlement Finality Directive and the Collateral Directive. The Giovannini II report advocates a harmonised EU securities law, also regulating the issuance and characteristics of securities. From a soundness point of view, it is important to avoid a race to the bottom. A harmonised legal and regulatory environment will prevent settlement providers competing by applying less stringent risk management standards.

3.3   Settlement cycles (Recommendation 3)

Recommendation 3 promotes a rolling settlement cycle of three working days after the trade day. Here, the market rule depends on the technical capabilities of the post-trade environment. Shorter settlement cycles do reduce the risk that market members incur between trade and settlement date, but can prove to be counterproductive if they result in a strong increase in the number of settlement failures. The more complex and fragmented the post-trade settlement infrastructure, the greater the risk of such failure.

Furthermore, an integrated EU capital market requires harmonisation of the settlement cycles, which currently differ between securities markets. Clearly, there will be a second trade-off between the advantages of harmonisation and those of shorter settlement cycles, as harmonisation could require the lengthening of the settlement cycles for some securities trades.

3.4   Use of CCPs (Recommendation 4)

Recommendation 4 states that the benefits and costs of the use of a central counterparty (CCP) should be assessed.

The use of a CCP has the potential to reduce systemic risk, as the intervention of a CCP usually has a strong impact on the subsequent settlement activity. To the extent that trades are netted, immediate (T + 0) settlement occurs de facto for these parts of the trades that are crossed-out, as compared to T + 3 settlement for most long-term securities cash market trades.

The netting process of a CCP is optimal when its clearing members are allowed to clear and net all their trades in a given security through the CCP, and not exclusively the trades executed on a particular exchange. Hence the obvious attractiveness, equally from a risk management point of view, of the "one CCP for the EU-zone"-project. Smaller overall net positions vis-à-vis one CCP will also reduce the need for collateral from the clearing member.

On the other hand, it is clear that any further concentration of CCPs, or even a single CCP for the EU, would concentrate clearing risks and increase the impact of a default by the clearing house. A model of a CCP acting as an hourglass between markets and SSSs is presented in box 2. Given the CCP's pivot position, any disruption at that level could impact several markets and/or SSSs. Currently, the CPSS-IOSCO Task Force is in the process of elaborating a set of standards specifically aimed at CCPs.

3.5   Risk controls (Recommendation 9) and Cash settlement assets (Recommendation 10)

When an SSS extends intra-day credit to its participants or operates a net settlement system, Recommendation 9 envisages that the system must be able to continue operating in the event of default by its largest participant. This constraint should increase in a consolidated system which will normally face higher positions and transaction volumes from its participants.

To offer settlement at cross-border level in an integrated entity, risk minimisation and operational cost savings should be reconciled. On the cash side, if central bank money or credit is not used, Recommendation 10 accepts as an alternative that the SSS may be a so-called limited purpose bank (LPB). An LPB is, by definition, exposed to a smaller range of risks as it limits the scope of its activities, compared with a full purpose bank. An LPB is also required to fully mitigate its credit extension. Such a structure offers a welcome alternative to a system where the central bank would be the sole possible settlement agent. Indeed, not all system participants have access to central bank accounts and credit. Besides, decentralisation in the execution of the Eurosystem monetary policy implies that the various national central banks (NCBs) may grant credit exclusively to their own domestic participants. The LPB structure offers a valuable solution, enabling the LPB both to offer cash accounts and to provide cash credit to all participants. Of course this format, that is also discussed in the Federal Reserve System and Securities and Exchange Commission Interagency white paper (May 2002), should be clearly defined and open to all interested parties.

3.6   Operational reliability (Recommendation 11)

Recommendation 11 looks at the operational reliability of a settlement system. When systems become interoperable, the sound design of their common interfaces and procedures becomes all the more critical because of their widespread use. Interoperability could facilitate the organisation of contingency plans, as the various systems could be used as mutual back-up facilities in case of a calamity. However, this option should be carefully assessed, and it might prove less workable or desirable than a standard contingency arrangement.

Contingency planning will become more crucial in the case of consolidation, as disruption of a consolidated system settling higher volumes and servicing more markets than any of the individual systems existing before will potentially have a bigger systemic impact, with contagion spreading more rapidly between the markets

it serves. The requirements set for the contingency plans of such a system should reflect this. In this respect, the April 2003 Interagency white paper on sound practices to strengthen the resilience of the U.S. financial system, a post 11 September exercise, calls for the identification of clearing and settlement activities in support of critical financial markets, and sets precise time-related and geographical criteria for contingency arrangements for both industry facilities and other firms that play a significant role in clearing and settlement.

3.7 Governance (Recommendation 13)

Recommendation 13 explicitly addresses user governance. Since a monopoly-inclined entity – such as an SSS – might let its own interests prevail, there must be an appropriate system for balancing the stakeholders' interests. The recommendation states that the users of the SSS should be sufficiently involved to have a say in its design and management. Users need to have a clear insight into the risks and costs of the system they use.

3.8 Linked SSSs (Recommendation 19)

Recommendation 19 specifically looks at the design and functioning of links between CSDs. When systems become interrelated, systems and system links should be designed and managed in a way that, as far as possible, avoids contagion between markets and/or systems. All legal consequences have to be scrutinised, and possible conflicts of law between the jurisdictions involved have to be avoided. Of utmost importance is the timing of settlement finality in linked systems, so as to ensure that securities received by a system are only further processed after the transfer has become final in the first system. Operationally speaking, the settlement of trades via links will be more demanding as compared to in-system settlement. For example, DvP-settlement between participants in different systems will be more complex. The realignment of securities positions held in different systems will have to take place up to the level of the system in which the security is transferred. Also, the reconciliation of securities positions will become more demanding, as it will have to take place at each holding level. Finally, the models of linked SSSs presented in box 2 illustrate that de facto hubs may emerge among those linked SSSs. If so, any disruption at the level of the hub SSS could potentially impact on the functioning of any other SSS linked to this hub.

3.9 Field of application of the recommendations

A final relevant issue is the field of application of existing or future recommendations for clearing and settlement. This question concerns in particular quasi-systems. Their emergence might have adverse implications if the risks are not appropriately managed by the quasi-system.

A settlement system – irrespective of the nature of the institution(s) performing this function – should ideally be capable of both offering cash accounts and securities accounts for system participants, and providing cash credit and securities lending facilities at short notice. If one of these four functions ceased to be part of the settlement service, the services offered to a system user could clearly be considered as suboptimal from the client's point of view. In an environment where alternatives are available, the system will probably lose its customers to the sub-level where these same services are offered in a suitable way, i.e. tiering will occur. This can be problematic from a risk point of view, as the bulk of settlement activity might switch to institutions that have a less stringent risk profile. The overall systemic risk will increase.

Traditionally, the standards for SSSs are intended for CSD/NCB-combinations and ICSDs. It is these systems that settle the bulk of securities trades and form the main focus of overseers. Likewise, in the EU, only SSSs have been designated and protected in the framework of the EU Settlement Finality Directive. In the current EU environment, quasi-systems become more important and can have a substantial settlement activity. Already, the CPSS/IOSCO Recommendations for SSSs are not confined to systems but are also in part applicable to custodians. Current discussions focus on the possible need to go further and to apply a so-called functional approach to settlement service providers, implying that comparable standards should apply to entities exercising comparable functions and whose overall systemic risk level is considered to be equally high. Precise criteria which should be used to decide on the systemic relevance of the entities concerned still have to be agreed upon.

Conclusion

The creation of a more integrated environment for the post-trade handling of securities is an important prerequisite for obtaining a truly integrated EU capital market by 2005, as envisaged in the European Commission's action plan. Today, the clearing and settlement of domestic trades between local participants is well organised. However, the settling of EU cross-border trades via the same channels is generally perceived to be inefficient and too expensive.

Some twenty central securities depositories, each holding domestic securities, are active throughout the EU. This causes considerable direct and indirect costs for intermediaries, investors and issuers.

To give the integration movement a chance, there is a general consensus that the solution should be market-led but that the authorities should step in if necessary. One important way to bring down the cost is to make securities clearing and settlement systems interoperable, giving investors or their agents comparable access to different systems.

Furthermore, a market-led solution requires that the existing barriers to competition should be abolished. These barriers are known, as the Giovannini reports identified the market practices, tax-related procedures and legal issues involved. The removal of these barriers should ultimately lead to a free choice of settlement location for the investor and the issuer.

For securities clearing and settlement services, both consumption network externalities and production economies of scale are present. Their existence might ultimately lead to the emergence of very large service providers, and eventually, to a regional or EU-wide monopoly. In that case, there is a risk that the users of the system will not get the full benefit of the enhanced clearing and settlement services structure, and there is a need for devices to prevent this.

On the one hand, settlement systems themselves and custodians should have the right to access the services of the registrar CSDs that are perceived to be essential facilities, i.e. the securities book transfer function and the communication of corporate actions. Without non-discriminatory and fair access to these functions, competition will be restricted. When this condition is fulfilled, settlement systems will be truly able to compete with each other and with custodians. Likewise, under this condition, a vertical silo of trading-clearing-settlement that is owned by an exchange, would not be able to hinder competing rivals and the overall integration movement.

On the other hand, since a monopolistic entity – such as an SSS – might let its own interests prevail, there must be an appropriate system for balancing the stakeholders interests. It will be of utmost importance to structure the governance properly so that users have a say in the design and management of the SSS.

Besides efficiency concerns, soundness considerations will shape the clearing and settlement industry. Authorities must pay particular attention to the low probability risks of catastrophic events that could destabilise the whole financial system. The CPSS-IOSCO Recommendations on securities settlement systems do cope with this concern in both a domestic and a cross-border context. In a cross-border context, links between systems should be soundly constructed. Furthermore, when systems integrate, it is necessary to take account of the fact that any default will have a potentially bigger impact. Finally, in a changing environment, clearing and settlement service providers equalling or exceeding the importance of some SSSs from a systemic risk point of view should be asked to comply with standards comparable to those imposed on SSSs.

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The Belgian Interbank Market : Interbank Linkages and Systemic Risk

Grégory Nguyen

1. Introduction

Interbank markets play a major role in the functioning of the financial system. They provide an effective way of transferring liquidity from banks with a cash surplus to those with a cash deficit. At the macro-economic level, interbank markets strengthen financial integration but they also increase linkages and common exposures to risks within the banking sector. At the micro-economic level, individual institutions make use of interbank markets for their liquidity and risk management. As a consequence, these markets represent one of the most important channels of contagion through which problems affecting one bank/country may spread to other banks/countries.

In the same spirit as analyses undertaken by other central banks[1], this paper addresses implications of Belgian interbank linkages for financial stability. The main objective is to evaluate the risk that a chain reaction in the interbank market – i.e., a situation where the failure of one bank would lead to problems among one or more of its interbank creditors – could create wider systemic risk in Belgium.

The Belgian interbank market[2] is very international and highly concentrated. This observation raises several interesting questions. How have consolidation and internationalisation affected the interbank market ? To what extent could the failure of banks in another European country's banking system affect Belgian banks through interbank exposures ? How has interbank contagion risk evolved over time ? How does the assessment of contagion risk in Belgium compare with assessments in other countries ?

Bank failures have historically been rare events, even more so in Belgium than in many other countries. Yet, because bank failures are not impossible, understanding the potential channels through which the failure of one bank (foreign or domestic) might affect Belgian banks is an important aspect of financial stability. Like the studies for other countries, we undertake a stylised, mechanical exercise[3] – resembling a stress test – to examine the potential for interbank contagion to occur in Belgium. Namely, we investigate the consequences of non-repayment of interbank loans of a given bank on the capital of its bank lenders (and any further domino-like effects from the latter banks), under the assumption that no adjustments have been made in interbank exposures to the failing banks. This assumption implies clear limitations; for example, it rules out preventive measures that might be taken by regulators or individual banks, such as reducing exposures to the failing bank. More generally, the assumption excludes any behavioural changes (which could also include bank panics) arising from market expectations about failing banks.

In the analysis we distinguish between potential contagion initiated by the failure of a Belgian bank versus potential contagion risk from abroad, i.e. implied by the failure of a foreign bank. We also investigate how the risk of contagion associated with failure of a Belgian bank has evolved over time. In addition, we are partially able to take

[1] See, for example Wells (2002) for the UK, Upper and Worms (2002) for Germany. Analyses undertaken by other financial institutions include Sheldon and Maurer (1998) for Switzerland, and Furfine (1999) for the US.

[2] By Belgian interbank market, we refer here to the set of interbank exposures where at least one of the counterparts is a bank incorporated in Belgium.

[3] Although the studies cited in Footnote 1 differ in the ways in which they estimate bilateral interbank exposures, they all use mechanical contagion mechanisms.

into account the moderation of interbank contagion risk arising from the increasing use of risk mitigation techniques, such as collateralised interbank loans or repurchase agreements (repos).

The paper is organised as follows. Section 2 discusses the link between interbank markets and systemic risk. Section 3 examines important features of the Belgian interbank market that might have a bearing on contagion risk. Section 4 presents the results of the simulation exercise. Section 5 concludes.

2. Interbank markets and systemic risk

2.1 Raison d'être of interbank markets

The interbank market is part of the overall money market. The money market, in general, refers to the wholesale market for low-risk, highly liquid, short-term debt instruments (see e.g. Stigum, 1990). Banks trade liquidity, and therefore take on interbank exposures for two main reasons.[4]

First, banks need to pay out cash to customers on demand and to clear transfers of their customers' deposits to other banks. Deviations of actual liquidity needs from banks' expectations imply that banks may, ex-post, hold excess liquidity or need to obtain liquidity.[5] Interbank markets are then used for risk sharing purposes, i.e. to manage bank-idiosyncratic liquidity shocks. Interbank markets thus allow financial intermediaries to offer improved risk sharing services to their clients.

Second, interbank markets are a convenient instrument for managing liquidity while simultaneously optimising banks' assets and liabilities management, by taking on exposures with the desired characteristics. Indeed, interbank markets may be used to hedge and transform other kinds of risks such as foreign exchange risk and interest rate risk.

2.2 Interbank markets and systemic risks

Contagion on interbank markets can occur in at least three types of situations: (i) when aggregate liquidity is insufficient, (ii) when the collapse of a bank induces a domino effect and (iii) when market expectations create spill-over effects. We now examine these three situations in more detail.

In the aggregate, the interbank market only redistributes liquidity across banks; it does not create liquidity. A lack of aggregate liquidity could occur, for instance, if banks have excessive confidence in the ability of interbank

markets to absorb transitory liquidity shocks, so that they under-invest in liquid assets (Bhattacharya and Gale, 1987). Interbank exposures may create problems if aggregate liquidity provision is insufficient. In this case, banks would try to avoid liquidation of their long-term assets, and would therefore liquidate their claims on other banks (possibly in other regions). A financial crisis in one region could then spread by contagion to other regions and thereby introduce liquidity problems in the latter (Allen and Gale, 2000). It should, however, be noted that in practice central banks play a key role in preventing aggregate liquidity shortages.

A second source of contagion is the domino effect itself. The failure of one individual bank may initiate a domino effect if the non-repayment of interbank obligations by the failing bank jeopardises the ability of its creditor banks to meet their obligations to their (interbank) creditors. Contagion occurs then "mechanically" through the direct interlinkages between banks.

"Spill-overs" through market expectations represent a third potential channel for contagion. For example, bank runs may occur when depositors observe other customers who face liquidity shocks withdrawing their funds from the bank. The depositors not facing liquidity shocks may decide to withdraw too, in the fear that they will ultimately be unable to recover their deposits (especially if banks must begin liquidating illiquid long-term assets in order to meet the high liquidity demand). These beliefs then become self-fulfilling (see Diamond and Dybvig, 1983). Other forms of market spill-over include withdrawals by depositors from (or unwillingness by other banks to provide liquidity to) a bank engaging in similar activities as those of a failing bank. Of course, regulatory intervention such as suspension of convertibility or deposit insurance may alleviate the problem of bank runs and banking panics (for an overview see Freixas and Rochet, 1997).

Factors that could influence the level of contagion risk include:

- *The structure of interbank linkages*: Interbank market structures that are "complete", where all banks have symmetric links with the other banks operating in the interbank market, appear to be less vulnerable to contagion than are "incomplete" market structures, where banks are only linked to some other banks of the system (Allen and Gale, 2000). Another possible

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(4) It is, among other things, through the interbank market that central banks implement their monetary policy. Banks, in turn, are able to obtain liquidity from the central bank at a penalty interest rate, via the marginal lending facility.

(5) Note that a bank can also have excess cash or liquidity needs ex-post, without deviation from its expectations, if it is ex ante specialised in deposit raising or in lending and deliberately relies on interbank markets to absorb its excess cash or to provide liquidity afterwards.

form of interbank market structure is that of a "money centre," where a bank at the centre is symmetrically linked to all the other banks without these banks being linked together. Freixas et al. (2000) analyse this type of structure and show that, in some cases, the failure of a bank linked to the money centre will not trigger the failure of the money centre, but the failure of the money centre itself may trigger failures of the linked banks.

- *Market concentration*: Economic theory does not provide an unambiguous response to the question of the impact of increasing concentration in banking markets on the stability of interbank markets, although some authors do find that such a trade-off exists in certain circumstances. [6] However, concentration increases the probability of "too-big-to-fail" type intervention in a crisis, which may induce excessive ex ante risk-taking behaviour on the part of large banks and increase the risk of crisis. Moreover, in the absence of too-big-to-fail intervention, the severity of contagion may be reinforced by a high degree of concentration.

- *Risk mitigation techniques*: Risk mitigation techniques, such as collateralised interbank loans (e.g. repos) reduce the risks of contagion. On the other hand, the existence of a repo market may lead to the disappearance of the uninsured international interbank market (Freixas and Holthausen, 2001). This can occur as a result of asymmetric information; a bank that attempts to obtain an unsecured cross-border loan may be suspected of having had the loan denied by other domestic banks which have more information about the borrower.

- *Netting mechanism*: The use of netting contracts among banks is a mechanism for reducing interbank exposures. A problem at one bank is then less likely to initiate a "domino effect" on the interbank market. Emmons (1995), however, shows that netting of interbank claims shifts the bank default risk away from interbank claimants towards non-bank creditors, i.e. the risk is transferred to the banks' creditors who are not included in the netting agreement.

- *Limits to large exposures*: Limits imposed by authorities on banks' large exposures (see e.g., the 1992 EU Directive on the monitoring and control of large exposures of credit institutions) contribute to reducing contagion risk. Limits are usually formulated in terms of banks' own funds. For example, the EU Directive states that a bank's maximum exposure to a single counterparty may not exceed 25 p.c. of regulatory own funds, and the cumulative amount of individual exposures exceeding 10 p.c. of regulatory own funds may not exceed 800 p.c. of those own funds.

- *Central bank intervention*: Potential central bank intervention, as well as the presence of safety nets, lowers contagion risk. Central banks may decide to provide liquidity to the market as a whole when aggregate liquidity is insufficient, or directly to individual banks when the market fails to provide liquidity to sound financial institutions. Moreover, although interbank exposures are not explicitly covered by deposit insurance, issues such as "too-big-to-fail" may introduce implicit deposit insurance for these exposures.

3. Features of the Belgian interbank market

In the previous section we have highlighted the links between the structure of the interbank market and the risks of contagion. In this section we describe some important features of the Belgian interbank market, their evolution over time, and their potential impact on contagion. Two main features, which reflect two different dimensions of contagion risk, are considered: (i) the size of the market and (ii) the structure of interbank loans and deposits. The size of the market determines the maximal direct knock-on effect on the banking system of defaults on interbank loans. The structure of interbank loans and deposits, in particular their maturity and secured character, also influences the nature of contagion risks.

3.1 Size

Although aggregate interbank exposures of Belgian banks have increased over time (interbank loans represented a gross exposure of € 176 billion at the end of 2002 vs. € 92 billion at the end of 1992, while on the same dates interbank deposits amounted to € 228 billion vs. € 119 billion), their growth has paralleled that of total bank assets. Indeed, between Q4-1992 and Q4-2002, interbank loans grew at a compound annual rate of 6.8 p.c., compared to 6.6 p.c. for total assets, and interbank exposures now represent just a slightly higher fraction of total assets than ten years ago. [7] Interbank loans of Belgian banks have consistently represented 20 to

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(6) For an overview of these issues see e.g. Carletti and Hartmann (2002), Carletti et al (2002) examine the effects of bank mergers on reserve management and on interbank market liquidity. They argue that the probability of the banking system experiencing a liquidity shortage following a merger hinges on several factors, including the cost of refinancing on the interbank market relative to the cost of raising deposits and the structure of the post-merger liquidity shocks to banks'. Allen and Gale (2003) show that contagion is less likely to occur in imperfect competition than in a perfectly competitive interbank market. Indeed, in imperfect competition, banks' actions affect the price of liquidity, leading banks to adopt strategical behaviour that may reduce contagion.

(7) Unless otherwise noted, the figures presented in this paper are reported on a company basis only. The interbank exposures represent interbank loans and deposits as reported in banks' balance sheet data. They exclude assets, such as bank bonds, shares or off-balance-sheet instruments. The figures provide an estimate of the stock of interbank loans and deposits owned by Belgian banks at a particular point in time.

30 p.c. of their assets over the last decade, while their deposits accounted for 28 to 40 p.c. of their liabilities. As Chart 1 illustrates, these ratios are broadly in line with the average at the EMU level (at the end of 2001, EMU interbank loans accounted for 22 p.c. of total assets), although there are significant differences between countries such as Finland (3 p.c.) or Luxembourg (48 p.c.). [8]

Several factors have contributed to a recent reduction in the relative importance of interbank exposures of Belgian banks relative to their peak during the past decade. First, 1999 was marked by the transition to a single currency in the whole euro area. This reduced the number of currencies traded by Belgian banks and subsequently the need to take positions in them. Secondly, the adoption of more effective large payment systems with real time gross settlement led to a drop in bilateral accounts between banks, as well as to less recourse to correspondent banking networks. Thirdly, the major consolidation wave in the Belgian banking sector in recent years has coincided with a decrease in the volume of domestic transactions, since interlinkages between merging banks were offset. Finally, actions by several large foreign banks to centralise their treasury management operations may also have contributed to reducing interbank loans and deposits of their Belgian subsidiaries.

As can be inferred from Chart 1, interbank deposits and interbank loans evolve very similarly. However, the magnitude of their movements differs, so that the net position [9] of the Belgian interbank market fluctuates, although it always remains negative. At first sight, this dependence vis-à-vis foreign countries may appear to be a source of vulnerability. In reality, several alternative sources of liquidity could compensate for a potential outflow of interbank liquidity. Central banks, for instance, may intervene to ensure the smooth redistribution of liquidity. The portfolios of Belgian banks also include a large proportion of government bonds, giving them quick access to liquidity. Moreover, the situation of Belgian banks is far from exceptional. According to OECD statistics, several European countries also have a structurally negative interbank net position. This negative net position is due not only to the structure of their banking systems but also to differences in the tax treatment of deposits across countries. [10] Finally, it should be noted that the net position of the Belgian banking system has tended to become less negative over the last five years.

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(8) According to the ECB (2002a), it is hard to find uniformity in the nature and importance of interbank activities across institutions and across countries because of the different banking structures characterising each EMU member.

(9) The interbank net position is defined as the difference between interbank loans (claims banks hold on other banks) and interbank deposits (claims other banks have on these banks). Hence, a negative net position implies that the interbank deposits are greater than the interbank loans.

(10) Huizinga and Nicodème (2001) find that non-bank international deposits are positively related to wealth taxes and to the presence of domestic bank interest reporting. This suggests that non-bank international deposits are in part determined by tax concerns. With regard to international interbank deposits, the tax treatment of deposits also undoubtedly plays a role, although it is not the sole driver. Chevallier-Farat (1988) reports, for instance, that the creation of off-shore areas in the United States in 1981 (International Banking Facilities) triggered massive movements of international interbank funds. Moshirian and Bishop (1997) show that international interbank movement of funds were determined, among other things, by the relative cost of capital (which is affected by differences in tax treatments) between countries. One partial explanation for the negative net position of the Belgian banking system could be the fiscal asymmetry between Belgium and its neighbouring countries, in particular Luxembourg. Due to the lenient tax treatment of savings in neighbouring countries, some neighbouring countries attract the savings of some Belgian households. This may explain why some banks of these countries have excess liquidity that they could lend afterwards to e.g. Belgian banks.

CHART 1   INTERBANK LOANS AND DEPOSITS OF BELGIAN AND EMU BANKS AS A P.C. OF TOTAL ASSETS
(Weighted average ; Belgian figures on a monthly basis ; EMU figures on an annual basis)
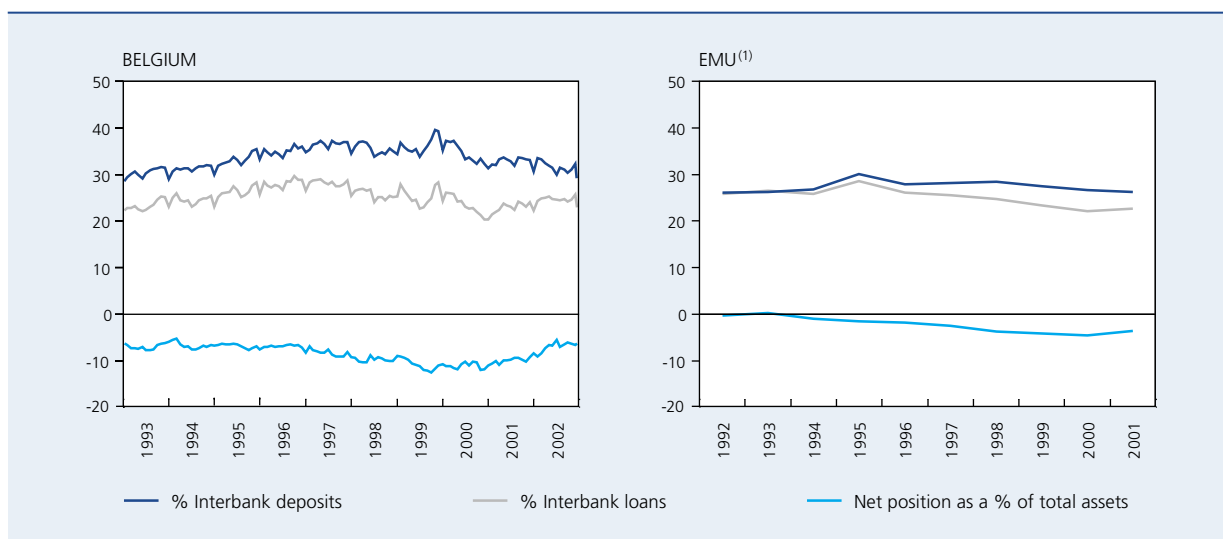
Sources : NBB, OECD.
(1) Greece, Luxembourg and Portugal : commercial banks only ; Ireland from 1995 onwards only.

TABLE 1   STRUCTURE OF INTERBANK LOANS AND DEPOSITS OF BELGIAN BANKS

(December 2002, percentages)

Origin of counterparty	Belgium	EMU	RoW	Total
Interbank loans				
Sight deposits	0.3	0.6	1.1	2.1
Term loans	6.2	27.2	12.9	46.3
Secured loans	6.1	18.5	24.8	49.4
Other	2.1	0.1	0.0	2.2
Total	*14.7*	*46.4*	*38.9*	*100.0*
Interbank deposits				
Sight deposits	0.3	1.3	1.3	2.8
Term deposits	7.3	11.7	35.4	54.4
Secured deposits	6.7	20.3	15.7	42.7
Total	*14.4*	*33.3*	*52.4*	*100.0*

Source : NBB.

3.2 Structure

Interbank loans and deposits show considerable heterogeneity in terms of their maturity, their secured character, and the counterparties. Indeed, these interbank exposures comprise several components: sight deposits, time loans/deposits, central bank accounts, monetary reserves and secured loans/deposits such as repurchase agreements[11] or collateralised lending (Table 1).

Secured loans/deposits and term loans/deposits are the most important categories of both interbank loans and deposits. Secured interbank loans of Belgian banks now account for about 50 p.c. of interbank loans and secured deposits for about 43 p.c. of interbank deposits, whereas at the beginning of the nineties, secured loans represented less than 10 p.c. of total interbank loans (Chart 2).

The recourse to secured loans and the use of repos have actually constituted a major change in the strategy of Belgian banks during the last decade. Initially, secured loans became more important for exposures between Belgian banks. Over the last five years, however, secured loans have also caught up for exposures between Belgian banks and foreign banks.[12] This shift towards secured loans is an important change that we will keep in mind in interpreting the results of our contagion exercise in Section 4. In particular, the increased reliance on secured loans has probably contributed to a considerably lower risk of contagion by decreasing expected losses in case of default, by both Belgian and foreign interbank borrowers.

We may expect the use of secured loans to be further stimulated in the future by the EU directive on Financial Collateral.[13]
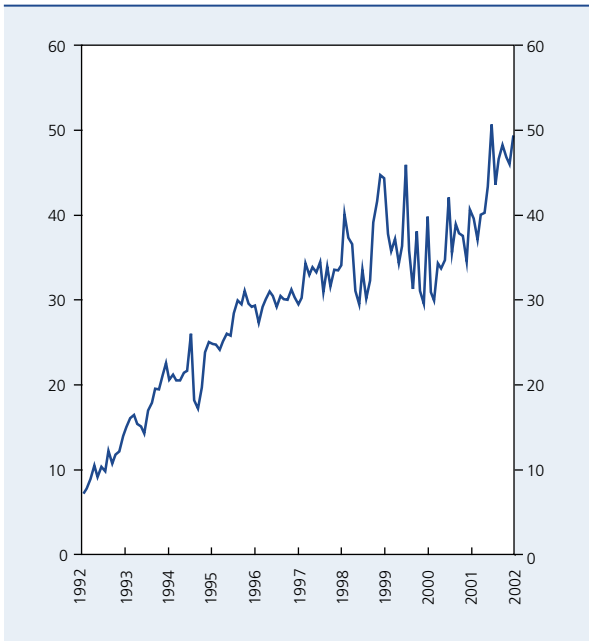
Another striking point revealed by Table 1 is the high level of internationalisation of the interbank market. Belgium is a particularly open economy, and so is its interbank market. A substantial share (more than 85 p.c.) of both interbank loans and deposits of Belgian banks is indeed cross-border. At the beginning of the nineties, this share already exceeded 70 p.c., and it has constantly increased since Q4-1998. These exceptionally high proportions of cross-border interbank loans and deposits highlight a feature of the Belgian interbank market which potentially transforms the risk of contagion, as well as the way it should be handled. Given that the lion's share of the interbank exposure is situated abroad, Belgian banks might be more sensitive to international crises than to domestic ones, and any attempt to assess the impact of interbank markets on Belgian financial stability must be viewed in that perspective. A significant step in this direction was taken with the agreement on the memorandum of

(11) A repurchase agreement (repo) is an agreement between two parties whereby one party sells the other a security with a commitment to repurchase it at a pre-specified date and price. Most repos are overnight transactions, with the sale taking place on the first day and being reversed the day after. A repo is considered as a loan since the party selling the security disposes of funds which have to be repaid afterwards. It is secured because the party that purchases the security holds it as collateral.

(12) The monetary policy reform in Belgium in 1991 fostered the use of repos between Belgian banks. Since the EU legislative framework on monetary policy was developed later, the use of collateral between EU banks also increased later.

(13) Directive 2002/47/EC of the European Parliament and of the Council of 6 June 2002 on financial collateral arrangements. See e.g. NBB (2002).

CHART 2   **SECURED INTERBANK LOANS**

(Percentages of total interbank loans)

Source : NBB.

understanding on high-level principles of co-operation in crisis management by EU countries, which aims at co-ordinating interactions between supervisors and central banks at the EU level. [14]

Banks of the neighbouring countries (i.e. France, the Netherlands, Luxembourg, Germany and the UK) represent the most important interbank positions in the balance sheets of Belgian banks (Chart 3). This is not surprising since the UK, France and Germany all tend to operate as interbank centres. Moreover, the connections between Belgian banks and Luxembourg or the Netherlands are heavily influenced by the shareholder structures of large Belgian banks. Since Belgian banks have strong links with these countries, we will pay particular attention to them in our contagion exercise.

The maturity structure of interbank loans is also important for determining the consequences of potential contagion. Both interbank loans and deposits show a relatively short maturity (Table 2), and only 24.1 p.c. of interbank loans have a maturity exceeding 3 months. [15] It thus seems that Belgian banks use interbank markets mainly to manage their short-term liquidity needs.

The interbank market is highly concentrated, as suggested by Table 3, which provides data on interbank exposures of banks by bank size groupings. Several observations follow from this table. First, the value of interbank loans and deposits correlates with bank size. Second, the

(14) See ECB Press Release, 10 March 2003.

(15) Data on the German interbank market (Upper and Worms, 2002) indicate that more than 75 p.c. of the interbank assets and liabilities have a maturity exceeding 1 month and more than 50 p.c. of the interbank assets and liabilities have a maturity exceeding 4 years.

CHART 3   **INTERBANK POSITIONS OF BELGIAN BANKS VIS-À-VIS EUROPEAN COUNTRIES**

(December 2002, percentages, data on a territorial basis [1])
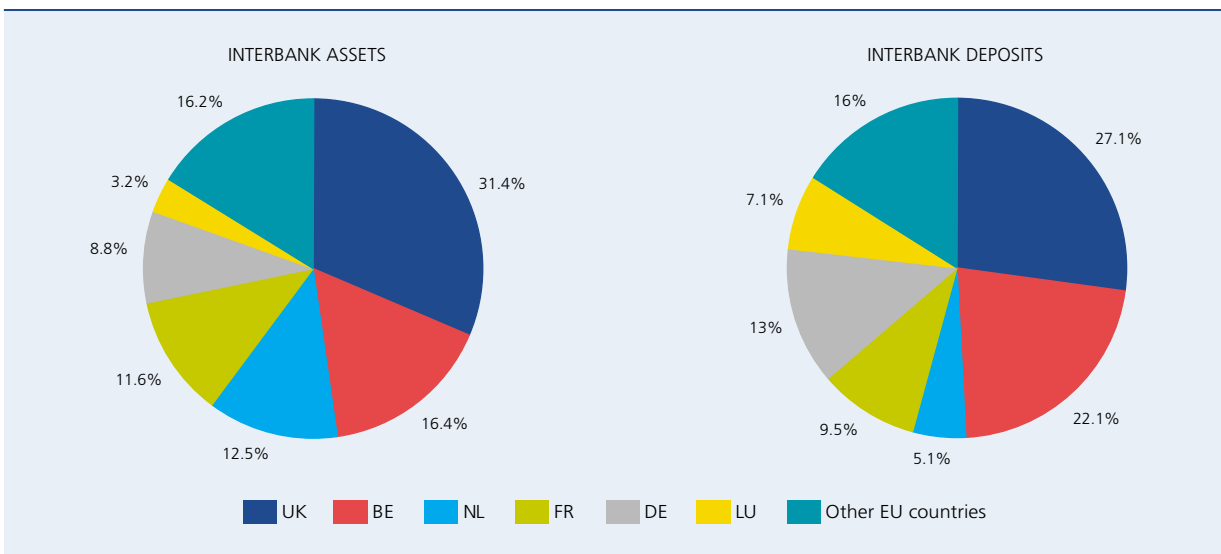
Source : NBB.

(1) Sample composed of the same banks as in the other tables.

TABLE 2   RESIDUAL MATURITY OF INTERBANK LOANS AND DEPOSITS OF BELGIAN BANKS

(December 2002, percentages)

	<= 8 days	8 days – 1 month	1-3 month	3-6 months	6 months – 1 year	> 1 year	Undetermined
Loans	28.0	22.6	25.3	11.5	8.4	2.9	1.3
Deposits	39.5	25.4	17.2	9.3	6.7	1.8	0.1

Source : NBB.

negative net interbank position of the Belgian banking sector is attributable almost exclusively to the negative positions of the four major banks (group G1). With the exception of group G3, all groups other than G1 have a positive net position.

A third observation suggested by Table 3 is that interbank activities with foreign banks are mainly concentrated in large Belgian banks. However, access to international interbank markets does not seem to be limited strictly to large banks. In particular, Belgian subsidiaries of foreign banks often have important intra-bank positions. Nevertheless, the proportion of foreign interbank loans and deposits tends to decrease with bank size. This may be true for several reasons. For instance, smaller banks may not reach the critical size necessary to conclude transactions on the international interbank market. Smaller banks could also be less known internationally, which could effectively deny them access to the international interbank market.

This would, in a sense, provide support for one of the scenarios presented by Freixas and Holthausen (2001), where large banks with a good international reputation act as correspondent banks for their domestic peers in order to overcome problems of asymmetric information.

3.3 Summary

Although the gross interbank exposures of Belgian banks have increased over time, interbank loans and deposits currently represent about the same percentage of total assets as ten years ago. Moreover, banks have increased their recourse to secured loans, and their interbank loans are mainly short term. The nature of contagion risk has likely been further affected by two trends: the continuing growth in the importance of cross-border interbank loans and increasing concentration of the Belgian banking market.

TABLE 3   INTERBANK EXPOSURES BY BANK SIZE CATEGORIES

(December 2002, billions of euros)

Group [1]	Percentages of banking sector assets	Interbank Loans				Interbank Deposits			
		Total Interbank Loans	Loans to EMU	Loans to RoW	Share of foreign loans in group total (Percentages)	Total Interbank Deposits	Deposits from EMU	Deposits from RoW	Share of foreign deposits in group total (Percentages)
G1	85.1	151.1	70.6	64.0	89.1	207.5	71.4	111.7	88.2
G2	11.2	18.3	9.4	3.0	67.6	13.2	3.9	4.9	66.8
G3	2.7	4.5	1.3	1.4	60.6	5.9	0.6	2.5	52.7
G4	0.8	1.9	0.4	0.3	36.3	1.6	0.0	0.6	38.6
G5	0.3	0.6	0.2	0.0	30.8	0.4	0.0	0.0	0.0
Total	100.0	176.5	81.9	68.7		228.6	75.9	119.7	

Source : NBB.

(1) The group G1 comprises the four large banks. The remaining 61 banks are grouped in G2 to G5 according to their size. Each group consists of 15 banks, except G5 which comprises 16 banks.

4. Simulation analysis of systemic risk on the Belgian interbank market

Section 3 has described some important characteristics of the Belgian interbank market; however, the extent to which these characteristics affect contagion risk was not formally investigated. This section presents the results of a contagion exercise[16] – similar to the ones carried out by other central banks[17] – whose objective is to quantify the effects of a sudden and unexpected failure by a banking counterparty of Belgian banks at a specified point in time. As noted earlier, the approach is rather mechanical as it does not take into account the behaviour of the various players (banks, regulators) or their (changes in) expectations. It therefore does not aim to depict the exact reactions of interbank players in a crisis. Rather, it is an exercise designed to analyse a stress situation created by interbank market linkages and, in the cases where contagion occurs, to investigate how it would spread and the amount of bank losses that would result.

The interbank exposure data used in the analysis are reported on a company basis only; i.e. they include the foreign branches of Belgian banks and Belgian subsidiaries of foreign banks, but they do not include foreign subsidiaries of Belgian banks or Belgian branches of foreign banks. Unreported results show that the figures, when available, do not differ significantly when based on other data (collected on a territorial or consolidated basis). Interbank exposures represent interbank loans and deposits as reported in banks' balance sheet data. Other types of assets, such as bank bonds, shares or off-balance-sheet instruments, are not reported.

4.1 Overview of the methodology

In order to quantify contagion risk, we have successively simulated the consequences of default on interbank obligations of each individual Belgian or foreign banking counterparty. In the exercise (see Box 1 for details on the methodology), we define bank "failure" following default by an interbank borrower as a situation where the lender bank's tier-I capital becomes negative as a result of the default. The extent to which the lender's capital decreases following the borrower's default depends on both the exposure at default and the loss given default (LGD). As explained in the Box, the initial default of a bank on its interbank obligations may cause successive rounds of defaults. The contagion effect ends when banks that defaulted during the last round do not cause any new bank defaults.

This exercise requires information on bilateral interbank exposures of Belgian banks. We estimate these exposures via two methods. We first use banks' reported large interbank exposures (exceeding 10 p.c. of own funds, together with the name of the counterparty).[18] We then use a second source of information – the total amount of interbank loans and deposits reported by each individual bank. The simulation technique with the latter source of information requires making an assumption regarding the distribution across other banks of each bank's total exposures. Following other similar studies, we assume maximum dispersion of these exposures across banks (see Box 1 for details).

These two estimation techniques, and the general contagion exercise, involve biases – some of which tend toward underestimation and others toward overestimation of contagion risk.[19] The sources of bias are summarised below. The extent to which contagion risk will actually be underestimated or overestimated in our simulations will obviously depend upon the importance of each of these sources.

Factors causing underestimation of contagion risk:

- Measure of interbank exposures, which includes interbank loans and deposits only and does not include other interbank exposures, such as off-balance-sheet exposures.

- Distributional assumption of maximum dispersion of banks' interbank exposures (see Box 1).

- Indirect effects of the failure of foreign banks are not taken into account, since we are not able to measure contagion between foreign banks.[20]

- Credit risk is the only source of interbank contagion; liquidity risks[21] are ignored.

- Conservative definition of bank failure: banks may fail before their tier-I capital is exhausted.

(16) The full contagion exercise, as well as the methodology used and its shortcomings, is presented in detail in Degryse and Nguyen (2003).

(17) See e.g. Upper and Worms (2002) or Wells (2002).

(18) The extent to which the large interbank exposures cover a bank's total interbank exposures varies from one bank to another. The large exposures reported by the five largest Belgian banks' covered on average about 70% of their total interbank exposures as reported in their balance sheets. The non-reported exposures probably represent a smaller risk in terms of contagion.

(19) A bias against contagion minimises Type II errors, i.e. incorrectly accepting a false hypothesis. This implies a trade-off in terms of Type I errors, i.e. incorrectly rejecting a true hypothesis. In other words, in the presence of a bias against contagion, we might be able to state that there is a potential for contagion. On the other hand, we would not be able to say that contagion is non-existent.

(20) When we measure the impact on Belgian banks of the failure of a foreign bank, we disregard the "foreign second and further round effects". However, the failure of a foreign bank is likely to have an impact on its domestic market, and some foreign banks (possibly counterparties of Belgian banks) may default subsequent to the first failure, worsening the overall situation of Belgian banks. We undertake a type of sensitivity analysis in Section 4.2.2 to try to compensate for this limitation.

(21) Liquidity risk is the risk that a bank experiences a liquidity shortfall because its counterparty fails to meet its obligations. For instance, a bank may face a liquidity shortfall because its counterparty postpones a repayment or because it takes time to realise collateral.

- Bank panics by depositors assumed not to occur. [22]

Factors causing overestimation of contagion risk:

- Banks assumed not to be able to refinance or to raise additional capital.

- Banks assumed not to anticipate crises and reduce their interbank exposures.

- Safety nets assumed absent.

- Measure of interbank exposures is on a company basis and not on a consolidated basis. [23]

The fact that the contagion exercises are mechanical and potentially involve biases suggests that the results reported below should be interpreted in much the same spirit as those of a stress test. Yet, despite the caution that must be exercised in interpreting the results, this type of exercise represents one of the only means of obtaining any quantitative assessment of interbank contagion risk. This type of exercise has also been undertaken by other central banks and thus allows for some international comparisons. The results may provide general indications regarding the relative importance of different sources of interbank contagion.

[22] Bank panics may occur following an individual bank's failure if depositors make inferences about systemic weakness based on observation of the individual failure (see Aghion et al., 2000).

[23] Interbank exposure data were not available on a consolidated basis. Although the use of data at a company level leads to the implicit assumption that cross-border intra-group exposures are between different banks, our actual simulations reveal few cases where such exposures cause "contagion".

Box 1

Methodology of the contagion exercise

The methodology applied in this paper is based on Upper and Worms (2002), and aims at assessing the impact on the Belgian financial system of the sudden and unexpected failure of each banking counterpart of Belgian banks. The contagion test uses the matrix of interbank bilateral exposures, **X**, to study the crisis propagation mechanisms. The matrix **X** of bilateral exposures summarises the interbank exposures of Belgian banks towards the other *(N-1)* Belgian banks and the **M** foreign banks:

$$X = \begin{bmatrix} x_{11} & \cdots & x_{1j} & \cdots & x_{1N} & w_{11} & \cdots & w_{1M} \\ \vdots & \ddots & \vdots & \ddots & \vdots & \vdots & & \vdots \\ x_{i1} & \cdots & x_{ij} & \cdots & x_{iN} & \vdots & & \vdots \\ \vdots & \ddots & \vdots & \ddots & \vdots & \vdots & & \vdots \\ x_{N1} & \cdots & x_{Nj} & \cdots & x_{NN} & w_{N1} & \cdots & w_{NM} \end{bmatrix}$$

$$\text{with } \sum_{j=1}^{N} x_{ij} = a_i = \sum_{i=1}^{N} x_{ij} = l_j \text{ and } \sum_{j=1}^{M} w_{ij} = fa_i$$

where x_{ij} represents the gross exposure of bank i to the Belgian bank j, w_{ij} represents the gross exposure of bank i to the foreign bank j, a_i represents the Belgian interbank assets of bank i, l_j represents the Belgian interbank liabilities of bank j and fa_i represents the foreign interbank assets of bank i.

The simulations successively study the impact of the failure of one of the **N** Belgian banks or one of the **M** foreign banks for a given **LGD**. The initial failure causes an additional failure when the exposure of one bank to failed banks is large enough to offset its tier-I capital. More specifically, the bank i fails following other failures when

$$C_i - \sum_{j=1}^{N} \theta x_{ij} - \sum_{j=1}^{M} \theta w_{ij} \prec 0$$

for all banks *j* that failed

where C_i refers to the tier-I capital of bank i and θ refers to the **LGD**. The **LGD** is assumed to be constant and identical for all the failed banks. We use the gross exposures x_{ij} and w_{ij} instead of the netted ones $(x_{ij} - x_{ji})$, since in case of bankruptcy, netting would appear to be unlikely to occur. The initial default may cause several rounds of failures when the combined effects of the failed banks trigger new failures at each round. The contagion effect ends when banks that failed during the last round of failures do not cause any additional failures, i.e. when the system is again stable.

The matrix of bilateral exposures is unknown. Similarly to Wells (2002), we use two alternative assumptions to solve this problem. The first one consists of using a matrix of bilateral exposures based on large exposures only. The second one entails using the information contained in each bank's total exposures to Belgian banks a_i and l_j and making an assumption on how they are distributed in the matrix.

Banks report their exposures (including their interbank exposures) exceeding 10 p.c. of their own funds. This source of information allows us to fill in several cells in the matrix of bilateral exposures but does not provide the full matrix since it omits smaller exposures, which are probably less significant in terms of contagion risk. These data do not require any additional assumption on the distribution of exposures and they include exposures to foreign banks.

The second technique, which is commonly used in computing input-output tables and frequently used in contagion exercises, is based on the observed a_i and l_j which only provide incomplete information on interbank exposures, i.e. the column and row sums of the matrix X, or the marginal distribution of the x_{ij}. Since the information is partial, we need to make an assumption on the distribution of the individual interbank exposures. We assume that banks seek to maximise the dispersion of their interbank activities. With the appropriate standardisation, this would be equivalent to assuming that $X = X^o$ such that $x_{ij} = a_i l_j$. However, such a distribution would neglect an important feature of the interbank market which is that banks do not have interbank exposures to themselves, so we have to add the constraint that $x_{ij} = 0$ for each x where $i = j$. The constrained matrix of bilateral exposures should stay as close as possible to X^o. Technically, this is equivalent to minimising the distance function (measured by the relative entropy) between X^o and the constrained matrix. This can be done by solving the following problem:

$$\min \sum_{i=1}^{N} \sum_{j=1}^{N} x_{ij} \ln\left(\frac{x_{ij}}{x_{ij}^0}\right)$$

$$\text{subject to } \sum_{j=1}^{N} x_{ij} = a_i \, ;$$

$$\sum_{i=1}^{N} x_{ij} = l_j \, ;$$

$$x_{ij} \geq 0 \, ;$$

with the convention that $x_{ij} = 0$ when $x_{ij}^0 = 0$, and $(0 \ln(0/0))$ is defined to be 0.

This kind of problem is easily solved with the **RAS** algorithm [1]. This approach, however, allows us to construct a matrix of bilateral exposures between Belgian banks only, so, when we use the second technique, we unfortunately do not have any information on foreign banks.

(1) See e.g. Blien and Graef (1997).

4.2 Results

4.2.1 Contagion triggered by the default of a Belgian bank

Table 4 reports results of our contagion exercise under the assumption that the initial interbank defaulter (the so-called "first domino") is a Belgian bank. In December 2002, there were 65 banks incorporated in Belgium, i.e. 65 potential sources of contagion. The first panel of the table presents results where bilateral exposures were estimated on the basis of the large exposure data, and the second panel on the total interbank exposure data (maximum entropy distribution). As Table 4 shows, the frequency of contagion occurring in the simulations is limited. Under the extreme assumption of 100 p.c. loss given default (LGD), no more than 12 unexpected Belgian bank failures cause the failure of at least one other Belgian bank. The knock-on effects are also limited. Indeed, in a worst-case scenario[24], banks that would lose their tier-I capital as a result of the interbank defaults in the simulations would never represent more than 3.8 p.c. of the total assets of Belgian banks.[25] Thus, the default of a Belgian bank in the interbank market cannot,

in the context of this exercise, cause a large Belgian bank to lose all of its tier-I capital. Moreover, if we assume an LGD of 40 p.c., which would probably be more realistic given that secured loans account for more than 50 p.c. of total interbank loans[26], the losses are lower. Finally, in the median scenarios[27], the percentages of assets represented by banks losing their tier-I capital are considerably lower than in the worst-case scenarios.

Interestingly, contagion between Belgian banks does not appear to have always been this low.

(24) The worst-case scenario is the scenario for which the percentage of total banking assets represented by banks losing their entire tier-I capital is greatest.

(25) This figure comes from the entropy maximisation simulations. The figure decreases to 3 p.c. for the simulations using large exposure data.

(26) The statistical estimation of an LGD for Belgian banks is very difficult, since fortunately very few Belgian banks have failed in the last decades. Moreover, actual losses on a defaulting bank can prove very complicated to calculate, since they depend on the time horizon chosen. Altman and Kishore (1996) estimate average recovery rates on defaulting bonds of financial institutions (for the period 1978-1995) to be about 36 p.c. However, recovery rates vary by type of institution: mortgage banks, 68 p.c.; finance companies, 46 p.c.; financial services, 42 p.c.; commercial banks, 29 p.c.; savings institutions, 9 p.c.. However, the LGD for bonds is probably very different from the LGD for comparable loans (which in our case comprise secured and unsecured assets). James (1991) estimates that losses average 30 p.c. of the failed bank's assets and that the direct expenses associated with bank closures average 10 p.c. of assets, making a total of about 40 p.c.. Seeing that more than 50 p.c. of interbank loans granted by Belgian banks are secured, it may therefore be realistic to assume a recovery rate of somewhere between 60 and 80 p.c. (i.e. an LGD between 40 and 20 p.c.).
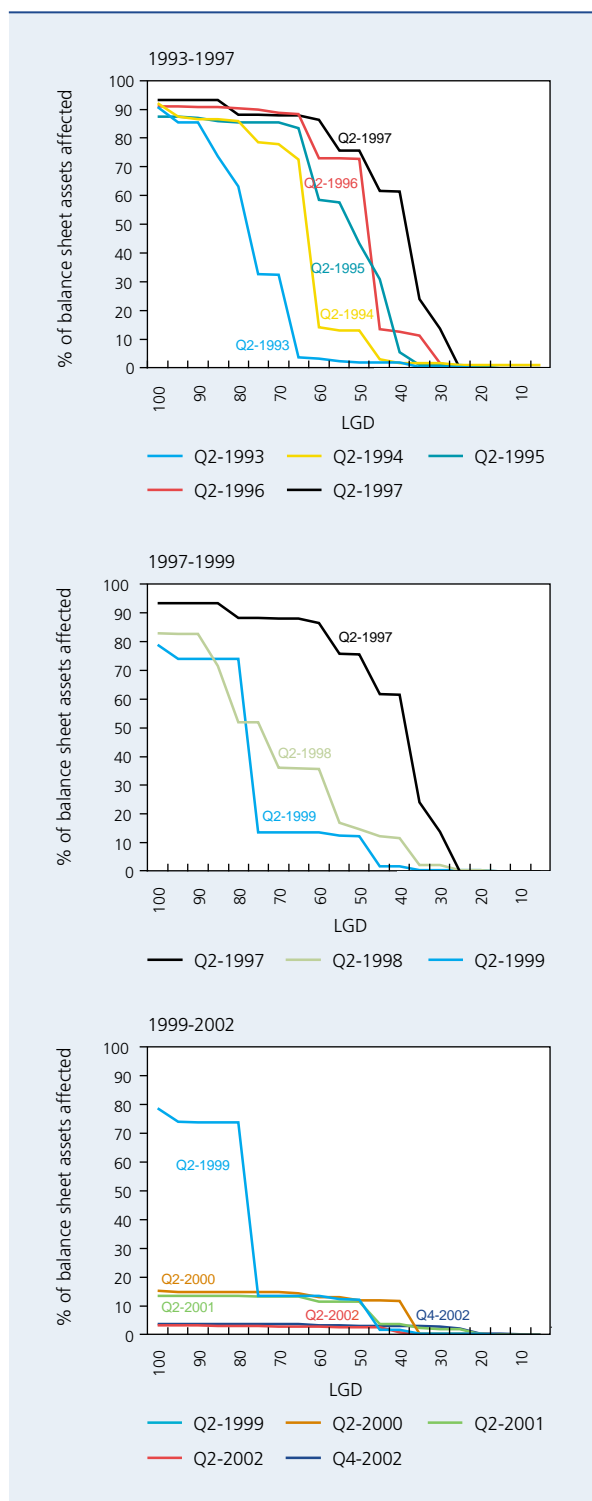
(27) The median scenario gives the median value, across all of the scenarios where contagion occurs, of the percentage of total banking assets represented by banks losing their tier-I capital.

TABLE 4   CONTAGION EXERCISE : BELGIAN BANK AS INITIAL DEFAULTER

LGD (Percentages)	Number of scenarios where contagion occurs (out of 65 possible scenarios)	Maximum number of failed banks in a scenario, (including "first domino")	Median scenario Percentages of balance sheet assets affected (excluding assets of "first domino")	Worst-case scenario Percentages of balance sheet assets affected (excluding assets of "first domino")
Large Exposures at Q4 – 2002				
100	12	12	0.46	2.97
80	10	11	0.44	2.27
60	10	8	0.16	1.77
40	7	6	0.14	1.77
20	3	3	0.03	0.14
Maximum entropy distribution at Q4 – 2002				
100	4	18	3.33	3.79
80	4	17	2.13	3.75
60	4	13	1.73	3.33
40	2	11	2.98	3.04
20	2	5	0.50	0.50

Source : NBB.

CHART 4

CONTAGION EFFECT : WORST-CASE SCENARIO

(1993-2002)

1993-1997

% of balance sheet assets affected

Q2-1997

Q2-1996

Q2-1995

Q2-1994

Q2-1993

LGD

— Q2-1993   — Q2-1994   — Q2-1995

— Q2-1996   — Q2-1997

1997-1999

% of balance sheet assets affected

Q2-1997

Q2-1998

Q2-1999

LGD

— Q2-1997   — Q2-1998   — Q2-1999

1999-2002

% of balance sheet assets affected

Q2-1999

Q2-2000

Q2-2001

Q2-2002   Q4-2002

LGD

— Q2-1999   — Q2-2000   — Q2-2001

— Q2-2002   — Q4-2002

Source : NBB.

Our contagion exercises conducted on historical data (using the maximum entropy distribution) show that, over the last decade, the worst-case scenarios in the case of contagion triggered by a Belgian bank have been subject to three major changes (Chart 4). Between 1992 and 1997, the worst-case scenario consistently worsened. Between 1997 and 1999, the worst-case scenario improved; i.e., the curve in Chart 4 decreased each year. Finally, since 1999 the curve has flattened. Thus, the amount of contagion generated in simulations with current data appears to be at a record low.[28] These trends are particularly striking for an LGD of 40 p.c. In this case, the percentage of total banking assets affected by contagion, excluding the first domino, varies over the time period from 61 p.c. to 3 p.c..

Several changes in the banking landscape could explain the results of these historical simulations. Between 1992 and 1997, the share of interbank assets in total assets tended to increase. This amplified the exposure of Belgian banks to other Belgian banks and increased the potential consequences of contagion in the worst-case scenario. Since 1997, mergers may have had an impact on the worst-case scenario. Large banks now seem to show an increased tendency to operate as money centres, where the failure of a bank linked to the money centre does not trigger the failure of the money centre itself. The decrease over time in medium-sized players, which were large enough to cause other banks to "fail" in the contagion exercise, also dampened the contagion effect observed over time in the simulations. Moreover, following consolidation, large banks have further increased their cross-border interbank exposures.[29] The bilateral interbank exposures between the large Belgian banks are now such that they no longer cause contagion in the simulations, although the failure of a large bank does still trigger the failure of small banks in the simulations.

This decrease in contagion over time for the domestic market simulations is potentially reassuring, although as noted earlier, these simulations may under- or overestimate the actual risk of contagion. Interbank loans to Belgian counterparts, however, constitute only a small portion of Belgian banks' interbank loans, and a decrease in domestic contagion risk could have been accompanied by an increased sensitivity of Belgian banks to the international interbank market. This suggests the need for an assessment of contagion risk triggered by foreign banks.

[28] Unreported tests show that the trends observed are not sensitive to the quarter chosen although in some rare cases and for some specific LGDs, the percentage of balance sheet assets affected by contagion might diverge from the general trend.

[29] Although the share of international interbank loans has always been high for large banks, it has increased over the last decade. In December 1992, the interbank loans granted by large Belgian banks to foreign banks accounted for 79 p.c. of total interbank loans. This proportion reached 89 p.c. at the end of 2002.

TABLE 5 CONTAGION EXERCISE : FOREIGN BANK AS INITIAL DEFAULTER

(Q4 – 2002, based on data on Belgian banks' large exposures)

LGD (Percentages)	Number of scenarios where contagion occurs (out of 135 possible scenarios)	Maximum number of failed Belgian banks in a scenario	Median scenario Percentages of Belgian banks' balance sheet assets affected	Worst-case scenario Percentages of Belgian banks' balance sheet assets affected	Long Term Fitch credit rating of the first foreign bank to fail in the worst case scenario ("first domino")
100	13	8	0.1	20.0	AA–
80	9	8	0.0	20.0	AA+
60	8	6	0.0	18.2	AA+
40	3	3	0.1	18.1	AA+
20	1	3	0.1	0.1	A

Source : NBB.

4.2.2 Contagion triggered by the default of a foreign bank

About 85 p.c. of Belgian interbank loans are granted to foreign banks. Foreign interbank positions thus represent a potential source of contagion that may be more important than domestic contagion risk. We therefore extend the contagion exercise to the foreign interbank market. Absence of data on the total interbank exposures of foreign banks, however, prevents us from using the maximum entropy technique for our simulations. The simulations are therefore limited to use of Belgian banks' large exposure data.

Table 5 reports the results of the contagion simulations when a foreign bank is the first defaulter (the "first domino") and when large exposure data are used. This table shows that given a 100% LGD the default of one large foreign bank can lead to the failure of 8 Belgian banks. In the worst-case scenario, the assets represented by Belgian banks losing their tier-I capital account for 20 p.c. of total Belgian bank assets. This result is considerably higher than the comparable figures for contagion simulations with Belgian banks as first dominos. Table 5 also indicates that even for an assumed LGD of 40 p.c., the default of a foreign bank can, in the worst-case scenario, have a significant impact on Belgian banks. Note that a small number of scenarios represented in Table 5 are due to cross-border intra-group positions; however, these scenarios represent exceptions rather than the rule.

Interestingly, contagion occurs less frequently (in less than 10 p.c. of cases) in the foreign-bank failure simulations than in the simulations where the first domino is a domestic bank. At most 13 of the 135 foreign counterparties listed by Belgian banks (in their reporting of large exposures) trigger contagion in the exercise. However, as the above discussion suggests, when cases of simulated contagion by foreign bank failure occur, they can affect a larger proportion of Belgian banking assets. Note, how-

ever, that large differences exist between the median and the worst-case scenarios. For an LGD of 100 p.c., only 3 of the 13 simulations that involved contagion entailed the failure of banks representing at least 10 p.c. of the total assets of the Belgian banking system. In addition, all of the foreign banks representing the first domino in the worst-case scenarios are European banks and all are ranked as investment grade, which suggests that actual interbank defaults by these banks are unlikely. Unfortunately, the absence of a long time series of bank large-exposure data prevents us from studying changes in the international risk of contagion over time.

As noted above, this contagion analysis cannot incorporate indirect effects of the failure of foreign banks (i.e., failure of other foreign banks as a consequence of failure of a given foreign bank). One way to roughly take account of indirect effects is to use data on exposures of

TABLE 6 SENSITIVITY OF BELGIAN BANKS TO LOSSES ON THEIR INTERBANK EXPOSURES TO FRANCE, THE UK, AND THE NETHERLANDS

(December 2002; assets of failed Belgian banks as a p.c. of total assets of Belgian banks; calculations based on data on a territorial basis)

Percentage default of country's interbank exposures	France	UK	Netherlands
100	22.2	93.6	41.8
80	22.2	41.5	40.6
60	21.8	39.8	40.1
40	0.0	39.7	0.5
20	0.0	0.0	0.5

Source : NBB.

Belgian banks to entire countries, instead of exposures to individual counterparts. Table 6 presents results of simulations where we assume that x p.c. of the interbank loans granted by Belgian banks to banks in a particular country are unrecoverable. The table reports only those simulations for which the total assets of failed Belgian banks resulting from the cross-border defaults exceeds 1 p.c. of total Belgian bank assets. For instance, in this exercise, if Belgian banks suddenly become unable to recover 80 p.c. of their interbank loans to French banks, Belgian banks representing 22 p.c. of the total assets of Belgian banks would incur losses (directly or indirectly) exceeding their tier-I capital. It is perhaps surprising to observe that apart from France, the Netherlands and the United Kingdom, simulations involving defaults on other countries' interbank loans (including Germany and Luxembourg) do not result in significant contagion in the Belgian banking sector. For instance, if we were to simulate the consequences of Belgian banks losing 100 p.c. of their exposures to German banks, the Belgian banks losing all of their tier-I capital as a result would represent less than 1 p.c. of total Belgian bank assets. Moreover, when we use more realistic loss rates, only the UK simulations yield significant levels of contagion in Belgium. This in fact reflects Britain's role as a money centre and the importance of British banks in the Belgian interbank market.

The results of this section suggest that, in the Belgian context, the international risk of contagion may deserve more attention than domestic contagion risk.

4.2.3 International comparison

Our study is closely related to other empirical work on estimating contagion through interbank linkages. [30] Sheldon and Maurer (1998) study the issue of systemic risk in the Swiss interbank market. They conclude that the number of potential cases of contagion arising from interbank linkages in Switzerland is quite low. However, the failure of a large Swiss bank would have serious implications, affecting almost all average-size banks. Furfine (1999), using data on bilateral exposures stemming from overnight U.S. federal funds transactions, finds that multiple rounds of failures are unlikely, and that aggregate assets at failing banks never exceed 1% of total assets of the commercial banks. The results of Upper and Worms (2002) for the German interbank market suggest, however, that the contagion risk is not always confined to a limited number of small banks. Indeed, they conclude that a bank failure can trigger contagion in a sizeable part of the German banking system, although safety nets considerably reduce this risk. Wells (2002) finds that contagion would only occur following the failure of some large UK banks, which

generally have a high credit rating. Finally, Elsinger et al. (2002), using a model that considers both credit risks and market risks and that endogenously determines the interbank flows, distinguish between fundamental (directly caused by a shock) and contagious insolvency. Their simulations indicate that in Austria, 97 p.c. of insolvencies may be classified as fundamental whereas only the remaining 3 p.c. are due to contagion.

Our results have suggested that interbank contagion risk in Belgium has evolved over time. Any attempt to compare our results with the results of simulations for other countries must therefore take this time dimension into consideration. Table 7 compares our results with other studies using the same methodology. It indicates that the simulated failure of a Belgian bank in December 1998 produced weaker contagion effects than the failure of a German bank in the same period, at least for high LGDs. Indeed, the worst-case scenario curves are higher for the German banking system than for the Belgian system except for the case of an LGD of 40 p.c.. When we compare our results with those of Wells (2002) for the UK, which uses data for end 2000, we find that the Belgian simulations produced a greater impact of contagion than for the UK. However, contagion occurred in a higher proportion of cases in the UK.

4.2.4 Institutional arrangements decreasing the risk of contagion

In recent months there have been several institutional initiatives aimed at decreasing the risk of (cross-border) financial contagion. We briefly mention two of them here : the Financial Collateral Directive and the Memorandum of Understanding on high-level principles of co-operation in crisis management.

The use of cross-border financial collateral in the European Union has been facilitated by the Financial Collateral Directive adopted by the European Parliament in 2002. This directive aims at encouraging the cross-border use of financial collateral, mainly by eliminating legal uncertainty concerning the use of collateral and by providing a uniform regime for banks with regard to the taking of financial collateral. This could further stimulate the cross-border integration of interbank markets. [31]

Banking supervisory authorities and the central banks of the European Union have recently agreed on a Memorandum of Understanding on high-level principles

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(30) As previously mentioned, contagion can propagate through other channels. Spill-overs through market expectations could for instance have increased for large banks, as shown by their increasing interdependencies as measured by their stock return correlations, see for instance De Nicolo and Kwast (2001).

(31) See NBB (2002).

INTERNATIONAL COMPARISONS

LGD (Percentages)	Case of multiple failures triggered by a domestic bank	Maximum number of failed banks in a scenario, (including "first domino")	Median scenario Percentages of balance sheet assets affected (excluding assets of "first domino")	Worst-case scenario Percentages of balance sheet assets affected (excluding assets of "first domino")
Maximum entropy distribution – Belgium December 1998 [1]				
75	7	34	0.50	56.00
50	2	21	14.49 [2]	28.46
40	2	16	7.69	14.87
25	1	2	0.50	0.50
10	0	1	–	0.00
Upper and Worms (Germany) end December 1998 [3]				
75	n.a.	2,444	0.85 [4]	76.30
50	n.a.	1,740	0.66 [4]	61.60
40	n.a.	115	0.58 [4]	5.00
25	n.a.	31	0.30 [4]	0.75
10	n.a.	19	0.26 [4]	0.57
Maximum entropy distribution – Belgium December 2000 [5]				
100	5	36	3.16	61.92
80	5	21	3.10	13.86
60	4	16	0.43	11.64
40	4	4	0.40	0.43
20	3	2	0.39	0.39
Wells (United Kingdom) end 2000 [6]				
100	4	n.a.	8.80	25.20
80	4	n.a.	1.00	6.70
60	3	n.a.	0.00	6.70
40	2	n.a.	0.00	0.00
20	0	n.a.	0.00	0.00

Sources: Upper and Worms (2002), Wells (2002), NBB.
(1) Out of 80 cases.
(2) Because the median is calculated on the basis of a very few scenarios, it can decrease when the LGD increases.
(3) Out of 3,246 banks.
(4) Average instead of median – not conditional on multiple failure.
(5) Out of 72 cases.
(6) Out of 33 cases.

of co-operation in crisis management situations. This MoU entered into effect on March 1, 2003. [32] With the adoption of this memorandum, the authorities have expressed their commitment to co-operate to ensure the stability of the financial system at the EU level. This agreement enhances the practical arrangements for handling banking crises in order to facilitate an early assessment of the systemic risk of a crisis.

(32) See ECB Press Release, 10 March 2003.

5. Concluding remarks

In this paper we have undertaken an empirical exercise to investigate the risk of contagion due to interbank exposures of Belgian banks. We have used existing information on the total amounts of interbank exposures of Belgian banks as well as banks' reported large interbank exposures.

Before summarising our main findings, we point again to the mechanical nature of our methodology. In our simulations, we start from data on interbank exposures and track the consequences of non-repayment of

(a fraction of) interbank loans on the equity capital of other banks, including any further domino-effects. This methodology does not allow for incorporating the role of market expectations or potential preventive measures taken by regulators and individual banks. Nevertheless, the exercise provides some insights regarding the potential impact of "stress" situations on the financial system.

Our simulations suggest that the risk of contagion due to domestic interbank defaults has decreased over the past decade. However, interbank exposures between Belgian banks currently represent only 15 p.c. of total Belgian interbank exposures, suggesting that the potential contagion risk stemming from foreign interbank exposures is more important. Our simulations indeed suggest that the failure of some foreign banks could have a sizeable effect on Belgian banks' assets.

The threat of contagion originating from foreign interbank borrowers, however, is mitigated by two main factors. First, our simulations indicate that cross-border interbank defaults have a major effect on the Belgian financial system only for high values of loss given default (LGD). Belgian banks currently maintain relatively high proportions of secured interbank exposures, which tend to lower LGDs. Second, the foreign banks whose interbank defaults had significant effects in our simulations are all internationally recognised and have high investment grade ratings.

The current structure and characteristics of the Belgian interbank market reflect several changes that have taken place over the past decade. Integration of money markets at the European level, increased recourse by banks to secured interbank exposures and several major mergers between Belgian banks have resulted in a trend towards market tiering and appear to have reshaped the risk of contagion. In the coming years changes in the microstructure of interbank markets may further alter the structure of interbank markets, thus keeping alive the debate about interbank contagion risk.

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An Analytical Review of Credit Risk Transfer Instruments*

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Introduction

Over the second half of the 1990s, the surfacing of credit derivatives and collateralized debt obligations (CDOs) enlarged the range of more traditional instruments for transferring credit risk, such as bank guarantees, loan sales or securitization. The market for the new instruments has experienced extremely rapid growth. Although no comprehensive aggregate data on credit derivatives exposures exist[1], the value of these exposures is estimated to reach 4.8 trillion USD by 2004, compared with an estimated value of 187 billion USD in 1997[2]. Whereas the characteristics and purposes of the new instruments (to transfer and manage risk) are very similar to those of the traditional instruments, the tradability of the new instruments has resulted in the creation of global markets for credit risk transfer (CRT).

Such CRT markets are of great interest as regards financial stability: while offering extended risk management opportunities for market participants, they also alter "traditional" relationships (between lenders and borrowers), as well as creating new types of relationships (lenders and credit protection sellers). All of these dimensions are worth addressing both from a micro and a macro perspective.

Until now, rather limited research has been undertaken on CRT markets. Available work focuses on specific instruments (such as credit default swaps, CDSs) and issues, such as the relationship between CDSs and loan sales, the pricing of structured portfolio products, or the regulatory treatment of products (see Banque de France, 2002). A report by the CGFS working group on Credit Risk Transfer (2003) is one of the only studies that addresses CRT markets as a whole. Its purpose is to provide a broad review of how CRT markets effectively work and what role they now play in the global financial system, including available instruments, market participants, market dynamics, and regulatory issues.

The present review, which has evolved out of work first begun in conjunction with the CGFS group, also aims at addressing financial stability implications of **all types of CRT instruments.** However, its specificity is to review this issue **from an analytical standpoint.** Relying on existing theoretical and empirical work as well as on contacts with market practitioners, it proposes an analysis of the various available CRT instruments and markets and possible avenues for further work. In particular, it analyses characteristics of differing CRT instruments in light of risk management and asymmetric information problems arising in financial markets.

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(1) See the report of the CGFS working group on Credit Risk Transfer (CGFS, 2003) for a discussion of differing data sources, covering various segments of the market.

(2) These estimates are taken from regular surveys conducted by the British Bankers Association. A recent study by Fitch Ratings of 147 financial institutions active in credit derivatives markets finds the total value of credit derivatives exposures of these institutions to equal 1.3 trillion USD. However, as shown in the BIS CRT report, there was a great difference in 2001 between private calculations (about 1.2 trillion USD) and the BIS triennial survey on derivatives (about 700 billion USD). As the main market players are taken into account in all sources, the reason for such a huge difference could arise from the fact that the BIS survey eliminates double-counting (as it identifies reporting institutions' exposure vis-à-vis other reporting institutions) so as to really identify the amount of underlying credit risk.

Four questions are successively addressed in four sections.

- A _first question_ relates to CRT instrument characteristics: **for what purposes are these products designed; why use one instrument rather than another?** It is frequently the case that a given risk management function could be served by more than one type of CRT instrument, but market activity makes it clear that some instruments are more equal than others. This may be because a large number of market participants have similar interests or, alternatively, because of the high degree of standardisation of certain instruments.

- A _second question_ raised by these instruments is: now that CRT markets exist, **who assesses credit risk?** The existence of financial intermediaries is generally understood to be motivated by the role they play in reducing asymmetric information in financial markets. In this regard, it is worth considering how CRT instruments impact this role and what the resulting implications are for financial stability. One could ask if, in transferring credit risk to third parties, lenders/credit protection buyers also transfer responsibility for credit risk assessment to new participants (credit protection sellers) and whether the latter are in a position to perform this function adequately. Practice appears to suggest that a certain degree of pressure exists within CRT markets for arrangements that provide banks with the incentive to continue performing credit assessment.

- This leads to a _third question_: **How are CRT instruments priced in practice?** Does pricing accurately or primarily reflect credit risk and does it also incorporate additional elements, such as counterparty, documentation or market risks? We present general principles which are used for pricing marketable instruments and show that, although pricing of single-name instruments is rather straightforward, pricing of multi-name instruments is more difficult and relies on assumptions whose robustness has not been thoroughly tested so far. This suggests that prices of multi-name instruments may not accurately reflect the risk of these instruments.

- _Finally_, even if credit risk is correctly assessed and fairly reflected in CRT prices, it is worth considering whether CRT markets may have other, macro-level implications. In particular, as the existence of CRT instruments enlarges the population of participants involved in the credit risk market, one could ask whether there is a chance that CRT markets will result in **more or less credit risk in the financial system**, or in a **better allocation of credit risk.** Given the relative youth of these markets, it is not surprising that these questions remain at this stage largely open ones.

1. Why use CRT Markets and Instruments?

CRT instruments help to complete credit markets by allowing market participants to separate credit risk from other types of risk. This leads to the creation of markets for credit risk, through which lenders may shed credit risk (e.g., for hedging purposes) and non-lenders may take on credit risk (e.g., allowing access to new categories of risk). In fact, numerous examples of the benefits of CRT instruments in dealing with different dimensions of credit risk can be identified.

These include the following:

- Separation of credit risk from funding risk and market risk.

- Isolation of time dimensions of credit risk.

- Separation of classes of credit risk, which allows matching levels of risk and risk appetites.

- Allowing banks to choose whether to retain ownership when transferring credit risk, which permits specialisation, "unbundling" of loan origination from credit risk, and easing of regulatory constraints.

The various available instruments provide different solutions for risk management, funding, regulatory capital and balance sheet disclosure. One of the questions addressed in this paper is the extent to which certain instruments might be better suited to particular transactions than others or whether some of these instruments are close substitutes. _Two tables in the Appendix present a classification scheme for single-name and portfolio CRT instruments based on their relevant economic features_[3]. Depending on the pursued objective, some specific CRT instruments with relevant characteristics may prove more useful than others.

The credit protection buyer's preference is often to take the credit risk off the balance sheet and thus reduce its funding requirements as well as its risk. The appendix tables show that this can only occur via a loan sale, or the issuance of either an asset-backed security (ABS) or a collateralised debt obligation (CDO). However, if the underlying asset is not transferable (either for legal or customer-relations reasons[4]), synthetic transfer instruments (i.e., those involving credit derivatives) must be used; the latter encompass credit

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(3) These tables are also referred to in Sections 2 and 3 and to a lesser extent in Section 4 below.

(4) See the discussion in Section 2.1.2 for more detail on the whys and wherefores of transferability.

default swaps (CDSs), credit-linked notes (CLNs), total rate of return swaps (TRORs) and synthetic CDOs.

A portfolio approach becomes the preferred shedding alternative when transfer of individual credits is too expensive. While market participants often report that single-name CDSs are expensive, Rule (2001) speculates that information asymmetries may be a cost factor[5]. Among the portfolio CRT instruments, the synthetic structures seem to be growing in popularity. J.P. Morgan (2001) attributes some of this to the combination of low funding costs for active banks in that market and relatively high yields in conventional ABS/CDO markets, even on AAA tranches. Also, this study points out that in most countries conventional securitisation cannot be applied to undrawn commitments (like revolving credit lines, liquidity facilities or future receivables).

A final important decision factor is the degree of regulatory capital relief for credit risk shedders. Although synthetic transactions can be structured so that the risk transfers are almost perfect, they do not remove the assets from the balance sheet, which thus limits the reduction of capital require-ments. Hence, synthetic risk transfer will not be useful if risk shedders are seeking funding leverage. Also, the protection buyer may face counterparty capital charges on a synthetic transfer. For example, capital charge considerations play a key role in the design of portfolio CRT instruments that are sold in "tranches". Any risk retained, e.g. in the form of first loss protection, is treated as recourse and is subject to a 100% regulatory capital charge. If the amount of risk retained is less than 8% of the amount of loans securitised, then the bank can reduce its capital charge through securitisation (since if it did not securitise the loans it would have to hold 8% in capital). Jones (2000) offers several "prescriptions" for CDO originators that seem consistent with market practice: for example, he recommends that the equity or first-loss tranche is less than 8% of the total risk shed, which fits the typical market practice, as the originator usually retains between 3% and 5% of such risk.

(5) Section 2 discusses asymmetries of information in detail.

(6) "Funding" is defined from the risk shedder's (credit protection buyer's) perspective and implies that the risk shedder/protection buyer receives funds from the protection seller at the time of the transaction.

(7) ABSs and CDOs can be both CRTs and underlying risks as a result of resecuritisations.

TABLE 1   THE CRT LANDSCAPE

Underlying Credit Risk		Typical CRT Mitigant and Comments	Accounting	Funding[6]
Consumer Loans	Residential mortgages Credit card receivables Auto loans and leases	**ABS:** underlying risk tends to be "local". That is, there is not a great deal of cross-border ABS volume. Also assets tend to be less diversified than those securitised via CDOs and CLNs	Loans transferred from risk shedder's balance sheet to risk taker's	Funding from the risk taker to the risk shedder
Other transferable debt (Loans and Bonds)	Commercial mortgages Trade receivables Equipment leases			
	Corporate debt (bonds and loans) Sovereign debt (Emerging market) ABSs and CDOs[7]	**Loan sale:** (cheapest and cleanest) alternative		
		CDO: allows for heterogeneous assets but expensive to set up and maintain		
Transferable and *Non-Transferable* debt		**CLNs and synthetic CDOs:** cheaper than conventional CDOs	Loans remain on the risk shedder's balance sheet, although the CRT transaction qualifies for hedge treatment	No funding from the risk taker to the risk shedder
		Single-name credit derivatives (CDS), surety bonds and guarantees: standardised (CDS) but rather expensive and counterparty risk exposure		
		Multi-name (or basket) default swaps: counterparty risk exposure		

NB: An asset may not be transferable either for legal or customer-relations reasons.

Table 1 summarises how CRT instruments are used, including the types of assets which tend to be included in multi-name portfolio instruments as opposed to single-name instruments, and the impact on balance sheets and funding. It shows, for example, that credit risk associated with consumer loans is typically shed via asset-backed securities. Conversely, ABSs tend not to be used to securitise corporate debt, leveraged loans and emerging market debt, and they cannot be used for non-transferable assets. The table also shows that CDSs and other synthetic CRT instruments, like basket default swaps, CLNs and synthetic CDOs, can be used when the assets[8] are non transferable.

2. Do CRT instruments have an impact on asymmetric information problems?

A large part of financial intermediation theory was built on the idea that banks, through screening of loan applicants and monitoring of borrowers, help to resolve problems of asymmetric information between agents who possess capital and those who have investment projects. It is therefore useful to consider whether the use of CRT instruments has an impact on banks' performance of these functions (do CRT instruments weaken banks' incentives to perform them?) and what role protection sellers play. While CRT markets help to resolve problems of risk management, they indeed may also give rise to some new risks in financial relationships, and they may have an impact on pre-existing problems of asymmetric information.

This section analyses whether the introduction of CRT markets creates new problems and risks[9]. The discussion focuses on the type of problems (moral hazard or adverse selection) and relationships (borrower – lender or lender – protection seller) – see Box 1. The analysis also highlights trade-offs between instruments with respect to the identified problems. The main results are summarised in Table 2.

2.1 Borrower - lender relationship

The introduction of CRT markets may actually worsen asymmetric information problems in the borrower-lender relationship, relative to the state of equilibrium that would exist in the absence of such markets. Indeed, authors such as Diamond (1984) warned early on that loan sales for example can be potentially dangerous, as they could weaken a bank's incentive to perform screening and monitoring activities.

2.1.1 Adverse selection

Insofar as the lender believes that it will be able to hedge its exposure on its borrowers (in purchasing credit protection through CRT once the loan contract is signed), the lender may have less or no incentive to screen borrowers. As a result, the adverse selection problem (which results in risky borrowers receiving funds and safe ones possibly not) may no longer be mitigated by the bank. This implies that there may be little or no borrower selection, since the bank may be willing to provide credit to all applicants as long as protection sellers are willing to take on the credit risk. However, if the protection sellers in CRT markets conduct their own screening before agreeing to sell protection on an exposure, and if they have equal access to information and screening technologies as do lenders, then the problem of weakened lender incentives to screen will not arise: in this case, the lender knows that protection sellers will refuse to sell protection on "bad" borrowers and he will therefore be incited to screen borrowers in order to avoid making loans to risky ones.

Reputation offers another potential solution to the problem of weakened lender incentives to screen. A lender might want to avoid developing a reputation for bringing bad loans to the CRT market, in which case the lender would continue screening potential borrowers even in the presence of these markets. The desire to maintain a good reputation might also motivate lenders to offer implicit guarantees when transferring credit risk; i.e., the lender implicitly agrees to reassume some of the credit risk if the exposure goes bad. Yet, such implicit guarantees might give rise to *a new potential problem: undercapitalisation.* If the lender has purchased credit protection via an instrument which removes the exposure from the lender's balance sheet, such as a loan sale or securitisation (without any explicit recourse), then the lender might not have set aside any capital to cover the risk of having to reassume the exposure. Determination of the "true" amount of risk that is being removed from the bank's balance sheet in such cases is a relevant regulatory concern.

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(8) The relationships between underlying credit risk and CRT mitigants are consistent with market practices as gleaned from various industry publications and the authors' discussions with market participants. For example, in a recent J.P. Morgan "Banking 101" report (Murray et al (2002)) it was stated that "whereas asset-backed securities are bonds backed primarily by consumer loans such as credit cards, auto loans, and home equity loans, CLOs/CDOs are bonds backed by US high yield debt, emerging market debt, or investment-grade commercial and industrial loans or bonds." There is little theoretical literature that focuses on this dimension, although Benston (1992) suggests that conventional securitisation (i.e., ABSs and outright sales) is more likely to work for assets for which moral hazard and adverse selection problems are not too severe, like pooled home mortgages and consumer loans. At the other end of the asymmetric information spectrum, he identifies commercial and industrial loans, which also fits with the JP Morgan report.

(9) The impact of CRT instruments on asymmetric information problems applies primarily to the loan market and not to the bond market, as information in the latter market is more of a public nature.

Box 1

Asymmetric information problems in financial contracting are well acknowledged and inherent to the borrower - lender relationship. These problems include adverse selection regarding borrower quality and moral hazard on the part of the borrower.

- The _adverse selection_ problem (Akerlof, 1970) – whereby the lender cannot observe the borrower's quality – may lead to elimination of the safest borrowers from the market[10] or to credit rationing by lenders (Stiglitz and Weiss, 1981). While adverse selection may lead to the self-elimination of the safest borrowers (because the cost of finance is driven up due to the presence of risky borrowers in the loan pool), rationing allows lenders to eliminate those which appear as the weakest. Problems of adverse selection can be alleviated by screening of the borrower by the lender prior to extending a loan, which enables the lender to learn something about the borrower's type.

- The _moral hazard_ problem exists when the lender cannot costlessly observe the borrower's actions after a loan contract has been signed, and the borrower may take actions that are in his own but not the lender's interest. Problems of moral hazard in the lending relationship can be mitigated by monitoring of the borrower by the lender (Diamond, 1984).

Much literature (following Leyland and Pyle, 1977 and Diamond, 1984) has been devoted to understanding the _special role played by banks_ in acquiring "inside" information about borrowers and in mitigating asymmetric information problems. A long-term relationship with a bank can allow a firm to develop a **reputation** for good quality, thereby benefiting from cheaper loan funding and ultimately facilitating access to market finance at lower cost – i.e. the idea of a **certification effect** (Diamond, 1991). The following diagram illustrates relationships when no CRT market exists and where banks mitigate problems of asymmetric information:

CASE 1: "NO CRT AND BANKS INCITED TO REDUCE ASYMMETRIC INFORMATION"

(*) since the bank is screening and monitoring
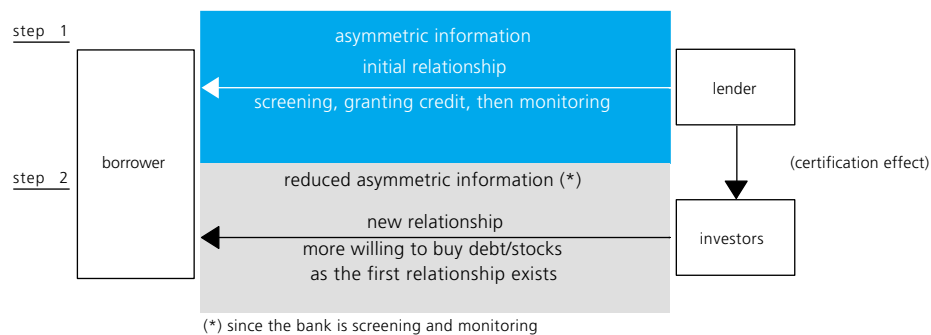
A related question is whether other agents (such as rating agencies) could assume the same function as banks. Diamond (1984) and others[11] argue that banks have a comparative advantage with respect to other market participants in this regard, due to the special knowledge they acquire from performing complementary functions on a large scale (account keeping of borrowers, provision of payment instruments etc.). Recent work suggests however that the advantage of banks tends to decrease for large corporates either because the latter increase transparency and disclosure so as to obtain good ratings or to increase their capital market access, or because they develop high tech activity which requires sophisticated credit risk assessment skills in the former (Diamond, 1991, Boot and Thakor, 1991, 1997)[12].

The introduction of CRT markets raises the question of whether banks which now benefit from hedging opportunities are still incited to screen and monitor credit risk. Diagram 2 illustrates a purely theoretical and extreme case where CRT markets are introduced and no one has an incentive to assess credit risk:

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(10) Because the lender does not know the quality of the borrower, the lender must charge a price to every loan applicant which reflects the average quality of the borrower pool. If the average quality is low, borrowers with safe projects (low risk, low return) may find the financing cost too high for the project to be profitable.

(11) See for example, Nakamura (1993) and Longhafer and Santos (1998).

(12) Considerable empirical evidence nevertheless exists to support claims of the unique role that banks play in resolving asymmetric information problems and their comparative advantage relative to other market players. This evidence includes event studies which find abnormal stock market returns of firms in response to bank announcements of new, renewed, or non-renewed loans or relating to the failure of a borrower firm's bank. (See Gorton and Winton (2002) for a detailed discussion.)

CASE 2: "CRT AND NOBODY INCITED TO REDUCE ASYMMETRIC INFORMATION" (HYPOTHETICAL)
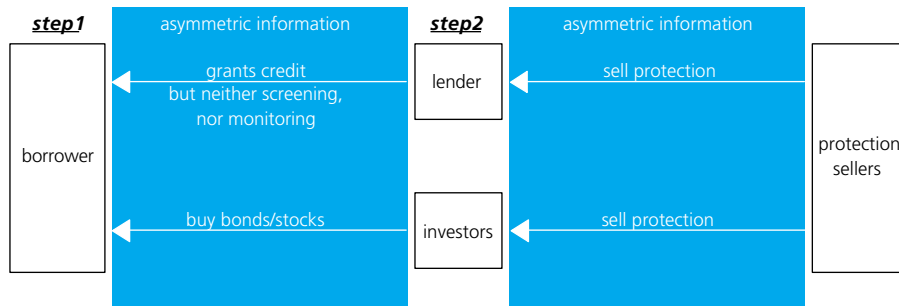
In this case asymmetric information problems are not mitigated, and the borrower's relationship with the lender no longer creates a certification effect. Although in reality the presence of CRT markets creates a situation in between the two cases depicted in the above diagrams, one of the purposes of Section 2 is to examine, **in a context of CRT markets,**

- the extent to which relationships between borrowers and lenders remain close to Case 1 (thanks to some specific CRT instrument characteristics) or, on the contrary, move in the direction of Case 2;

- the extent to which new "Case 1-type" information problems may also arise between lenders and protection sellers.

2.1.2 Moral hazard

• Moral hazard by borrower.

A lender who has purchased credit protection may have less incentive to monitor the borrower than in the absence of a CRT market (Gorton and Pennachi, 1995; Morrison, 2002)[13]. Assuming that other market players cannot perform monitoring as well as the bank, a lower incentive for bank monitoring would worsen the moral hazard problem relative to the state of equilibrium in the absence of CRT markets.

Morrison (2002) analyses the problem of weakened lender monitoring in the presence of a market for credit default swaps. He shows that the existence of a CRT market may have a negative impact on welfare relative to the absence of such a market. When no CRT market exists, banks will monitor borrowers and force them to carry out "good" projects (low risk, high profitability). Firm borrowers benefit from this "bank certification" and are able to combine cheaper bond finance with more expensive bank finance for their project[14]. When a CRT market is introduced, banks' purchases of credit protection may remove their incentive to monitor borrowers. Because borrowers (and market investors) know that they will not be monitored, borrowers no longer benefit from bank certification and thus cannot

use bank finance as a "commitment" to choose a good project. Rather, borrowers may now choose to issue junk bonds and to choose "bad" projects (risky and less profitable – but yielding high private benefits to the borrower). **Thus, although at first glance the possibility for a bank to hedge its loan exposures might have been thought to improve welfare, it is possible that it reduces welfare** (since high profitability projects are no longer being financed). However, such a result does not take into account the need for the lender to signal to the protection seller its commitment to continue monitoring (see Section 2.2).

• Moral hazard by lender.

A new problem in the borrower – lender relationship that may be created by CRT markets is one of lender moral hazard. This problem arises *when the lender can purchase credit protection against the borrower's wishes* or without informing him. The potential negative impact for the borrower is twofold: the lender's purchase of credit protection may send a negative signal about the borrower's quality and/or (as discussed above) may prevent the borrower from obtaining the benefits of bank

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(13) Except if lenders benefit so much from the higher expected return generated by monitoring that they would choose to purchase only partial protection in the CRT market and to continue monitoring the borrower.

(14) Bond finance is assumed to be cheaper than bank finance, since the cost of bank finance includes the cost of monitoring activities.

certification.[15] For these reasons, a borrower may be opposed to the lender having recourse to CRT markets.

Depending on the type of CRT instrument, the nature and impact of the signal generated by the bank's purchase of credit protection on a borrower may vary. Important instrument characteristics include the *balance sheet impact*; i.e., whether the instrument allows a full transfer of the underlying exposure (e.g., a loan sale or securitisation) versus only hedging of credit risk (credit derivatives, guarantees), and whether *the lender retains some exposure* (i.e. is not entirely hedged in case of a single name or retains a first loss position for portfolios). **If the lender retains a large enough exposure, then the incentive to monitor will not be weakened** and the signal regarding the borrower will be less (if at all) negative.

The severity of this problem is of course also influenced by the *observability or transparency of the bank's purchase of credit protection* (which relates to the bank's reporting requirements for use of CRT instruments or to requirements to notify the borrower). As Morrison (2002) points out, if the bank's purchase of credit protection is observable, then the amount of credit protection to be ultimately purchased by the bank may be negotiated with the borrower at the time of signing of the loan contract. For example, loan sales generally require notification of the borrower and are therefore observable. On the other hand, banks often prefer credit default swaps, as they do not require notification of the borrower and thus cannot be detected by the borrower. **The problem of lender moral hazard is thus more severe when unobservable instruments (such as CDSs) are used to transfer credit risk** than when loan sales are used. As a remedy for this problem, Morrison proposes imposing reporting requirements on the use of CDSs.

The context in which the instrument is used also plays an important role with respect to the problem of lender moral hazard vis-à-vis the borrower. Credit insurance, financial guarantee insurance, and surety bonds are, for instance, typically sought by the borrower, in the creditor's interest, from a third party prior to the signing of the loan contract. In this case, the protection seller will often screen the borrower prior to agreeing to sell protection. Thus, use of these types of CRT instruments is not expected to send a negative quality signal (and on the contrary should send a positive one) about the borrower. In addition, if these instruments include clauses requiring the bank to monitor the borrower, the borrower should not lose the bank certification effect.

A second form of lender moral hazard arises in cases in which it may be in the interest of the lender, once it has purchased credit protection, *to prematurely trigger a credit event*. Although this problem is discussed below in

the context of the lender - protection seller relationship, it may also adversely affect the borrower through, for example, negative reputational effects associated with restructuring or bankruptcy.

2.2 Lender - Protection seller relationship.

2.2.1 Adverse selection

Lenders might have an incentive to buy credit protection for their lowest-quality assets. This will not necessarily create a problem for protection sellers, as long as they are able to price CRT instruments to accurately reflect the low asset quality. *Conversely, to the extent that protection sellers' knowledge of asset quality is inaccurate or that pricing is difficult, then an adverse selection problem might arise.* In addition, high CRT prices due to adverse selection may prevent lenders with good-quality assets from purchasing protection for those assets (Duffee and Zhou, 2001). These questions are also addressed in Section 3 on pricing.

In a manner similar to the above discussion, *the context in which the instrument is used* could influence the severity of this problem. That is, **the use of instruments (such as guarantees) for which credit protection is obtained from a third party by the borrower prior to the signing of the loan contract may help avoid the problem**, although it may also affect the financing conditions faced by weaker borrowers. In this case, the protection seller may conduct its own screening of borrowers.

Inclusion of due diligence clauses in credit protection contracts, whereby the lender must provide to the protection seller all relevant information relating to the borrower, could also help mitigate the adverse selection. The advantages of such tailor-made clauses may, however, be counter-balanced by higher legal and documentation risks[16] with these instruments relative to standardised ones, which tend to involve a limited number of simple clauses.

Relying on external ratings – by selling credit protection only on rated assets or on blue-chip firms – may be another way for protection sellers to solve the adverse selection problem. Some support for this idea is provided by the observations that the market for single-name CDSs is largely

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(15) It is, however, worth noting that the certification effect may not be the only relevant consideration. Professionals generally cite two main reasons for borrowers to be opposed to the transfer of their loans: i) borrowers traditionally think of their loans as private transactions and do not wish to give too much publicity to their financing structure and indebtedness; ii) in a case of a restructuring, borrowers prefer to deal with an identified counterparty than with a large number of unknown holders of their debt. Such an attitude is also reported in Caouette et al. (1998) and cited in Morrison (2002). This widespread belief of practitioners might well be wrong. Alternatively, the certification effect may be of lesser importance than academics traditionally think.

(16) Documentation and legal risk represent an important category of risks linked to the incomplete nature of contracts. (See Section 3.3 for discussion.)

limited to rated firms and that this market is liquid primarily for blue-chip firms. Similarly, asset-backed securities (such as CLOs and CDOs) are rated prior to sale or may be restricted to rated names. Limiting sales of credit protection to rated products should help alleviate the problem of adverse selection [17], because even if the individual names in the portfolio are not rated, the rating agency will have assessed the quality of the assets included in the portfolio in order to assign a rating (to the entire portfolio or to the tranches). Yet, problems of adverse selection even in rated portfolio products such as CDOs are increasingly acknowledged by market participants and rating agencies alike, and rating agencies are currently conducting empirical studies to quantify the impact of adverse selection on CDO riskiness [18].

The usefulness of *tranched portfolio structures* (like CDOs, CLNs and basket swaps) might also relate to the severity of the adverse selection problem. DeMarzo and Duffie (1999) have shown that pooling and tranching may be optimal when the lender/credit risk shedder has superior information. DeMarzo and Duffie argue that **the tranching process allows the lender/risk shedder to concentrate the "adverse selection risk premium" in the small first-loss or equity tranches and create relatively large, low-risk senior tranches**. Also, the lender/shedder's retention of the subordinate tranches reduces the total adverse selection problem by aligning the interests of the lender/risk shedder and the investors.

Duffee and Zhou (2001) have described another set of circumstances in which the adverse selection problem might be less severe. If there exists a time period (probably early in the life of a loan contract) during which no asymmetric information exists between the lender and outsiders regarding the borrower's probability of default, then the lender's purchase of credit protection during this period could not result from an adverse selection problem. Any CRT instrument for which coverage could be limited to this time period could be used. On the other hand, an instrument such as a loan sale or a CLO (without any accompanying repurchase agreement), which removes the asset from the lender's balance sheet, implicitly represents a purchase of credit protection up to maturity of the asset and would thus not avoid the problem.

2.2.2 Moral hazard

• *Moral hazard by the lender*

CRT instruments potentially embody several possibilities for moral hazard by the lender vis-à-vis the protection seller.

A *first potential problem* is one in which, as mentioned above, *the lender stops monitoring the borrower once the lender's exposure is fully hedged/transferred*: the

protection seller cannot costlessly observe whether the lender still monitors or not. Gorton and Pennacchi (1995) analyse this problem in the case of the loan sales market, which experienced rapid development in the 1980s. As a result of the moral hazard problem, loan buyers should be expected to require high returns and, insofar as a bank enjoys low funding costs, it has no incentive to sell loans. In the 1980s, however, deregulation and stricter capital requirements increased competition within the banking sector and raised funding costs, providing banks with greater incentives to resort to loan sales. Yet, because of the moral hazard problem with respect to lender monitoring, loan sale contracts needed to be made "incentive compatible" – i.e., providing the lender with incentives to continue monitoring.

Two potential mechanisms cited by Gorton and Pennacchi for preserving incentive compatibility are: *implicit guarantees* (as described above) and *retention of a portion of the loan* by the originating bank. Gorton and Pennacchi found, in tests on a sample of about 900 individual loan sales, that **banks selling loans convinced loan buyers of their commitment to monitor borrowers by retaining a portion of the loans.** The riskier were the loans, the higher was the observed portion retained.

Characteristics of CRT instruments that influence the severity of this problem are, therefore, whether *the lender retains some exposure* (which most instruments allow) and whether *the instrument is standardised/tradable*. With respect to the issue of standardisation, one advantage of non-standardised instruments – such as credit-linked notes, credit insurance, surety bonds, or bank guarantees – is that they allow a protection seller to include clauses in the contract requiring the lender to undertake monitoring activities. This obviously induces the lender to monitor. In contrast, standardised and tradable instruments such as credit default swaps or collateralised debt obligations cannot allow such individually tailored provisions.

Thus, **it may be the case that non-tradable CRT instruments perform better than traded instruments with respect to the problem of reduced lender monitoring.** However, these instruments also entail greater documentation and legal risks than standardised ones. Furthermore, protection sellers using these traditional instruments must possess enough information about the borrower and/or the lender, so as to be able to verify

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(17) At least if the bank has no private information that is not reflected in the rating – which may be a strong assumption.

(18) Because a given rating may include firms with varying probabilities of default, an adverse selection problem can still arise in a portfolio of rated assets: within any given rating category, the lender can include the firms with the higher probabilities of default.

whether the latter has properly monitored the former. This may restrict the number of potential protection sellers who can use traditional instruments. Finally, enforceability of monitoring clauses in CRT contracts may be difficult.

A _second potential problem_ in terms of moral hazard by the lender is that the lender who has purchased credit protection on a loan may have _an incentive to prematurely trigger a credit event_, such as a restructuring of the loan, if it is in its interest to do so. Whether this problem arises depends upon _the nature of the trigger events_ specified in the credit protection contract. An interesting example is given by the case of Conseco in September 2000, where the borrower faced a restructuring of its debt without going bankrupt[19]. In this case the lender was able to realise a two-fold benefit: payment by the protection seller (against delivery of the cheapest assets the lender could find on the market) and redemption of the restructured loans.

Whereas CDSs have in the past included credit events which some observers have judged to be too broad with respect to the notion of default (such as restructuring and acceleration)[20], financial guarantee insurance and bank guarantees are only triggered upon nonpayment by the borrower. Use of the latter types of instruments or **inclusion of a narrower set of credit events in CDSs may prevent the moral hazard problem from arising**.

A _third potential problem_ of moral hazard by the lender may arise with respect to _managed securitised portfolios_:[21] in arrangements that allow for substitution of (for instance) maturing assets, the lender may have the incentive to substitute lower quality assets for the maturing ones. **Arrangements which establish independent management boards and stipulate strict rules for substitution can minimise this risk**. This problem represents a current area of concern among market participants, and there is ongoing discussion of the appropriate design of managerial compensation contracts for aligning the interests of the portfolio manager with those of the investors.

- _Moral hazard by protection seller_

The protection seller might _delay payment, refuse to pay, or litigate the claim_ when a credit event is triggered[22]. It is a fact that insurance companies regularly verify (sometimes through extended procedures) a claim's materiality before paying, which delays payment. Indeed, rating agencies have begun issuing ratings of insurance companies' willingness to pay[23].

Whether the instrument is funded or unfunded is a critical feature of CRT instruments in relation to this problem. **The use of funded instruments, such as credit-linked notes, CDOs and loan sales prevents the moral hazard problem from developing**, since protection sellers must provide the funds up front, prior to any default by the borrower. Conversely, for unfunded instruments, the _form of settlement following the trigger event_ becomes an important consideration. Whereas credit default swaps specify payment by the protection seller upon the triggering of the credit event, instruments such as credit insurance and surety bonds allow the protection seller (usually an insurance company) to investigate the losses before making payment. Instruments such as financial guarantees, by which the guarantor (protection seller) assumes the payments to the lender (bank) and at the same time takes over the claim on the borrower, would also appear to limit the risk of moral hazard by the protection seller.

2.3 Trade-offs between CRT instruments

The above discussion of the differences in CRT instrument characteristics and the trade-offs between instruments points to an open question: is there an "optimal" form of CRT contract – i.e. a single contract that minimises the cost for all types of asymmetric information problems? For example, is the CRT instrument that best resolves the adverse selection problem between the lender and the protection seller also the instrument that best addresses the problem of the lender's reduced incentives to monitor borrowers once credit protection has been purchased? Although formal analysis of the trade-offs between CRT instruments in differing circumstances is still at its earliest stages, the optimal form of CRT contract would appear to depend upon the nature of the problems existing in financial relationships.

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(19) Conseco's bankers granted it additional credit in order to help it avoid bankruptcy. As this was technically considered as a restructuring, the banks were able to activate their credit protection, and they delivered long-dated Conseco bonds to protection sellers. Such a case was part of the reason why ISDA issued a new standard contract with a restructuring clause. However, this contract is not universally used.

(20) Acceleration is the lender's exercise of its contractual right, under certain circumstances, to declare a debt immediately due and payable.

(21) Initially, portfolio CRT instruments were static, or "unmanaged"; i.e., the maturity of the instrument corresponded to the maturities of the assets included in the portfolio. More recently, however, many portfolio instruments have become dynamic, or managed. The managers of these portfolios are allowed to substitute new assets for the maturing exposures within the portfolio. Substitution may also occur for other reasons, such as replacing an asset which has been downgraded or even re-designing the content of the basket according to some general contractually agreed upon guidelines.

(22) This situation should be distinguished from one where the protection seller defaults on its obligation to the protection buyer because of unanticipated financial distress. The latter situation would not be classified as a problem of moral hazard by the seller.

(23) Standard & Poor's began issuing Financial Enhancement Ratings for insurance companies in 2000. These ratings include an assessment of an insurance company's willingness, as well as its capacity, to pay to in CRT contracts.

TABLE 2   POTENTIAL CRT ASYMMETRIC INFORMATION ISSUES

	Potential Problem	Affected Relationship	Instrument characteristics offering potential solutions
Adverse Selection	Reduced incentives for lender to screen loan applicants	Borrower – Lender Lender – Protection seller	• Credit enhancements provided by lender • Partial risk retention by lender
	Adverse selection problem: lender buys protection on low-quality assets, drives up cost of protection on high-quality assets	Lender – Protection seller	• Independent evaluation (e.g. ratings) • Protect only near-term risks
	Incentives for asset manager to select low-quality assets (managed securitisations)	Lender – Protection seller	• Independent governance • Strict asset selection rules • Partial risk retention by manager
Moral Hazard	Reduced incentives for lender to monitor loans	Borrower – Lender Lender – Protection seller	• Credit enhancements provided by lender • Partial risk retention by lender • Monitoring provisions in documentation
	Increased incentives for lender to prematurely trigger defaults	Borrower – Lender Lender – Protection seller	• Narrowly defined default triggers
	Protection seller reneges (partially or fully) on contingent payouts	Lender – Protection seller	• Objective trigger definitions • Use of funded CRTs
	Borrower deprived of "bank certification" because of use of nontransparent CRT instruments	Borrower – Lender	• Increased transparency of all CRT markets

Differences between standardised/tradable and non-standardised instruments will likely be important to any assessment of the design of CRT contracts. Non-standardised instruments allow for contracts to be tailored to particular lenders' circumstances or to borrower – lender relationships. Yet, these same instruments appear to leave the lender more vulnerable to protection seller moral hazard and to legal or documentation risk. In addition, too large a diversity in tailor-made CRT instruments may give rise to extended risk management concerns on the sides of both the protection buyer and protection seller. Standardisation of CRT contracts lowers documentation risk in the lender - protection seller relationship. Thanks to the efforts of the International Swaps and Derivatives Association (ISDA), CDSs now represent one of the most standardised forms of contracts[24]. Reduction of documentation risk, however, appears to come at the expense of greater inefficiency owing to problems of asymmetric information.

3. How are CRT instruments priced in practice?

CRT market participants naturally have to accurately assess credit risk. However, the question is: what do they do in practice? CRT markets are of utmost interest from a risk management perspective: not only do they allow a lender to insure itself against a borrower's default (and the possible resulting financial distress), but they allow an institution to add credit risk, where appropriate, by selling protection. Therefore, for the credit risk transfer to effectively occur, both parties must agree on a price that is based (among other things) on the intrinsic credit risk of the underlying asset. In addition, both counterparties to such transactions have to deal with *other risks that are bundled* in the CRT instrument: market risk, counterparty risk and documentation risk.

(24) However, even after the introduction of its "modified restructuring" clause, the definition of credit events remains uncertain (as shown in June 2002, when Xerox renegotiated a credit facility). A group of insurers asked ISDA to clear up whether debt restructuring triggers a default swap after a group of New York swap dealers agreed to pay. (Bream, 2002)

Basically, credit derivatives are financial instruments that allow the "trading" of credit risk by isolating it from other kinds of risks such as interest rate and currency risk. As a result, should the market be perfectly liquid and flexible, the value of the default protection should relate to the spread between the yield on the underlying debtor bonds and the cost of funding the purchase of such bonds. However, one still has to determine the true price of the underlying asset. This could be quite straightforward if the underlying bond or loan is traded in a transparent market, but if not, more sophisticated modeling approaches must be used. In addition, there is a risk that CRT instrument price dynamics diverge from those of the underlying assets ("basis risk").

Basis risk relates to hedge imperfections caused by various technical factors. Kessler and Levenstein (2001) call particular attention to the technical differences between financial guarantees (where default events are very narrowly defined) and default swaps (where default events can cover a wide range of situations). Other more fundamental reasons can cause the price behaviour of CRT instruments to diverge from that of the underlying assets. O'Kane and McAdie (2001) show how factors such as funding cost differentials, delivery options, and regulations can cause cash market and CDS spreads to diverge. More generally, unexpected price changes can result in less than perfect hedging, so hedgers should have a solid understanding of CRT price dynamics. Beyond the underlying credit risk, a remaining question is whether market prices adequately reflect counterparty and documentation risk. Market risk is not explicitly covered here, since there is already a large body of literature that discusses the use of interest rate and currency derivatives for mitigating it.

As the next subsections will show, there is a fairly mature and well understood single-name CRT instrument pricing literature. However, multi-name portfolio CRT instrument pricing appears to be still very much work in progress.

3.1 Pricing Single-Name CRT Instruments

Among single-name credit derivatives, CDSs are the most commonly traded instruments, as well as the simplest ones from a conceptual viewpoint: they are relatively well standardised contracts that provide protection against the risk of default of a given debtor. Loan sales and syndication are not covered here, since by their very nature, prices are directly observable to market participants. In addition, other tradable "synthetic" CRT instruments like total rate of return swaps (TRORS) and single-name credit-linked notes (CLNs) are not explicitly covered since their price

dynamics derive so directly from those of CDSs. Also, "insurance-type" instruments (e.g., surety bonds and guarantees) are not discussed, since they are not, in general, tradable, although their pricing dynamics would be very similar to those of CDSs.

The pricing of any synthetic CRT instruments is **closely tied to funding costs**, the TRORS being the most obvious case, since its risk-return profile is virtually identical to that of a "cash" position in the underlying asset. In the TRORS case, the periodic fee should lie somewhere between the funding costs of the two counterparties. The link to funding costs for CDSs is somewhat more complex because only credit risk is being transferred, but Duffie (1999) and Bomfim (2002) show that, in a market in which all participants are assumed to fund themselves in floating rates at LIBOR, the premium on a single-name CDS is equal to the spread (over LIBOR) on a maturity-matched floating-rate note issued by the underlying entity. Even in the absence of an underlying floating-rate note, a maturity-matched fixed-rate bond issued by the same entity can be swapped into a synthetic floating-rate note for pricing purposes (i.e., an "asset swap"). This methodology is sometimes called the *replication* approach [25].

Houweling and Vorst (2001) show that CDS spreads derive directly from the replication approach for **investment-grade credits** but that they are wider than asset swap spreads for **credits rated below "A"**. O'Kane and McAdie (2001) run through some of the factors that might lead to such spread divergence:

- Factors that increase default swap spreads include the protection seller's exposure to counterparty risk, "technical default" risks caused by the CDS's typically broader default definitions and the delivery option usually held by the protection buyer. (Typically, the protection buyer can choose from a basket of deliverables in the event of a "default".) Also, CDS spreads tend to be wider in the less liquid parts of the curve – for example, in the three- to five-year area. In addition, CDS spreads tend to be wider if the cheapest-to-deliver bond is trading below par.

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(25) The replication approach to valuing default risk is also consistent with the market's practice of valuing corporate liabilities off the swap curve, rather than government bond yield curves. Collin-Dufresne, Goldstein and Martin (2001), and Elton et al. (2001) and Rappoport (2001) show that conventional (versus government bond yield) corporate bond yield spreads have little connection to credit-risk factors. In addition, Collin-Dufresne and Solnik (2001) show that swap contracts are virtually devoid of credit risk, and Liu et al. (2000) show that changes in the spreads between swap and US government bond yields are little influenced by credit-risk factors.

- Factors that decrease CDS spreads include the protection buyer's exposure to counterparty risk and the fact that most market participants fund themselves above LIBOR [26].

Although numerous more "fundamental" approaches have been developed for situations where replication does not work, the **differences between "defaults" and "technical defaults"** (or "soft defaults") is worth emphasising (see Section 3.3).

Theoretical models can be called on to replace or validate the prices generated by replication. The theoretical single-name models can be segregated into two distinct groups:

- *Structural models* based on ideas presented by Merton (1974) and operationalised by KMV and CreditMetrics (a detailed explanation of the Merton model is given in Lubochinsky, 2002 and the KMV model is described in Crouhy et al., 2003). In these models, credit risk is modeled in terms of the firm's assets relative to its liabilities. Pan (2001) and Finger (2002) have applied this approach to CDS pricing. However, structural models have only limited applicability to the pricing of credit risk on sovereign bonds [27], and they seem to have difficulties with modeling financial institution credit risk [28]. Also, empirical tests of structural model bond pricing have not been overly promising [29].

- *Reduced-form models* which associate credit risk with exogenous events that can be modeled with statistical tools most often associated with actuarial science. Essentially, they relate credit derivative prices to distributions of default probabilities and recovery amounts. The theoretical underpinnings of this approach have been laid out in Jarrow et al. (1997) and Duffie and Singleton (1999). The approach has been applied to credit derivatives by (among others) Acharya et al. (2002), Cheng (2001), Hull and White (2000 and 2001).

Anecdotal evidence would suggest that **structural models have the upper hand for pricing single-name default swaps** on trading desks, given the important role that KMV and CreditMetrics play on the risk management side. However, the only academic empirical research that has actually been published to date (Houweling and Vorst, 2001) focuses on a reduced-form model. Several recent papers (Altman et al., 2001, and Delianedis and Lagnado, 2002) have also called attention to the sensitivity of reduced-form credit derivative pricing models to the assumptions made about post-default recovery values. Three different parameters may be used in this respect: 1) the market value of the risky debt prior to default (RMV),

2) the market value of an otherwise similar riskless debt instrument (RT), and 3) the risky debt's face value (RFV). Delianedis and Lagnado (2002) show that the RMV and RT assumptions produce very similar risk-neutral default probabilities and default swap prices, whereas the RFV assumption tends to underestimate probabilities and overestimate swap prices, particularly on longer-dated speculative-grade credits. Indeed, this was confirmed by Houweling and Vorst (2001), who use the RFV assumption [30].

There is very little literature devoted to the pricing of credit spread put options, largely due to the small size of this segment of the credit derivatives market, and also because the contracts are far from standardised. McDermott (1993), Longstaff and Schwartz (1995) and Das and Sundaram (2000) effectively apply the Black (1976) commodity option pricing model to put options on forward yield spreads. However, another spread put variation, which gives the holder the right to sell the risky bond at the strike spread, has been modeled by Duffie and Singleton (1999) and Schonbucher (2000).

3.2 Pricing Portfolio CRT Instruments

There is not really an ABS theoretical pricing literature [31], but the CDO pricing literature is growing rapidly. However, in either case, the empirical work is very lean. Two key conclusions stand out in almost all of the studies devoted to multi-name instruments:

- Default risk explains such a small part of observed corporate bond spreads that there are serious doubts as to whether those spreads could be used in a multi-name product pricing model [32].

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(26) Working the other way, to some extent, is the fact that high-grade sovereigns and supranationals swap into sub-LIBOR asset swap levels. Since default swap spreads cannot be negative, there should be a positive bias versus asset swap spreads.

(27) Westphalen (2002) develops a structural-like model that accounts for some of the factors that make sovereign debt different from corporate debt. These unique factors revolve mainly around the greater incentives for sovereigns to strategically default and the impossibility of taking a sovereign borrower to bankruptcy court.

(28) Finger (2002) points out that the typically high leverage of banks and finance firms results in structural models significantly overestimating credit default swap spreads. He posits that actual spreads are tighter for these sectors because banks benefit from government oversight and implicit guarantees, plus their effective leverage is much lower than what it appears to be on the surface, because so many of their assets are secured.

(29) See Eom et al. (2002) for a recent empirical test of various structural bond pricing models and a summary of other empirical work. They conclude that some models are more accurate than others but accuracy is still lacking. Nevertheless, Campbell and Taksler (2002) show that the structural model idea of linking the price of credit risk to equity values is not altogether without merit, particularly for highly leveraged firms.

(30) Hayt (2000) had suggested that default swap prices should be insensitive to recovery rate assumptions, but his argument holds only in a single-period world with only one claim type. Delianedis and Lagnado (2002) extended the analysis to multiple periods and claim types (bonds and default swaps).

(31) Childs et al. (1996) used a contingent-claims pricing methodology to examine mortgage-backed securities pricing dynamics, but they did not attempt to test it empirically.

(32) See Collin-Dufresne et al. (2001), Elton, et al. (2001), Rappoport (2001) and Lubochinsky (2002).

• Defaults are rare and extreme events, which makes it difficult to estimate default correlations.

Market ABS pricing practice seems to revolve around either the inferred-rating approach or option-adjusted spread (OAS) calculations [33].

Inferred-rating methodologies infer a credit rating for the ABS from an analysis of the underlying collateral, the collateral manager and any credit/liquidity enhancements. The inferred ratings are then used to price the ABS off similarly rated fixed-income securities.

An ABS's OAS represents an approximation of its yield compensation for its combination of credit and liquidity, plus, in some cases, prepayment risk. The OAS pricing approach (the accuracy of which, to our knowledge, has never been empirically tested), described in such practitioner publications as Hayre (2001), involves a three-step process:

• Project all of the ABS cash flows, including scheduled amortization, coupons and prepayments.

• Discount the projected cash flows using the appropriate discount rate (a spot rate inferred from either a government bond or swap yield curve) plus a constant spread (across all maturities).

• If the total present value so calculated equals the ABS's price, the spread chosen is the OAS. If not, an iterative process is followed until the OAS is determined.

Mahadevan and Schwartz (2001) identify three broad types of CDO pricing methodologies:

• *Re-rating* methodologies that infer a credit rating for the CDO from the ratings of its constituent parts and the relationships between them, which is then used to price the CDO off similarly rated bonds and CDOs [34]. For example, Cifuentes and O'Connor (1996) describe the process used by Moody's, and how they calculate "diversity scores" by which the analysis of a portfolio of correlated assets is effectively simplified into an analysis of a portfolio of uncorrelated assets. [35]

• *Market value* methodologies that essentially equate the CDO price to the sum of the market values of the constituent parts. Duffie and Garleanu (2001) present such a model, although Mashal (2002) says that such risk-neutral "reverse-engineering" models are fundamentally flawed, because of the large size of the non-default risk components embedded in the prices of typical corporate credits.

• *Cash flow* methodologies, much like the ABS OAS approach described earlier, that involve discounting back simulated future cash flows. Mina (2002) presents a case study of such an approach.

Although none of these models has been subject to rigorous empirical testing, there is a fairly extensive investment banking "literature" that focuses on the **apparent "free lunch" in the CDO market**, whereby CDOs trade consistently cheap relative to corporate bonds of the same credit rating. Most point to the relative illiquidity of CDOs versus corporate bonds as the main reason, but King (2002) posits that some of this may relate to an imperfection in the market for corporate bonds that the CDO tranching process arbitrages. Basically, it is said that the market overprices very low-rated and very high-rated corporate bonds due to a market segmentation effect which puts many investors at the extreme ends of the credit risk spectrum. (That is, many are constrained to buy only "AA" rated loans and bonds, while many others are constrained to buy exclusively high-yield assets.) Hence, assets rated "A" through "BB" trade with larger illiquidity premia. In the CDO portfolio creation and tranching process, these "surplus" illiquidity premia can be shared amongst the high-grade and high-yield tranches, and the originating bank.

Most of these rationales would apply to synthetic CDOs, although, as shown in Goodman (2002), enhanced opportunities for regulatory arbitrage (versus "cash" CDOs) could provide an even larger surplus to spread around.

Most of the recent multi-name credit derivative pricing literature basically refines the techniques put forward by Li (2000), which uses the method of copulas to model the connections between the marginal default probability distributions of the underlying credit risks. (For example, see Frey et al. 2001, and Mashal and Naldi, 2002.)

3.3 Documentation and counterparty risks

As indicated above, market prices for CRT instruments should reflect (beyond credit risk) counterparty and documentation risk.

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(33) Prior to the development of OAS-type ABS pricing methodologies market practitioners used "average life" approaches, whereby some sort of average prepayment parameters were used to determine a single cash flow vector that was then discounted back using risk-free spot rates (Dunn and McConnell, 1981).

(34) Some controversy has arisen as to how Moody's and Standard & Poor's treat CDO assets that they have not themselves rated. Lyon (2002) describes how these two agencies take off up to four rating "notches" (for example, one "notch" being from "A+" to "A" on the S&P scale) from another agency's rating, for CDO rating inferral purposes. Fitch, whose ratings are often the brunt of such "notching", has accused Moody's and S&P of uncompetitive practices.

(35) As an alternative to the "diversity score" approach, Davis and Lo (1999) develop an "infectious default" contagion model of default correlation.

Counterparty risks include the risk that the protection seller (unintentionally) defaults on required payments once a credit event is triggered or that the lender/protection buyer defaults on the payment of premia.

As regards settlement, two aspects are worth underlining:

- The *timing of payments* from CRT instruments can have an impact on the liquidity of the protection buyer. Whether CRT instruments are *funded or unfunded* obviously plays a role, as does the nature of the *trigger events*. CDSs may have broader definitions of credit events than some other instruments, and payments may be triggered prior to the point at which the borrower defaults. *Settlement following trigger events* also influences the timing of payments. Instruments that allow the protection seller to investigate losses will imply slower repayment than those which do not.

- *The amount of payment* is determined both by *settlement following trigger events* and *associated counterparty risks*. Unfunded instruments leave open the possibility of counterparty default. Among unfunded instruments, those which provide more freedom for the protection seller to contest the claim embody a greater risk than those which require payment upon the triggering of the credit event.

Along these lines, **documentation (or legal) risks** represent an important category of risks that is fundamentally linked to the incomplete contracting nature of credit protection contracts: at the time the contract is written it is impossible to envisage or to contract upon all possible future contingencies. As a consequence, unanticipated situations sometimes arise ex post (for example, once a credit event is triggered) in which one party has an incentive to act opportunistically[36]. This implies that CRT instrument documentation may entail differences in the degree of credit risk exposure from that embodied in the underlying asset (Tolk, 2001 and Merritt et al., 2001)

The nature of trigger events will have an influence on the severity of documentation risks. CDSs often involve "soft" default clauses, which are much broader than "the common understanding of default" (see Tolk, 2001 and Merritt et al, 2001). The soft default clauses include restructuring and acceleration clauses. As noted by Tolk and Merritt et al, standard default swap restructuring event definitions fail to differentiate between "good" and "bad" restructuring. In addition, the acceleration event is particularly problematic because it is an event that the lender (i.e., risk shedder) can trigger.

In contrast, financial guarantees have narrowly defined default events. However, documentation risk can be particularly severe when financial guarantees are hedged with CDSs (Kessler and Levenstein, 2001). Although these risks can be mitigated by tight documentation and objective mechanisms for verifying loss determinations, there may nevertheless be systemic concerns, to the extent that risk is being transferred out of the banking sector (which concentrates the experience and expertise in such matters). In addition, documentation risk for products which experience rapid development (with increasing underlying exposures) could be cause for concern[37].

Another common type of documentation risk arises through the settlement of the CRT contract when there is room for interpretation as regards the nature of deliverable assets. It is indeed in the lender's interest to deliver the cheapest assets he can find to the protection seller. In particular, recent cases have shown that it remains unclear whether convertible obligations are deliverable or not, due to their contingent nature.

TABLE 3   POTENTIAL CRT RISK MANAGEMENT ISSUES

Potential Problem	Instrument characteristics offering potential solutions
Counterparty risk: protection seller defaults on contingent payouts or buyer defaults on premia	• Embedded mitigants like downgrade clauses, reserve/trust accounts and collateralisation • Use of funded CRTs
Documentation risk: "credit event" definitions do not completely cover all potential risks	• Careful documentation and solid understanding of CRT dynamics
Basis risk: hedge imperfections caused by funding cost differentials, delivery options and regulations	
Market risk: bundled interest rate and currency risks *(only on CLNs and funded CDOs)*	• Use other derivatives to unbundle other risks

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(36) Problems such as these are sometimes referred to as incomplete contracting problems.

(37) Cebenoyan and Strahan (2001) attempt to show empirically that banks that are more active in loan sales markets tend to take on more underlying risk than those that do not. Demsetz (2000) has also shown that smaller banks that lack good opportunities for diversified originations are more likely to be big loan sellers.

The relevancy and importance of **other risks** vary depending on the instrument:

- CDSs, credit insurance, financial guarantee insurance, surety bonds, and bank guarantees do not embody additional *market risk* but they do entail *counterparty, documentation and basis risks*.

- CLNs and CDOs may reduce or eliminate counterparty and documentation risk, but they do embody market and basis risk.

However, it is still not clear whether these additional risks are really reflected in observable CRT prices. For instance, it is not rare that CDS prices are very close (if not identical) to asset swap prices.

4. Could CRT markets have macro-financial implications?

4.1 Can CRT have an impact on the overall amount of credit in the system?

Beyond their effects on micro-relationships, CRT instruments could have an impact on the overall access to financing at a macro level. At first glance, however, the overall impact of CRT instruments on borrowers' access to financing (as a whole, as it is relevant both on the loan market and on the bond market) is unclear.

4.1.1 More available credit?

CRT instruments may have a positive impact for borrowers in enlarging the potential population of "lenders" because in principle they allow new investors (such as insurance companies) to take on credit risk to which they would not have had access before. For a given level of imperfect information, a greater demand for credit risk resulting from the existence of CRT instruments could allow borrowers to benefit from extended financing opportunities and thus reduce the risk of credit rationing (see Box in Section 2). At a first stage, this may occur whatever the credit quality; lenders would be more willing to grant credit, as they would dispose of larger possibilities of hedging/transfer. At a second stage, the price of protection itself would be expected to decrease, insofar as competition among protection sellers would intensify. Larger and/or cheaper access to liquidity would also reduce the risk of elimination of the safest borrowers. To this extent, CRT instruments would complete the market for credit risk and increase its efficiency.

CRT markets could also have an impact on the way monetary policy exerts its effects on credit distribution. For example, an empirical analysis (Estrella, 2002) shows that mortgage securitisation has made US output less sensitive to monetary policy. In the spirit of the Bernanke and Gertler (1995) bank-lending-channel monetary policy transmission mechanism theory, Estrella posits that securitisation mutes the impact that monetary policy tightening is supposed to have on banks' ability to fund themselves and to provide loans. However, Stanton (2002) warns that this conclusion cannot be automatically extended to all securitisation activity, as there are reasons to suspect that the impact of non-mortgage securitisation would be different. For example, Stanton (1998) and Minton et al. (1999) show that banks and industrial firms securitise more during recessions, whereas mortgage securitisation tends to decline during recessions. In fact, Stanton (1998) goes on to say that "procyclicality differences in lending activity should become less severe as markets for securitised loans develop."

4.1.2 Or risks of restriction of the loan channel?

CRT instruments may, however, entail some drawbacks (and reduce the market's efficiency) for borrowers' financing, insofar as they could trigger a fundamental change in the functioning of the loan market. If banks move from an "originating and holding" attitude to one of "originating and transferring", credit distribution would be determined by the possibilities of hedging on the CRT market.

- One can therefore ask whether lending conditions by banks – and credit distribution to the economy as a whole – would not endure increased pressure from market-linked factors. As shown in Section 3, although credit risk pricing methods have recently advanced, they remain imperfect and are often difficult and costly to implement. As a result, liquidity conditions – either for a given CRT instrument or more generally for the whole market segment – play a key role in forming prices of CRT instruments. Such prices may thus prove highly volatile. If these prices influence lending conditions, the impact of financial market strains on the business cycle could be magnified.

- In addition, if loan prices were to be determined as a function of hedging costs, not only could loan prices become more volatile, but loans themselves could become more expensive and scarce and the scope of available financing might be reduced. Such developments could thus reduce the specificity of the loan market versus the bond market. As previously mentioned (see also Diamond, 1991), when asymmetric information exists, young, small, nonrated or poorly

rated firms rely on loan financing – in order to benefit from reputation effects – before coming to the market and issuing bonds. If bank loans were to become more similar to marketable instruments and more closely resemble classic bonds, such firms might experience additional difficulties for their financing. The cost of loans (which are already higher than market financing due to monitoring costs) would further increase, which might lead to some renewed form of credit rationing.

4.2 Resilience of the global financial system

4.2.1 Interactions between CRT and other markets: more or less overall protection? [38]

The discussion in Sections 1 and 2 has noted that whereas CRT markets help to "complete incomplete" credit markets, individual CRT instruments embody differing characteristics and thus vary in their impacts on financial markets. This suggests that the introduction of a new type of CRT instrument can have an impact not only on the underlying market for loans or bonds but also on the markets for other CRT instruments. Along these lines, Morrison (2002) notes that according to practitioners, credit derivatives possess two advantages compared with secondary loan markets: first, they facilitate portfolio diversification management as they are more easily traded and, second, they protect relationships rents, as their use is unobservable.

Duffee and Zhou (2001) offer one of the rare studies of interactions between CRT markets. These authors analyse the effect of introducing a market for credit default swaps when a market for loan sales already exists. One difference in the characteristics of CDSs and loan sales drives the results; namely, loan sales (without recourse) transfer credit risk for the full term of the loan, while CDSs allow credit protection to be purchased for a shorter period than the entire life of the loan. As noted in Section 2, this difference can be important if the problem of asymmetric information between the lender and protection seller varies over the life of the loan. Duffee and Zhou assume that the quality of the borrower (which is known to the lender but not to the protection seller) has no effect on the borrower's default probability during the early period of the loan but does affect the default probability later in the life of the loan. Thus, credit protection through a CDS can be purchased during the early time period without giving rise to adverse selection (as explained in Section 2.1.1).

Under these assumptions, the introduction of a CDS market can have a significant impact on equilibrium in the loan sale market. In some cases, the introduction of a CDS

market will result in a reduction in the overall amount of loans that are sold, and the average quality of loans sold will also be lower. For those loans which would have been sold in the absence of the CDS market, the lender now uses a CDS to purchase protection during the early period of the loan. However, because the CDS only covers a portion of the life of the loan, the total amount of credit protection purchased is now less than it would have been in the absence of the CDS market. In other cases, introduction of the CDS market allows protection to be purchased in the early period for loans for which no sale would have occurred in the absence of the CDS market. In this case, the CDS market causes the total amount of credit protection to increase, since loans for which CDSs are used would not have been sold in the absence of such instruments. The ultimate effect on welfare of the introduction of the CDS market will thus depend upon the relative importance of each of these cases.

4.2.2 Interactions between CRT and other markets: impact on reference assets and entities

A great deal of market commentary has focused on the impact of CRT markets on the underlying reference assets and entities. For example, front-running arbitrage CDO managers have been said to narrow credit spreads on the bonds that they accumulate ahead of issuance [39]. On the other hand, some market participants have accused hedge funds of aggressively selling synthetic credit risk protection, in order to push credits that are barely investment grade ("BBB +" and above on the Standard & Poor's credit rating scale) into the speculative-grade rating range ("BB +" and below) [40]. Under such circumstances, many institutional investors are forced to liquidate bonds that drop through the investment-grade threshold, thereby accelerating credit spread widening and making their short positions more valuable. However, this implies that CDS premia movements *cause* bond yield spread movements, and that furthermore, credit rating agencies take their leads from market spread movements.

In fact, several recent empirical studies of CDS premia and bond yield spreads indicate that CDS premia movements lead bond yield spread movements. However, this does not necessarily point to a causal link between the two markets. As pointed out in Blanco et al. (2002), "price discovery will take place where relative costs are lower and where

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(38) At a latter stage, the adequacy of capital requirements for banks moving from primary warehousers of credit risk to diversified originators and distributors should be addressed (see Froot, 2001).

(39) "Balance sheet" CDOs are initiated by the holders of the assets, whereas "arbitrage" CDOs are driven by asset managers and investors.

(40) For example, see Sender (2003).

trade is easier" – i.e. in the CDS market. Also the results of Brousseau and Michaud (2002) and Hull et al. (2002) suggest that the linkage is somewhat asymmetric – when spreads are widening, CDS premia lead bond yield spreads; when spreads are narrowing, they tend to move more closely together. This is consistent with the fact that "betting" on spread widening in the CDS market is much cheaper and easier than in the cash market, where bond short selling is often hampered by illiquidity in corporate bond lending and repo markets.

4.2.3 More dispersion of credit risk?

In 2001 and 2002, the global financial system was faced with a series of shocks: the first synchronised slowdown of the globalisation era; September 11 terrorist attacks; and continued bursting of the equity bubble. Among the explanations advanced regarding the resilience of the system was that CRT had allowed a better dispersion of credit risk (IMF, 2002; BIS, 2002b; several speeches of officials at the US Federal Reserve -including A. Greenspan and R. Ferguson; Persaud, 2002).

As shown in previous sections, CRT markets potentially allow for a broadening of the population of end risk holders as well as extended portfolio diversification. To this extent, they could have helped financial intermediaries mitigate risk and thus could have played a role in reducing systemic risk. Moreover, at the current developing stage of CRT markets, one can even assume that the total amount of outstanding credit risk is increasing at a slower pace than the growing capacity of ultimate risk bearers, which may have resulted in a decrease in the average exposure of investors to credit risk.

On the other hand, one must bear in mind three potential risks. First, there exists a high degree of concentration in intermediation on CRT markets, which could mean that even credit risk brokers could be faced with significant residual credit risk exposures (due, for instance, to potential hedging mismatches). Second, as shown by existing public data, CRT markets remain to a large extent inter-banking markets. Although likely to increase as the market develops, the portion of non-bank investors who take on credit risk is at present very limited. As a result, the "dispersion" argument should not be overstated. Furthermore, as noted in IMF (2002) and BIS (2002b) regulatory arbitrage preoccupations could have resulted in a concentration of credit risk in lesser capitalised institutions (including SPVs) entailing reputational risks for their promoters. Third, a dispersion of credit risk among a larger population of end investors may reduce systemic risk only to a certain

extent: were these investors to face repeated defaults, their resulting financial difficulties could exert negative pressure on the business cycle and hence on financial intermediaries themselves.

4.2.4 Less transparency as regards who bears credit risk?

As pointed out in IMF (2002) and CGFS (2003), credit risk transfer instruments "can reduce the transparency about who owns credit risk" and result in more difficult counterparty and credit risk assessment. The BIS (2002a) report on bank disclosure and the CGFS CRT report (2003) identified a number of areas where the reporting of CRT activity by banks was lacking. "Pillar 3" of the proposed new Basel Accord (see BIS, 2001) may resolve this problem for regulated banks. However, non-bank disclosure standards will still leave much to be desired. Although financial accounting standards setters appear to be in the process of tightening the rules for removing assets from the balance sheet via credit risk transfer, there may remain shortfalls in the reporting of how the removal is achieved.

5. Conclusion

This paper has analysed the micro and macro-level effects of markets for credit risk transfer and their potential financial stability implications. At the micro level, CRT instruments provide benefits to financial institutions in managing their credit risk, yet these instruments also alter the nature of relationships among financial market players and, as a result, introduce new asymmetric information and risk management problems. These problems – such as weaker incentives on the part of banks to screen and monitor borrowers or increases in counterparty risk – can be mitigated to greater or lesser degrees via the choice of CRT instrument. Nevertheless, the problems can raise financial stability concerns if not properly addressed. In addition, pricing of CRT instruments remains difficult, which raises the prospect that CRT prices do not adequately reflect the risk.

At a macro level, CRT markets have the potential of dispersing credit risk. While there is evidence that CRT markets have moved some credit risk out of the banking sector, the true degree of dispersion achieved via these markets is at present unknown. In addition, intermediation in CRT markets is highly concentrated.

CRT markets may also affect the total availability of credit, but the effect may go in either direction. On the one hand, the enhanced ability of banks to transfer

credit risk off their balance sheets may increase their willingness and ability to lend. On the other hand, if banks monitor borrowers less as a result of purchasing credit protection, lesser known firms may lose their "bank certification" benefits and, in turn, access to certain forms of finance.

Given the growing importance of CRT markets and their rapid expected future expansion, the potential of these markets to affect financial stability is likely to increase over time. Improved disclosure of CRT activities would go a long way toward enabling market observers to judge their true impact.

APPENDIX A   KEY CHARACTERISTICS OF SINGLE-NAME CREDIT RISK TRANSFER INSTRUMENTS [41]

	Credit default swap (CDS)	Credit linked note (CLN)	Total return swap (TRORS)	Credit insurance or surety bond	Financial guaranty insurance	Letter of credit	Loan sale
Protection buyer/risk shedder cashflows	Pays regular premia over life of swap; receives contingent amount upon credit event	Pays periodic payments linked to a market interest rate plus credit premia and principal at maturity; interest and/or principal reduced following a credit event	Pays all cashflows on a reference asset	Pays regular insurance premia	Pays regular insurance premia	Pays regular or one off fee	Receives loan market value up front
Funded or unfunded?	Unfunded	Funded	Unfunded	Unfunded	Unfunded	Unfunded	Funded
Protection seller/risk taker cashflows	Receives regular premia over life of swap; pays contingent amount following credit event	Pays principal up front	Pays cashflows linked to a market interest rate plus periodic cash adjustment to reflect change in market value of reference asset	Pays amount (based on policy documentation) following a loss event	Pays interest and principal on original schedule following non-payment	Pays amount following a failure to pay by the borrower	Pays market value of loan up front, receives all subsequent loan cashflows
Balance sheet impact?	No	No	No	No	No	No	Yes
Trigger events (if applicable)	ISDA standard credit events (bankruptcy, obligation default, failure to pay, restructuring) – may also include repudiation for sovereigns and obligation acceleration in trades based on 'old' ISDA standards	Typically ISDA standard credit events but documentation less standardised than CDS, e.g. MTN documentation may use 'old' ISDA language	Not applicable	Loss events to insured as defined in policy	Non-payment of interest or principal	Failure to pay by borrower	Not applicable
Settlement following trigger events	Typically through delivery of an obligation of the borrower by the risk shedder to the risk taker in exchange for its face value in cash; occasionally through establishment of a market price for the borrower's debt following the credit event (e.g. by polling dealers) and cash payment of the difference between this value and the debt's face value	Typically through establishment of a market price for the borrower's debt following the credit event (e.g. by polling dealers) and payment of the difference between this value and the face value of the debt. This amount is deducted from the nominal principal value of the note, and interest payments reduce accordingly	Not applicable	Insurer pays out the insured's losses less any excess (deductible) and up to any limit. Losses usually claimed by the insured and investigated by the insurer before payment is made (loss adjustment)	Interest and principal paid to risk shedder on original schedule; risk taker takes over claim on borrower	Bank repays lender face value of debt and takes over claim on underlying borrower	Not applicable

(41) This table was developed on the basis of CGFS (2003) Appendix 3, Instrument Characteristics.

	Credit default swap (CDS)	Credit linked note (CLN)	Total return swap (TRORS)	Credit insurance or surety bond	Financial guaranty insurance	Letter of credit	Loan sale
Protection buyer's counterparty risk exposure	Exposed to protection seller up to potential settlement amount	Exposed to risk that high-quality collateral pool, seeded by the initial issue amount, is insufficient to cover default losses	Exposed to protection seller up to potential settlement amount but risk mitigated by periodic payments to reflect changes in market value	Exposed to protection seller up to potential settlement amount			None
Protection seller's counterparty risk exposure	Exposed to protection buyer for transaction replacement cost	Exposed to protection buyer for value of note	Exposed to protection buyer for transaction replacement cost	Exposed to protection buyer for transaction replacement cost			
How these are typically managed?	Collateral support and downgrade triggers	Not managed	Collateral support and downgrade triggers	Not managed			Not applicable
Any other risks bundled?	No (except risk shedder may be long a delivery option, which may have value if the borrower's liabilities differ in value following credit event)	The note may pay a fixed or floating interest rate in addition to the cashflows on the embedded single name default swap	Credit risk bundled with any other risks associated with the underlying instrument to which the swap is linked, e.g. interest rate, fx or equity risk	No			Credit risk bundled with any other risks associated with the sold loan

APPENDIX B   KEY CHARACTERISTICS OF MULTI-NAME CREDIT RISK TRANSFER INSTRUMENTS

	Basket credit default swap	Collateralized debt obligation (CDO)	Synthetic CDO	Asset-backed security (ABS)
Protection buyer/risk shedder cashflows	Pays regular premia over life of swap; receives contingent payment upon nth default	Receives loan/bond market values up front from special purpose entity (SPE). May retain residual interests (e.g., equity tranche)	Pays regular premia over life of swap; receives contingent amounts from SPE upon credit events. May retain residual interests (e.g., equity tranche)	Receives loan market values up front from SPE. May retain residual interests (e.g., excess spread)
Funded or unfunded?	Unfunded	Funded	Unfunded	Funded
Protection seller/risk taker cashflows	Receives regular premia over life of swap; pays contingent amount following nth default	SPE receives all subsequent loan/bond cashflows, less any fees paid to managers and enhancers	SPE issues various securities and invests proceeds in high-quality collateral (e.g. US Treasuries)	SPE receives all subsequent loan cashflows, less any fees paid to managers and enhancers
Balance sheet impact?	No	Yes if loans/bonds were on originator's balance sheet; otherwise no	No	Yes
Trigger events (if applicable)	ISDA standard credit events (bankruptcy, obligation default, failure to pay, restructuring) – may also include repudiation for sovereigns and obligation acceleration in trades based on 'old' ISDA standards	Not applicable	ISDA standard credit events (bankruptcy, obligation default, failure to pay, restructuring) – may also include repudiation for sovereigns and obligation acceleration in trades based on 'old' ISDA standards	Not applicable
Settlement following trigger events	Typically through delivery of an obligation of the borrower by the risk shedder to the risk taker in exchange for its face value in cash; occasionally through establishment of a market price for the borrower's debt following the credit event (e.g. by polling dealers) and cash payment of the difference between this value and the debt's face value	Not applicable	Typically through delivery of an obligation of the borrower by the risk shedder to the risk taker in exchange for its face value in cash; occasionally through establishment of a market price for the borrower's debt following the credit event (e.g. by polling dealers) and cash payment of the difference between this value and the debt's face value	Not applicable
Protection buyer's counterparty risk exposure	Exposed to protection seller up to potential settlement amount	Not applicable	Exposed to risk of collateral mismanagement	Not applicable
Protection seller counterparty risk exposure	Exposed to protection buyer for transaction replacement cost	Exposed to risk of collateral and portfolio mismanagement	Exposed to risk of collateral and portfolio mismanagement	Exposed to risk of collateral mismanagement
How these are typically managed?	Collateral support and downgrade triggers	Structural enhancements like over-collateralization and excess spread traps	Structural enhancements like over-collateralization and excess spread traps	Structural enhancements like over-collateralization and subordination
Any other risks bundled?	No (except risk shedder may be long a delivery option, which may have value if the borrower's liabilities differ in value following credit event)	SPE may be exposed to basis mismatches between the underlying asset (the loans) and the securities issued.	SPE may be exposed to basis mismatches between the high-quality collateral, contingent payouts and the securities issued	SPE may be exposed to basis mismatches between the underlying asset (the loans) and the securities issued

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The Basel II Capital Accord, SME Loans and Implications for Belgium

Nancy Masschelein

Introduction

The Basel Committee is in the process of finalising a new Accord, known as Basel II, as a new regulatory framework for banks. By making capital requirements more risk-sensitive, Basel II aims to further improve the financial soundness of individual banks and so contribute to the soundness and stability of the financial system as a whole. The question addressed in this paper concerns how this preliminary regulatory proposal, currently scheduled for implementation end 2006, is likely to affect the structure of bank lending in Belgium, and in particular its consequences for SME lending.

Using detailed information on loans granted in Belgium as well as individual firm and bank balance sheet information, Section 1 of the paper documents the importance of SME lending in our country, which amounts to roughly 80 p.c. of total lending to firms. The data also indicate that the four large banks based in Belgium focus as much on SME lending as smaller banks, which means that the bulk of SME lending is granted by these four institutions. This fact is important because Basel II plans to offer banks a *menu* of regulatory possibilities with potentially different treatments of different lending categories, and large banks are predicted to adopt the more sophisticated but also more costly-to-implement 'Internal Ratings Based' (IRB) system, rather than the simpler 'Standardised Approach' (SA).

Section 2 presents in detail the Basel II proposals under discussion. Before doing this however, the section discusses the regulatory framework facing banks, putting current regulatory reforms into a more general context.

It stresses that regulation can be seen as trying to 'mimic' the discipline exerted by the sophisticated debtholders of non-financial companies (these debtholders are typically banks) in a world where the banks' debtholders do not perform this job, because they are dispersed, non-expert *depositors* (who are, moreover, protected by deposit insurance). This helps to explain the reliance of regulation on capital requirements with a threat of intervention/liquidation of banks that do not comply with these requirements.

Ideally, these regulatory constraints should force banks to internalise the full economic value of equity capital. In reality, however, the regulatory constraint introduces biases of its own, because the relative 'capital weights' of various bank operations do not necessarily coincide with their 'true economic weights', that is, regulatory capital may differ from 'risk-adjusted economic capital'. One can understand both Basel I and Basel II as attempts to minimise these biases. As detailed in Section 2, Basel I was a step in this direction. However, it was excessively favourable to OECD sovereign lending and discriminated against low-risk corporate lending, and Basel II tries to correct these problems.

Basel II intends to make capital requirements more risk-sensitive, and so contributes to a more efficient allocation of capital. For the sake of comparison with Basel I, the Standardised Approach is briefly discussed. It stresses that this approach specifically tries to reduce prior biases against safe firm lending and more risky lending. The specifics of the IRB approach are then discussed in detail. The section presents both the theoretical foundations for the approach, its dual perspective (the 'foundation' and 'advanced' versions, which differ in terms of the internal inputs the bank is able/obliged to supply), and its treatment of asset correlation. Indeed, in contrast with Basel I, the IRB approach of Basel II incorporates to some extent portfolio considerations in computing capital requirements. This leads in particular to a pro-SME effect, following the assumption that small firm risk has a lower correlation with aggregate risk than does large firm risk. Belgian data calculations confirm this assumption and are in line with foreign studies.

Finally, in Section 3, the paper provides an overall estimate of the impact of Basel II on capital requirements for both corporate and SME lending[1]. While caution is clearly called for, we can offer the tentative conclusion that, relative to Basel I, capital requirements under Basel II for firm lending in Belgium should not *automatically* go up. This conclusion is of course reached 'ceteris paribus', i.e. assuming that banks' risk-taking behaviour remains unchanged. A second tentative conclusion is that the IRB approach seems to produce lower capital requirements than the SA approach, and this conclusion obtains for large as well as small Belgian banks and for corporate as well as SME lending. This can only reinforce the presumption that the main Belgian banks will choose the IRB approach in the future. Sensitivity analysis suggests the

robustness of these conclusions and is discussed at the end of Section 3. Further discussion is included in the last section, which concludes the paper.

1. Bank lending to SMEs

In order to better understand the potential effects of Basel II on SME lending, this section provides some facts about the structure of this type of lending in Belgium. Basel II is going to offer banks a *menu of approaches* whose relative attractiveness will typically depend on bank size, given the fixed cost of implementing the most advanced approaches. In order to determine how Basel II will affect Belgian banks' capital requirements, it is therefore important to understand which banks lend to which firms in Belgium. Before doing this, it is necessary to define small/large banks and firms.

1.1 Some definitions

1.1.1 Large versus small banks

To distinguish between small and large Belgian banks, the 100 billion euro cut-off for total assets has been chosen. Table 1 clearly shows that this is a natural cut-off point. Furthermore, this cut-off point is often used in the empirical literature (see e.g. Berger et al., 2001), which distinguishes banks with respect to size, to differentiate between the two smallest bank asset classes. Note that the table only covers the banks that granted credit to non-financial firms in the period under consideration.

[1] For a review of the impact of Basel I on capital requirements, see Jackson et al. (1999).

TABLE 1   BANK ASSETS BY SIZE CLASS

(June 2002; in billions of euro)

	Number of banks	Total assets (p.c. of total banking sector)	Mean	Min.	Max.
Large banks[1]	4	658.1 (87 p.c.)	164.5	100.7	271.8
Small banks	39	69.7 (9 p.c.)	1.7	0.1	13.3
Foreign branches	25	28.1 (4 p.c.)	1.0	0.0	4.4

Source : NBB.
(1) Including Belgian subsidiaries since the Accord needs to be applied on a consolidated basis.

The table stresses the overwhelming dominance, in asset terms, of the four large banks that operate in Belgium. We have already mentioned that large banks are likely to follow the IRB approach while small banks are more likely to adopt the SA approach. Foreign branches, on the other hand, will need to adopt the approach of their foreign parent banks. In what follows we will only concentrate on small and large banks.

1.1.2 Non-financial firm exposure

We define non-financial firm exposures as put forward in the Basel II Accord. Basel II identifies 3 types of non-financial firm exposures: exposures to corporates, exposures to corporate SMEs and exposures to retail SMEs. (BIS, 2003b) First, a corporate exposure is defined as a debt obligation of a corporation, partnership or proprietorship. Second, in the corporate portfolio, SME borrowers are defined as those with less than 50 million euro of annual sales on a consolidated basis. Third, loans extended to SME borrowers are eligible for the retail treatment provided the total exposure of the banking group to the individual firm is less than 1 million euro. The definition most often used in the empirical literature on SME lending (see e.g. Berger et al., 2001a) corresponds to the definition of retail SMEs in Basel II.

1.2 The importance of SME lending in Belgian banks' loan portfolios

Empirically, identification of SMEs according to this definition requires us to combine data from the Credit Register (CR), from which we have used information on utilised credit lines to Belgian firms[2], and the Central Balance Sheet Office (CBSO), which provides balance sheet and income statement data for these Belgian firms. We used CR data based on June 2002. As information from the CBSO is not yet available for 2002, financial information for the years 2001 and 2000 is used. [3]

To provide a first indication of the composition of the loan portfolios[4] of large versus small Belgian banks, Table 2 provides descriptive statistics relating to loan exposures

[2] The CR also contains information on credit lines to associations of firms (or associations of firms and individuals). As these lines count for only roughly 11 p.c. of total firm lending, we decided to disregard them.

[3] When combining these two datasets, we noticed that there are exposures in the CR dataset for which no balance sheet information is available in the CBSO. Specifically, total coverage of CR data in the CBSO dataset is on average 90 p.c. in terms of exposure, and 83 p.c. in terms of number of debtors, when lending to associations is not taken into account. When this type of lending is included, the figures are 74 p.c. and 76 p.c. respectively. They also correspond to the coverage of 75 p.c. of exposures calculated in Saurina and Trucharte (2002) for Spain, and they are higher than their total coverage in terms of number of debtors, which was on average only 45 p.c.. Saurina and Trucharte concluded from this that it was mainly for small firms that no financial information was available. In their article there is no reference to the role of associations.

[4] Exposures to public entities and educational institutions have been excluded as most of them are treated differently in Basel II.

TABLE 2 LOANS TO BELGIAN FIRMS AS A PERCENTAGE OF BANK ASSETS ACCORDING TO BANK AND FIRM SIZE
(June 2002; Bank-level data)

Corporate

	Mean	Median	Min.	Max.	Stdev.
Large banks	2.15	2.18	1.60	2.64	0.52
Small banks	1.47	0.00	0.00	21.24	4.49

Corporate SME

	Mean	Median	Min.	Max.	Stdev.
Large banks	4.89	4.69	3.94	6.22	0.97
Small banks	4.89	0.75	0.00	32.91	8.33

Retail SME

	Mean	Median	Min.	Max.	Stdev.
Large banks	3.30	3.28	1.84	4.82	1.34
Small banks	3.27	1.40	0.00	15.82	4.78

Total

	Mean	Median	Min.	Max.	Stdev.
Large banks	10.34	10.04	8.42	12.86	2.14
Small banks	9.63	4.17	0.01	48.92	11.75

Source: NBB.

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as a percentage of bank assets. Two conclusions emerge from the table. First, we see that, on average, large banks exhibit a portfolio composition similar to that of small banks in terms of proportion of assets devoted to SME lending. A difference exists for corporate lending, as large banks lend more to corporates in terms of assets than do small banks. However, there are large differences between banks, especially between small banks. Second, on average, in terms of bank assets, both large and small banks lend less to large Belgian corporates than to Belgian corporate SMEs or Belgian retail SMEs[5]. This highlights the very important role of SMEs in the Belgian economy.

Table 2 also indicates that small banks devote less of their total assets to firm loans than do large banks, which makes it difficult to draw definite conclusions as to which banks specialise in lending to which firms. Therefore, Table 3 gives an overview of the distribution of loans by firm class as a percentage of total loan exposures. Again, the table stresses the very important role of large and small banks for SME lending in Belgium. Further, it indicates that, although large differences exist between banks, small banks specialise more in loans to retail SMEs while large banks tend to specialise in loans to corporates and corporate SMEs. The latter observation is consistent with a large stream of research which has documented the fact that small banks invest a much higher proportion of their assets in small business loans. (See for example Berger and Udell, 1996, Peek and Rosengren, 1997, Strahan and Weston, 1998 and Berger et al. 1998, 2001a). Small and large banks may have a different lending focus because

small banks face an exposure constraint. However, small firms may also be a natural customer base for small banks because of the different organisational structures of small and large banks. As the size and the complexity of the banking organisation increases, organisational diseconomies à la Williamson (1988) may raise the cost of transmitting the "soft" information[6] related to SME lending through layers of management. (Stein, 2002 and Liberti, 2002).[7]

Tables 2 and 3 do not tell us much about the proportion of SME lending that will be represented by banks adopting the IRB approach. An idea is provided by Table 4, which gives information on the aggregate proportions to different firm classes accounted for by large and small banks. [8] We can conclude that although small banks tend to specialise in small loans, an extremely high proportion of total SME loans are provided by large banks since large banks' lending to all firm classes accounts for more than 92 p.c. of total firm lending. If we accept the credible hypothesis that large banks will take the IRB road, we can conclude that IRB banks will account for most SME lending.

(5) We may expect large banks to lend more to corporates when foreign firm lending is also included. Credit Register data, however, does not provide information on utilised credit lines to foreign firms.

(6) Soft information can be defined as information that is initially not available in hard numbers and is difficult to summarise in a numerical score (Petersen, 2002).

(7) However, these organisational costs may be dampened by diversification benefits which can be mainly exploited by large banks (See e.g. Black and Strahan, 2002)

(8) The larger the total exposures to a firm class, the higher the risk weight assigned to these firms.

TABLE 3   COMPOSITION OF BANKS' LOAN PORTFOLIO

(June 2002; Bank-level data; as percentage of loan exposures to Belgian firms)

Corporate

	Mean	Median	Min.	Max.	Stdev.
Large banks	21.56	20.37	14.15	31.35	7.34
Small banks	10.22	0.00	0.00	100.00	25.53

Corporate SME

	Mean	Median	Min.	Max.	Stdev.
Large banks	47.48	47.56	42.78	52.00	3.82
Small banks	34.71	24.34	0.00	99.06	36.45

Retail SME

	Mean	Median	Min.	Max.	Stdev.
Large banks	28.06	28.37	18.00	37.49	9.56
Small banks	55.08	63.26	0.00	100.00	39.93

Source : NBB.

TABLE 4 **DISTRIBUTION OF LOANS ACCORDING TO BANK AND FIRM SIZE AS PERCENTAGE OF TOTAL LOAN EXPOSURES TO BELGIAN FIRMS**

(June 2002; Aggregate data)

	Corporate	Corporate SME	Retail SME
p.c. of total exposure	20	49	31
of which			
Large banks	93.49	92.50	94.47
Small banks	6.51	7.50	5.53

Source : NBB.

2. The Basel II approach

2.1. The regulatory context up to Basel II [9]

In order to evaluate banking regulation, it is important to start with the question : what is special about these institutions that warrants regulation ? A key characteristic of financial institutions concerns the nature of their *claimholders*, i.e. *depositors* in the case of banks. Indeed, typical corporations have liabilities held by debt holders and by equity holders. The latter ones are "in control" in good times and the former ones in bad times. In *non-financial companies*, debtholders – which are often banks – are expected to play a major role in disciplining management in the case of financial distress, in order to avoid "gambling for resurrection", in particular. This requires expertise, and it is often a role played by banks (indeed, only large firms – backed by rating agencies – can get disintermediated debt). By contrast, banks, like several other types of financial institutions, have liabilities held by depositors, i.e. *dispersed non-experts*. In such a case, there is a need for a *debtholder representative*, which is a fundamental role for the regulator. This is especially true since banks can take risks that could contribute to contagion or systemic risk.

How does the regulator act as a bank debtholder representative ? First, by imposing constraints, in the form of capital requirements, which serve to ensure bank solvency and to avoid systemic externalities. Second, by threatening a "get-tough-policy" when these requirements are not respected, with the regulator taking control and possibly closing or selling the financial institution. This broadly mimics the role of debt as a contingent control arrangement in non-financial firms, where control over the firm switches to creditors in bad times. Moreover, regulation is aimed at limiting the ability

of shareholders to "play with the deposit insurance fund money", something their debtholders/depositors care about insufficiently if they feel at least partially protected by deposit insurance.

The general combination of capital requirements and control shifting to the regulator in the case of violations of the above rules is common to the regulation of banks, securities firms and insurance companies. Specifics, however, differ between types of institutions. Since banks have a special role in bearing *credit risk*, this is the natural focus for banking regulation. In contrast to previous regulation, since 1988, the Basel I accord has tried to measure credit risk and has required banks to hold a capital of at least 8 p.c. of their "risk-weighted assets (RWA)". In this first attempt at forcing banks to internalise the credit risk characteristics of their loans, four risk categories were considered each receiving a different risk weight (RW) [10] : a risk weight of 0 for OECD sovereign risk; a risk weight of 20 for lending to OECD banks; a risk weight of 50 for residential mortgage lending; a risk weight of 100 for all other lending (including all lending to firms). (see BIS, 1988)

Basel I offered an improvement over previous regulation that essentially treated all lending in the same way but still discriminated in favour of sovereign lending as well as within firm lending, against 'safe firms' and in favour of 'risky firms'. As such, Basel I induces a form of regulatory arbitrage : when banks find that economic capital [11] for firm loans is significantly below the 8 p.c. regulatory capital requirement, they have the incentive to minimise the difference between economic and regulatory capital by altering their lending behaviour towards riskier loans. Basel II aims to reduce this form of regulatory arbitrage.

Besides the risk of regulatory arbitrage, another shortcoming of Basel I regulation is the practice of computing total capital requirements by *summing* the requirements associated with individual elements on the asset side of the balance sheet. Although regulators were obviously aware of the potential diversification effects linked to the size or composition of the portfolios held by financial institutions, the difficulty in measuring them had largely prevented regulation from taking diversification into account in Basel I. How to measure and incorporate diversification effects is an issue that Basel II partially tries to address.

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(9) For a general treatment of this issue, see Dewatripont and Tirole (1994).

(10) Here we leave aside the question of capital requirements for off-balance-sheet operations, for the sake of simplicity.

(11) Economic capital is defined as the amount of capital needed for a portfolio such that there is only a small probability that losses may exceed capital. For a prescribed level of confidence it is calculated as the confidence quantile of the portfolio loss distribution minus the expected loss. In the literature, economic capital is also often called credit Value at Risk.

2.2 General philosophy of Basel II

The above section suggests that regulation is clearly helpful in limiting risk-taking by banks, by forcing them to 'play with their own money': if they are forced to stay above the 8 p.c. capital threshold at all times, the externality from deposit insurance is eliminated. And one can hope that, in general, imperfections in reporting systems and regulatory lags are not so severe that an 8 p.c. rule would be insufficient to 'catch violators' before their capital becomes negative.

While the Basel II Accord has not been finalised[12], current plans give a good idea of its philosophy. The accord is relatively complex and multi-faceted, and we do not aim to summarise it in all its dimensions here. The proposal is based on three pillars:

1. A system of minimum capital requirements.

2. Supervisory review in which supervisory authorities assess banks risk control systems and capital adequacy policies.

3. The use of market discipline as a lever for strengthening disclosure.

As most elements for the treatment of SME exposure are included in the first pillar, we will focus on principles developed in this pillar. The New Accord maintains the level of the minimum capital requirement at 8 p.c. of RWA but adds the RWA for operational risk to the RWA for credit risk and market risk[13]. In what follows, we will concentrate on the calculation of minimum capital requirements for credit risk. More specifically, we will focus on changes in risk weights relative to Basel I, the incorporation of asset correlation effects, and their implications for the specific treatment of SME lending.

A key feature of the first pillar of Basel II is that it presents two options for the measurement of credit risk: the SA and the IRB approach.[14] Within the IRB approach the Accord gives two methods for calculating risk capital charges: the 'Foundation IRB Approach' and the 'Advanced IRB Approach'. Banks are encouraged to move along the spectrum of available approaches as they develop more sophisticated risk measurement systems and practices. The SA is closer to Basel I, and is expected to be adopted by smaller institutions. The IRB approach relies to some extent on internal risk calculations by banks, implying a fixed set-up cost that, in the first instance, may only be worthwhile for bigger institutions on average (since the gain of a more 'tailor-made' system will typically grow with asset size). So, although most SME lending in Belgium is likely to be granted in the future by banks adopting the IRB approach, it is useful to spend some time first on the standardised approach, to understand better what Basel II implies relative to Basel I.

2.3 The Standardised Approach

This approach differs from Basel I essentially in making the capital requirement depend on external ratings (by nationally certified rating agencies, e.g. Moody's, Standard and Poor's or Fitch). Specifically, the risk weights are as detailed in Table 5. Risk-weighted assets are then calculated by multiplying these risk weights by credit exposures.

(12) The Committee released a final consultation paper on the 29th April 2003 and is planning to agree on the new Accord by the end of this year. (BIS, 2003b)

(13) RWA for market risk need to be calculated as put forward by the Committee in 1996. The amendment allowed banks, for the first time, to use their own internal models. (BIS, 1996)

(14) Note that supervisory authorities may require systemically important banks to adopt the IRB approach.

TABLE 5   RISK WEIGHTS BY RATING BUCKET

Rating	AAA to AA–	A+ to A–	BBB+ to BBB–	BB+ to BB–	B+ to B–	Below B– and defaulted	Unrated
Sovereigns	0	20	50	100	100	150	100
Banks 1	20	50	100	100	100	150	100
Banks 2							
< 3 months	20	20	20	50	50	150	20
> 3 months	20	50	50	100	100	150	50
Corporates	20	50	100	100	150	150	100

Source : Basel (2001a).

Moreover, residential mortgages would carry a 35 p.c. weight, while other 'retail exposures' would carry a 75 p.c. weight.

The key adjustments to Basel I are thus:

1. Refined treatment of sovereign lending relative to the Basel I system of 0 p.c. for OECD States and 100 p.c. for non-OECD States. There will thus be, in particular, 'tougher' treatment of some OECD sovereign lending.

2. Refined treatment of interbank lending, where two options are possible: either according to the sovereign rating where the bank is incorporated ("option 1") or according to the bank's own rating ("option 2", with preferential treatment for maturities of less than 3 months). On average, OECD interbank lending receives a higher capital requirement.

3. A drop in the residential mortgage requirement from 50 p.c. to 35 p.c..

4. Refined treatment of lending to firms, with two key effects: (i) more favourable treatment of firms that have a good rating but harsher treatment of firms with bad ratings; (ii) unchanged treatment of firms that are unrated, except for 'retail lending', where the capital requirement is down from 100 p.c. to 75 p.c..

Banks are also allowed to take account of several credit risk mitigating techniques, such as collateral, guarantees, credit derivatives and netting arrangements. Where banks take eligible collateral, which has been expanded to include most types of financial instruments, they are allowed to reduce their credit exposure to take account of the risk mitigating effects of the collateral. Banks may opt for different approaches. For guarantees and credit derivatives a substitution approach will be applied. The portion of the exposure that is protected will be assigned the risk weight of the protection provider. To the extent that there are netting arrangements, banks will be allowed to calculate capital requirements on the basis of net credit exposures.

Let us make two comments on the standardised approach at this point: First, note that the regulation would seem to suggest that, at least for firms wishing to access capital markets, being unrated is on average a bad thing; that is, good firms presumably find it profitable to get rated. This has been analysed in the economics literature on 'disclosure of hard information' (see Grossman and Hart (1980), Grossman (1981), Milgrom (1981), and Okuno-Fujiwara et al. (1990). This literature shows how

such information naturally gets disclosed in equilibrium. This is called the 'unraveling argument': since it pays to disclose whenever one's private information is favourable, the 'market' will 'assume the worst' when disclosure does not take place.

However, this unraveling argument will not apply fully if, for example, it is very costly for a firm to access capital markets (it will only need a rating if it accesses these markets) or if there is a fixed cost entailed in disclosing information. In this case, non-disclosure only means that the gain from accessing capital markets or disclosing information is less than the cost. While very favourable information will be disclosed, the undisclosed information is not necessarily the most damaging. The higher the cost of disclosure, the less unfavourably one should look at non-disclosure.

If we apply this view to Basel II, since only firms that plan to access capital markets get rated and since getting rated involves a fixed cost, which is a more significant hurdle for SMEs, this is a justification for the lower capital requirement of retail lending relative to other firm lending: retail lending involves unrated firms, but their lack of rating is due much more to the cost of accessing capital markets than the possibly unfavourable financial situation of the firm.

A second justification for the more favourable regulatory treatment of retail lending seems to come from the desire to have a 'level playing field' between the standardised approach and the IRB approach, and has to do with the fact that retail default has a lower correlation to aggregate movements than corporate default (see below). Indeed, while the standardised approach keeps the idea of summing individual capital requirements, thereby leaving aside any explicit portfolio considerations, one can see the 'retail correction' as a means of taking on board this diversification effect in a simple (and admittedly crude) way.

2.4 The IRB approach

The second approach that the Basel Committee envisages for the determination of regulatory capital is based on internal ratings systems. Banks are allowed to use their own internal ratings, subject to supervisory approval, to assign a wide range of risk weights to corporate, bank, sovereign and retail exposures. The weights planned under the IRB approach exhibit much higher risk-sensitivity than those under the standardised approach.

2.4.1 Risk weights

The general risk weight curve for corporate, sovereign, banks and retail portfolios[15] transforms risk components (PD – Probability of Default, LGD – Loss Given Default and ρ – correlation) into capital requirements. The main part of this risk weight function is based on a structural-approach portfolio model in which the correlation is the free parameter. See Box 1 for a discussion of the theoretical foundation of the following risk weight curve:

$$k = \Phi \left[\frac{\Phi^{-1}(PD) + \sqrt{\rho}\,\Phi^{-1}(C)}{\sqrt{1-\rho}} \right] * LGD$$

where:

k = capital requirement

Φ = standard normal function

Φ^{-1} = inverse standard normal function

ρ = asset correlation (see formulae below)

C = confidence interval – set by Committee at 99.9 p.c.

We can think of the risk weight formula as being the marginal contribution of a debtor to bank risk, i.e. the additional capital a bank needs to hold to protect itself against the risk of a single extra exposure (see Box). For the corporate, sovereign and interbank curve, the capital requirements are adjusted for maturity (M). For retail exposure, the capital requirement curve contains no explicit maturity adjustment. Risk-weighted assets can then be obtained by multiplying the derived capital charge by 12.5[16] (to obtain the RW) and by the exposure at default (EAD). Note that capital requirements, and thus the risk-weighted assets, increase with the probability of default, the loss given default, the asset correlation and, when it applies, the maturity of the exposure.

Parameters of this risk weight function, and especially the parameters of the correlation formula (see below), were adjusted to fit the goal of keeping the average economy-wide requirement unchanged at the current 8 p.c. This calibration of the IRB capital requirements has occurred within a simplified portfolio model to cover both unexpected and expected credit losses (see Box). This seems at first sight counter-intuitive, as capital is intended to provide a cushion against unexpected losses, while

provisioning and (at origination of the loan) loan prices need to provide a cushion for expected loss. However, there are several reasons for the Committee's decision. First, this is to prevent loan loss provisions that are considered eligible for capital (up to a maximum of 1.25 p.c. of risk-weighted assets) from also being used to cover for expected loss ('double gearing'). Furthermore, this prevents problems that may arise from differences in provisioning practices between countries. And finally, it prevents difficulties that supervisors may experience when validating estimates of future margin income. However, as there are conceptual arguments for taking provisioning and prices into account in the calculation of capital, the Basel Committee decided to include the following two elements. First, under certain conditions, banks may reduce risk-weighted assets by the difference between 12.5 times the provisions and the expected loss portion of the risk-weighted assets (which is calculated as 12.5*PD*LGD*EAD) in a given class. And second, for qualifying revolving retail credit such as credit cards, which exhibit a high ratio of future margin income to expected losses, the expected loss portion of the risk-weighted assets can be reduced by 12.5 times future margin income (see BIS, 2001b).

As already mentioned above, there are two variants within the IRB approach: the IRB foundation and the IRB advanced approach. Under both approaches, the capital charge required to cover credit risks depends on the same components: PD, LGD, EAD, correlations and maturity M. However, they differ mainly in terms of the inputs that need to be estimated by the bank and those specified by the Committee (see Table 6 and see the following section for the treatment of correlations). Under the foundation approach, banks must assign each borrower to an internal rating bucket and allocate an average PD to each of the rating buckets. Other components such as LGD, EAD and M are set by the Committee. At national discretion, maturity values can be provided by banks based on own estimates. Under the advanced IRB approach, banks must provide their own estimates of PD, LGD, EAD and M. For retail exposures, there is no distinction between the foundation and advanced approaches, and banks must provide their own estimates of PD, LGD and EAD for these exposures. In general, the advanced approach is expected to be adopted by more sophisticated institutions and is intended as the starting point for accepting the use of banks' own credit risk portfolio models in determining regulatory capital.

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(15) Capital requirements for other portfolios, such as specialised lending (i.e. project finance, object finance, commodities finance, income-producing real estate and high-volatility commercial real estate), purchased receivables, and equity portfolios are subject to another specific treatment.

(16) The inverse of the current minimum 8 p.c. risk-based capital requirement.

| TABLE 6 | INPUT FACTORS SPECIFIED BY BANKS AND/OR THE BASEL COMMITTEE IN THE IRB APPROACH |

| | Sovereign, corporate and interbank | | Retail |
	Foundation	Advanced	
PD	Bank	Bank	Bank
LGD	Committee	Bank	Bank
EAD	Committee	Bank	Bank
M	Committee or Bank	Bank	N.A.

An important element of the IRB framework is also the treatment of credit risk mitigants such as collateral, guarantees, credit derivatives and netting arrangements.

Compared to the SA approach, a wider range of collateral is accepted. In addition to the eligible financial collateral, other collateral types such as receivables, and residential and commercial real estate can be taken into account in the value of LGD. As physical collateral is often used in lending to SMEs, this favours SME lending. Under the foundation approach, the risk-mitigating effects of guarantees and credit derivatives are recognised as follows: for the covered portion of the EAD, a risk weight function may be used which is specific to the type of protector and the PD specific to the protector's rating may be used. Under the advanced approach banks may choose whether the guarantee is reflected through the probability of default or through the LGD estimates. On-balance-sheet netting of loans and deposits is recognised under certain conditions on EAD.

Box 1

Theoretical foundation of the IRB risk weight curve

The model used by the Basel Committee to calibrate the risk weight functions of the IRB approach is derived from a structural-approach portfolio model.[1] The roots of these models can be found in the seminal papers by Merton (1977) and Black and Scholes (1974). Structural-approach models typically postulate some explicit microeconomic model of the process that determines the default of the individual debtor[2]. In these models, a borrower's financial position is driven by underlying latent variables, which are determined by common risk factors and idiosyncratic risk factors. In this box we discuss the theoretical foundations of the risk weight function and its underlying assumptions. (see also Gordy, 2000, 2003)

The model that underlies the Basel proposal is a one-factor model, which implies that there is only one systematic risk factor common to all debtors. The state of borrower i is driven by the latent variable Y_i, which is defined as a linear function of a single systematic factor X and an idiosyncratic risk component ε_i

$$Y_i = wX + \sqrt{1 - w^2}\,\varepsilon_i, \qquad i = 1\ ...n \qquad (1)$$

where w can be thought of as the weight with which the latent variable of an individual obligor is driven by the systematic risk factor X. The variables X and ε_i follow a standard normal distribution with mean 0 and variance 1, and X and are independent for every obligor i. The weights of the two components are chosen so that Y_i is also standard normally distributed. The common factor affects all companies equally and represents the state of the economy, i.e. the systematic risk. The idiosyncratic risk component affects one specific borrower and represents the diversifiable risk.

The model is a default-only model, assuming the firm to be in a state of either default or of non-default. As default occurs when Y_i is below a critical threshold value γ at a certain horizon, and rearranging formula (1), we obtain

$$\varepsilon_i < \left(\frac{\gamma - wX}{\sqrt{1 - w^2}} \right) \qquad (2)$$

(1) In general, there are two main correlation estimation procedures: the structural approach and the reduced-form approach. Reduced form models assume a particular relationship between the default rate and some background factors, which represent systematic factors. To the extent that two obligors are sensitive to the same set of background factors, their default probabilities will move together.

(2) The best-known industry models of portfolio risk using a structural - based approach are the RiskMetrics Group's CreditMetrics and KMV's Portfolio Manager.

From this we can derive the probability of default conditional on the realisation of the systematic risk factor $X = x$.

$$p(x) = \Phi\left(\frac{\gamma - wx}{\sqrt{1 - w^2}}\right) \qquad (3)$$

where Φ is a standard normal distribution function. Once we have conditioned on the common factor, the individual obligor defaults are driven only by own idiosyncratic terms and are independent for other defaults. This independence justifies the Basel decision to apply risk bucketing rules.

As the latent variable is a standard normal variable, this threshold value γ is equal to $\Phi^{-1}(PD)$ where PD is the unconditional probability of default, i.e. the average value of the conditional default probability across all possible realisations of the systematic risk factors.

A random expected loss given default rate *(LGD)* is introduced that is independent and has mean λ. The conditional portfolio loss is then equal to

$$p(x) = \lambda^* \, \Phi\left(\frac{\Phi^{-1}(PD) - wx}{\sqrt{1 - w^2}}\right)$$

If the number of loans in a portfolio goes to infinity, i.e. the portfolio is asymptotically fine-grained, the variance of the portfolio is completely determined by the variance of the market, as the specific risk contributes no volatility to a well-diversified portfolio. Therefore, it is possible to map the percentile $(1 - C)$ of the X-distribution to the C portfolio percentile to account for portfolio variance. Banks typically hold reserves and capital sufficient to cover this percentile of the distribution of portfolio loss over the horizon.

$$p(x) = \lambda^* \, \Phi\left(\frac{\Phi^{-1}(PD) - w\Phi^{-1}(C)}{\sqrt{1 - w^2}}\right) \qquad (4)$$

We can replace the weighting parameter w by $\sqrt{\rho}$, which stands for the average value of the asset correlation. Since we have assumed that idiosyncratic factors are independent, correlations between latent variables are due to the existence of the systematic risk factors. The degree of correlation between defaults is determined by the sensitivity of the latent variables to the systematic factor, that is by w of the latent variables of two obligors, as shown by

$$\rho = corr\,(Y_i, Y_j) = w^2$$

Using this result, the conditional portfolio loss function looks as follows:

$$p(x) = \lambda^* \, \Phi\left(\frac{\Phi^{-1}(PD) + \sqrt{\rho}\,\Phi^{-1}(C)}{\sqrt{1 - \rho}}\right) \qquad (5)$$

This function appears to be an important input factor of the IRB risk weight function and can be interpreted as a benchmark in terms of marginal value at risk for the capital required for an individual loan. To arrive at the risk weights the function is multiplied by an adjustment that allows for the maturity of the exposure and by 12.5 p.c. The IRB capital requirements are calibrated within this simplified portfolio model (assuming a one-factor model and portfolio-invariant capital requirements) and cover thus both expected (defined as $\lambda^* PD$) and unexpected credit losses.

2.4.2 Asset correlations

The risk of individual loans can be assessed by different drivers of credit risk such as PD, LGD and EAD. To assess the risk of a credit portfolio, however, it is not sufficient to simply aggregate the individual risks; it is also necessary to take into account the correlations of the risks between the assets in the portfolio. These correlations determine by how much the loss on a portfolio is reduced by diversification across debtors, industries and regions. Although there has been much progress in recent years in the estimation of correlations across exposures in a portfolio, there is not at present a single, well-accepted "best-practice" for calculating them. Estimating correlations is indeed considered to be one of the central challenges for quantifying portfolio credit risk.

The Basel Committee (BIS, 1999) recognises that an approach based on a full credit risk portfolio model that takes into account the effect of correlations may bring regulatory capital into closer alignment with the perceived riskiness of the assets and portfolio concentrations. For a number of reasons, however, Basel II does not allow for a full portfolio-based approach in the assessment of credit risk. First, a lack of data on individual bank portfolios hinders the reliable estimation of the correlations between different exposures. This lack of data is due partly to the infrequent character of default events and the relatively longer-term time horizon used in the calculation of credit risks. Furthermore, the lack of data prevents appropriate back-testing of the models. This is in sharp contrast with market risk models, which typically can make use of daily data.

Second, correlation estimates are subject to several methodological issues. Different assumptions, e.g. on the distribution function, made in different credit risk models to calculate correlations may affect the loss distributions. There appears to be no theoretical answer as to what the value of the average asset correlation should be. In the end, it is an empirical question whether the correlations calculated by the different models are acceptable in size and whether they are stable over time.

Given the data and the methodological limitations involved in calculating correlations, the Basel Committee decided not to allow banks to calculate the correlations themselves, but rather to incorporate correlations in a more indirect manner. Following empirical research, the Committee incorporated variables reflecting some of the characteristics displayed by correlations into the regulatory formula; in particular, a decreasing relationship between asset correlation and the probability of default is incorporated, and a positive relationship between firm

size and correlation is introduced. Thus, although the risk weight curve is based on a structural portfolio model, asset correlations are introduced in a more indirect way, dependent on PD and firm size.

The correlation formulae that are put forward by the Basel Committee vary for different asset portfolios and are set as follows:

1. sovereign, corporate and interbank exposures:

$$\rho A = 12\%* \left(\frac{1 - e^{-50*PD}}{1 - e^{-50}} \right) + 24\%* \left(1 - \frac{1 - e^{-50*PD}}{1 - e^{-50}} \right) \text{ (1)}$$

Correlations are a decreasing function of the probability of default, and they vary between 12 p.c. for low quality exposures and 24 p.c. for high quality exposures. For corporate SMEs, there is a firm-size adjustment to the corporate risk weight formula:

$$\rho A = (1) - 4\%* \left(1 - \frac{(S-5)}{45} \right)$$

where S is expressed as annual sales in millions of euros with values of S falling in the range of less than or equal to 50 million euros or greater than or equal to 5 million euros. Firms with annual sales of less than 5 million euros will be treated as if their sales were equal to 5 million euros for the purposes of the firm-size adjustment. The formula shows that the smaller the firm size, the lower the asset correlation and hence the lower the ultimate capital requirement. On average, this size-adjustment may reduce the capital requirements by 20 p.c. for the smallest firms.

2. retail exposures:

For exposures secured by residential mortgages, asset correlation is fixed at the level of 15 p.c.. This rather high correlation takes into account the fact that mortgage loans are in general long-term loans (recall that there is no maturity adjustment for retail exposures) which may be greatly affected by the business cycle. Banks will be allowed to apply the following formula for correlations for their SME exposures so long as the total exposure of the banking group to the SME is less than 1 million euro and provided that those exposures are managed in a way similar to retail exposures. This implies that they should be treated consistently over time and in the same manner as other retail exposures and that they must not be managed individually but as a part of a portfolio segment. (BIS, 2003b, § 200)

$$\rho_A = 2\% * \left(\frac{1 - e^{-35*PD}}{1 - e^{-35}} \right) + 17\% * \left(1 - \frac{1 - e^{-35*PD}}{1 - e^{-35}} \right)$$

Correlations thus vary between 2 p.c. for low quality retail lending and 17 p.c. for high quality retail lending.

The asset correlation curve for qualifying revolving retail credit is very similar to the one for loans to retail SMEs; correlations vary between 2 p.c. and 11 p.c. while the value 35 needs to be replaced by 50.

To show the impact of these different correlation formulas on the risk weight curve for non-financial firms, Chart 1 reports the risk weight curves for loans to corporates, corporate SMEs and retail SMEs under the assumption of a 45 p.c. LGD (which is the value put forward by the Committee for senior unsecured claims under the foundation approach), a maturity of 2.5 years, (which is the value for banks using the foundation approach) and annual sales of 5 million euros (for the purposes of the firm-size adjustment for SME borrowers). The risk weight curve for exposures to retail SMEs is both lower and less steep than the risk weight curves for exposures to corporate SMEs and corporates.

CHART 1 **THE RELATIONSHIP BETWEEN CAPITAL REQUIREMENTS (k) AND PROBABILITIES OF DEFAULTS (PD) NON-FINANCIAL FIRMS**
(In percentages)[1]
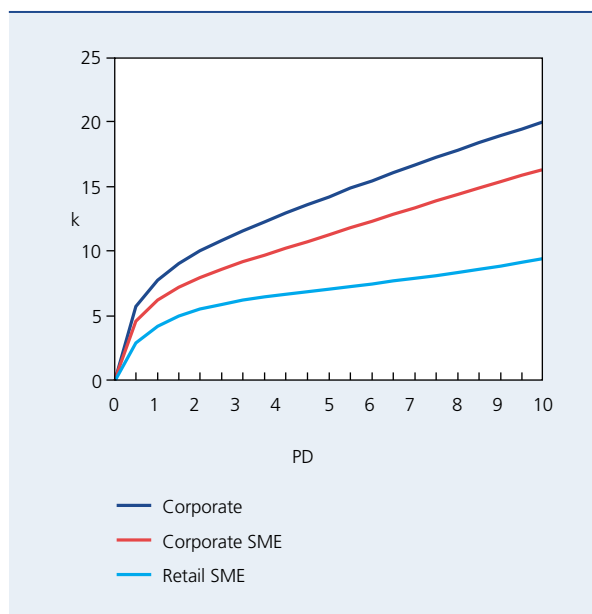
Source : BIS (2002).
(1) LGD = 45 p.c. and Maturity = 2.5 year, S=5

2.4.3 Rationale of PD and size dependence of correlations

The box has shown that the risk weight formula is based on a one-factor model in which the correlation factor measures the exposures against systematic risk. Basel incorporates a lower correlation factor for smaller firms, which implies that these firms are less vulnerable to systematic risk than larger firms. Although small firms have on average a higher default rate than large firms, the weak sensitivity to systematic risk of small firms favours a reduction in the SME risk weight. Two arguments can be found in the literature that explain this positive size dependence of correlation.

First, large firms may be more sensitive to systematic risk because they are better diversified than SMEs (see e.g. Lopez et al. (2002)). Larger firms generally have many divisions in many markets, and thus superficially resemble diversified portfolios of smaller firms. According to the theory of portfolio diversification, we may expect those diversified portfolios to resemble more closely the general economy and less idiosyncratic elements. Although SMEs have on average a higher default rate, it is due mostly to idiosyncratic risk, which can be diversified away in a large portfolio. The positive effects of diversification may explain the decreasing relationship between asset correlation and firm size as reflected in the Basel correlation formulae. However, Roll (1988) has found that portfolios of smaller firms, which were constructed to match large firms in asset size, were more exposed to systematic risk, in terms of R², than the size-matched large firms.

Second, Düllmann and Scheule (2003) argue that firm size may serve as proxy of the business sector dependency of the correlations, since sectors which are more correlated to the state of the economy are dominated by large firms while sectors which are less prone to systematic risk are dominated by small firms. They found support for this hypothesis with German data. Sectors such as manufacturing, construction and automotive have a higher percentage of large firms, while sectors such as transport & communication services, health and financial services and other public services have a higher percentage of small firms.

Empirical studies have also found support for the relationship between firm size and correlation. Lopez et al. (2002) constructed portfolios of American, Japanese and European firms and calculated asset correlations using the KMV methodology using equity returns as input data. Another stream of research (see Sironi and Zazzara (2001) on Italian data, Düllmann and Scheule (2003) on German data and Dietsch and Petey (2003) on French and German data) calculated correlations using historical default rates. Also, initial estimates of correlations with Belgian data conform to the hypothesis of positive size-dependency of

correlations (see infra). Although all studies found an increasing relationship between firm size and correlation, there is less uniformity in the literature related to the actual size of the correlations. The asset correlations for firms estimated in Lopez et al. are more in line with the ones proposed in Basel II[17] while in the other studies correlations are consistently lower. The underlying methodology and data may be the cause of these variations in results across studies. Two potential explanations exist for the low correlations in the second stream of research. First, the studies use a legal bankruptcy definition of default, which is more restrictive than the definition put forward in Basel[18]. Second, correlations may have been underestimated as they were calculated from the total population. In general, a portfolio of banks contains fewer exposures. Some limited studies (Düllman and Scheule, 2003 and Dietsch and Petey, 2003) that tried to address part of these problems found larger correlation estimates. However, they stayed well below the ones put forward by Basel II. In sum, studies analysing the relationship between firm size and correlations have shown that, although the level of the correlations and/or the relative correlations are not always in line with the Basel II proposal, they all confirm the same ranking of correlations as the ones assumed in Basel II.

The negative relationship between PD and correlations appears to be somewhat counter-intuitive since empirically asset correlations increase during systemic crises, when PDs also tend to increase, which would suggest that correlation and PD are positively related. Furthermore, empirical research has not found support for the negative relationship between PD and correlations (see e.g. Carey (1998); Erlenmaier and Gersbach (2001), De Servigny and Renault (2002) and Dietsch and Petey (2002)) even after controlling for firm size (see e.g. Dietsch and Petey (2003) and Dülmann and Scheule (2003).

The assumed negative relationship between PD and correlations in the risk weight formulas may, however, be understood by the desire to reduce the procyclical effects of the Basel Accord. Excessively large capital charges for certain firms could induce a credit rationing process, especially in periods of economic downturn, which may amplify the business cycle. If the correlations are made

negatively dependent on PD, the risk weight curve becomes flatter, thereby dampening procyclical effects.

3. The implication for Belgian banks of the Basel II treatment of SME loans

The object of this section is to evaluate the implications of the Basel II accord on capital regulation for Belgian banks, given the special treatment of SMEs. We make use of the empirical distributions of loans in Belgian banks' portfolios and calculate average PDs for differing firm types to estimate the capital requirements for Belgian banks. Here we focus on the SA and the foundation IRB approach.

3.1 Probabilities of Default

To get an idea of the PD of Belgian firms, we can make use of a database linked to the balance sheet register, which provides information on the Belgian firms entering bankruptcy procedures and the timing of these bankruptcies. These data allow one to estimate PD by the average default rate of a given class of firms. As mentioned above (see footnote 20), this definition is more restrictive than the definition put forward by Basel. To obtain estimates of the default rates for corporate firms and corporate SMEs, we have linked data on entry into bankruptcy with data from the balance sheet register. To obtain estimates of the default rate for retail SMEs we need information on exposure size. As this information is not available in either data set, we have analysed the characteristics of the firms classified as retail SMEs in 2002 using the Credit Register dataset. We used information on asset values to identify corporate SMEs and retail SMEs which enables us to calculate a proxy for the PD for the retail SMEs category. Following examination of the percentiles of the asset values of corporate SMEs and retail SMEs, we classified firms with an asset value of roughly 2 000 000[19] euro as retail SMEs.

Table 7 presents the size distribution of the total firm population and of the firms that entered into default. We see that retail SMEs form the highest proportion of (defaulting) firms. Corporates represent only a minor proportion of total (defaulting) firms. The distribution of defaulting firms does not include firms that did not file a balance sheet. These firms represent a rather large percentage of the total number of defaulted firms, on average about 34 p.c. Although we may assume that a significant proportion of these firms belong to the retail SME class[20], in what follows we have decided to disregard them. Making assumptions on the size of these firms will inevitably lead to a bias. Furthermore, although adding them to the retail SME class increases the PD of this class, it does not have

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(17) Here we refer to the asset correlations included in the retail risk weight curve.

(18) Basel II considers a default to occur when one of two events has taken place: the bank considers that the debtor is unlikely to pay its credit obligation to the banking group; or the debtor has failed to honour for more than 90 days any credit obligation to the banking group. (see BIS, 2003b, §414)

(19) The cut off point has been calculated as the average of the mid-point of the 90th and 80th percentile of the retail SMEs and the mid-point of the 20th and 10th percentile of the corporate SMEs.

(20) The multiple reasons for not filing a balance sheet are for example: new established firms that did not have the time to file a balance sheet (±32 p.c.), firms that went bankrupt and never filed a balance sheet (±20 p.c.), firms that disappeared for several other reasons, such as voluntary discontinuation (± 24 p.c.) and firms that do not have to file a balance sheet (±15 p.c.)

TABLE 7	THE SIZE DISTRIBUTION AND DEFAULT RATES OF BELGIAN FIRMS

(Average 1990-2001; in percentages)

	Corporate	Corporate SME	Retail SME
Total firms	0.5	8.3	91.2
Total firms entering bankruptcy	0.2	4.4	95.4
Default rate	0.30	0.89	1.69

Source: NBB.

CHART 2	PROBABILITIES OF DEFAULT OF BELGIAN FIRMS[21]

(In percentages)

Source: NBB.

an impact on the general conclusions (see Section 3.3 on sensitivity analysis). In any case, most defaulting firms for which financial information is available are classified as retail SMEs.

The following Chart 2 shows the 1-year default rates of corporates, corporate SMEs and retail SMEs. The data clearly show that bank loans to corporates are the least risky while the retail SMEs present the highest risks. The chart thus confirms that the default rate tends to decrease on average with the size of the firms. On average, corporates have a default rate of 0.30 p.c., corporate SMEs a default rate of 0.89 p.c. and retail SMEs a default rate of 1.69 p.c. Furthermore, the default rates are volatile over time and over the business cycle as the figures for the standard deviations in Chart 2 below show. Note that the volatility of the PD decreases with size. As these default rates fluctuate, we performed bootstrap simulations to test the stability of the average historical default rates. Results are presented in the annex. The analysis suggests that the observed average default rate provides us with a good proxy of the true average default rate. In what follows, we will therefore use the time-average of the one-year default rates over the period 1990-2001 to derive a credit rating to calculate capital requirements according to the SA and to plug into IRB the risk weight curve to calculate the capital requirements according to IRB foundation approach.

3.2 Capital requirements

To calculate capital requirements for banks under the standardised approach, we need information on the credit ratings. Assigning a credit rating to the average PDs or assuming that corporates and corporate SMEs are unrated does not make much difference in the standardised approach, as a 0.30 p.c. one-year PD for corporates and a 0.89 p.c. one-year PD for corporate SMEs correspond to a BBB-rating and a BB-rating respectively (S&P, 2002),
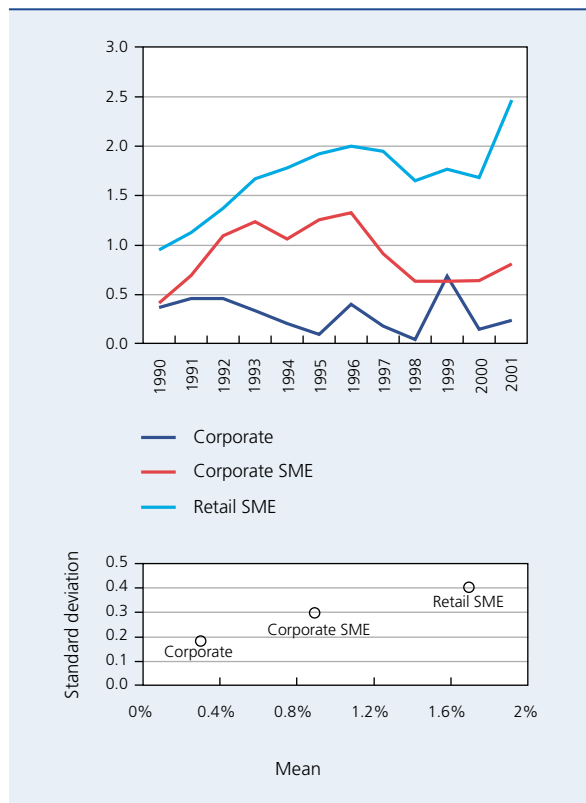
which are assigned a 100 p.c. risk weight, which is equal to the risk weight for unrated firms. Retail SMEs obtain a risk weight of 75 p.c. Information on the distribution of credit exposures per asset class reported in Table 3 is then combined with these risk weights to obtain total capital requirements for firm lending for each bank under the standardised approach.

As Section 2.4 has shown, we need more information on different input factors in order to calculate capital requirements for individual Belgian banks under the foundation IRB approach. As an estimate of the PD for the different asset classes, we used the average PDs calculated in the previous section: 0.30 p.c. PD for corporates; 0.89 p.c. PD for corporate SMEs; and 1.69 p.c. PD for retail SMEs. To compute the capital requirements for the corporate SMEs, it was also necessary to calculate a firm-size adjustment for each bank on the basis of the characteristics of their debtors[22]. When available, we used annual sales

(21) The calculations exclude the firms for which balance sheets are unavailable.

(22) It is no surprise that this size-adjustment S is larger for the loan portfolios of larger banks than for smaller banks. On average, e.g., the value of the variable S for large banks was 14 million euros while this was 4 million euros for small banks.

reported in the firms' balance sheet. When there was no information on total sales [23], we used instead total assets, as suggested by the Basel Committee (see BIS, 2003b, § 243). Furthermore, we assumed a 45 p.c. LGD (which is the value put forward by the Committee for senior unsecured claims under the foundation approach). Maturity is assumed to be 2.5 years (which is the value for banks using the foundation approach). This information is then plugged into the formulas presented in Section 2.4 to compute capital requirements for credit risk for each bank. And finally, we have used information on the distribution of credit exposures per asset class reported in Table 3 to calculate total capital requirements for each bank.

Tables 8 and 9 present descriptive statistics on the capital requirements for credit and operational risk corresponding to each firm asset class and by bank size. These tables give an idea of the contribution of each firm class to total capital requirements. Table 8 assumes that all banks apply the standardised approach, and Table 9 assumes that all banks apply the IRB foundation approach. For the operational risk component of capital, we have assumed that the capital

requirement is 10 p.c. of the total capital requirements, which is the target set by the Basel Committee.

The following conclusions emerge from the analysis. First, total capital requirements derived from the SA and IRB approach are mostly lower than the 8 p.c. put forward in Basel I, although the capital requirements for SA large banks exceed 8 p.c. when operational risk is taken into account. For SA banks this observation reflects the fact that both large and small banks greatly benefit from the risk weight reduction for retail SMEs in the standardised approach relative to Basel I. [24] On the other hand, the benefit to large SA banks of the reduction in risk weight for retail SMEs is counterbalanced by the additional operational risk requirements. The differences between small and large banks thus depend very much on the composition of the loan portfolios, as the main reason

(23) In Belgium, firms that file an abbreviated balance sheet do not need to report turnover.

(24) As a point of comparison, the mean contribution of retail SMEs to total capital requirements under Basel I would have been 2.48 p.c. for large banks and 4.41 p.c. for small banks. The contribution of corporates to total capital requirements under Basel I would have been on average 1.72 p.c. for large banks and 0.83 p.c. for small banks and for corporate SMEs it would have been on average 3.80 p.c. for large banks and 2.78 p.c. for corporate SMEs.

TABLE 8   CAPITAL REQUIREMENTS (CREDIT PLUS OPERATIONAL RISK) PER ASSET CLASS ASSUMING ALL BANKS APPLY THE STANDARDISED APPROACH

(June, 2002; Bank-level data; in percentages of risk-weighted assets)

Corporate

	Mean	Median	Min.	Max.	Stdev.
Large banks	1.92	1.81	1.26	2.79	0.65
Small banks	0.91	0.00	0.00	8.89	2.27

Corporate SME

	Mean	Median	Min.	Max.	Stdev.
Large banks	4.22	4.23	3.80	4.61	0.34
Small banks	3.09	2.16	0.00	8.81	3.24

Retail SME

	Mean	Median	Min.	Max.	Stdev.
Large banks	2.07	2.15	1.46	2.50	0.46
Small banks	3.67	4.22	0.00	6.67	2.66

Total

	Mean	Median	Min.	Max.	Stdev.
Large banks	8.20	8.17	8.06	8.40	0.15
Small banks	7.66	7.48	6.67	8.89	0.89

Credit risk only (excluding operational risk)

	Mean	Median	Min.	Max.	Stdev.
Large banks	7.38	7.35	7.25	7.56	0.14
Small banks	6.90	6.73	6.00	8.00	0.80

Source : NBB.

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why small banks receive a lower total capital requirement than large banks is because small banks invest a higher proportion of their assets in retail SMEs.[25]

The figures in Table 9 reflect the fact that all banks adopting the IRB approach greatly benefit from using the IRB risk weight functions.[26] On average, each asset class contributes less to the total capital requirement than it would have under Basel I. The IRB approach is also favourable with respect to the Basel II SA approach in terms of capital, and this holds for both large and small banks and for each firm class. This is consistent with the aim of Basel to give banks incentives to move to more advanced approaches.[27] Finally, Table 9 reveals that the capital requirements vary significantly between banks, especially between small banks. This highlights the need for analysis of the PD- sensitivity of capital requirements (see the next section).

Not much empirical research has yet been published on the impact of Basel II on banks' capital regulation. The Basel Committee has initiated a number of quantitative impact studies to calculate the impact on capital requirements of all the elements of the proposed approaches, and several banks participated in these studies. A general summary of the results is published for each study after completion of the exercise (see BIS, 2003a for an overview of the results of the last exercise) and the results have been used by the Basel Committee to calibrate the parameters of the risk weight function.

Saurina and Trucharte (2002) have analysed the aggregate impact for Spanish banks of the Basel treatment on SMEs, however, they do not examine possible differences between individual banks. Furthermore, they do not take into account requirements for operational risk. They find that for Spanish banks the difference between the SA and the IRB approach in terms of capital appears to be rather small. This result is primarily because of higher PDs obtained for Spanish firms.

(25) In the standardised approach, if we were to treat each firm class as a separate portfolio, we would obtain total capital requirements for corporates and corporate SMEs of 8.89 p.c. and for retail SMEs of 6.67 p.c.

(26) In the IRB approach, if we were to treat each firm class as a separate portfolio, we would obtain the following capital requirements: corporates, 4.97 p.c.; corporate SMEs , 6.93 p.c. for large banks and 6.61 p.c. for small banks; and retail SMEs, 5.81 p.c.

(27) To smooth the transition period, the Basel Committee has decided to introduce in the first two years after implementation a minimum floor capital requirement. The implementation year 2006 and the following year, IRB capital requirements for credit risk together with operational risk cannot fall below 90 p.c. of current minimum requirements. In the third year of implementation, the minimum will be 80 p.c. of this level.

TABLE 9   CAPITAL REQUIREMENTS (CREDIT PLUS OPERATIONAL RISK) PER ASSET CLASS ASSUMING ALL BANKS APPLY THE IRB FOUNDATION APPROACH

(June, 2002; Bank-level data; in percentages of risk-weighted assets)

Corporate

	Mean	Median	Min.	Max.	Stdev.
Large banks	1.07	1.01	0.70	1.55	0.36
Small banks	0.51	0.00	0.00	4.96	1.27

Corporate SME

	Mean	Median	Min.	Max.	Stdev.
Large banks	3.80	3.85	3.32	4.27	0.39
Small banks	2.61	1.74	0.00	7.62	2.81

Retail SME

	Mean	Median	Min.	Max.	Stdev.
Large banks	1.63	1.65	1.05	2.18	0.56
Small banks	3.20	3.68	0.00	5.81	2.32

Total

	Mean	Median	Min.	Max.	Stdev.
Large banks	6.52	6.54	6.22	6.78	0.24
Small banks	6.39	6.21	4.96	7.74	0.78

Credit risk only (excluding operational risk)

	Mean	Median	Min.	Max.	Stdev.
Large banks	5.87	5.89	5.60	6.10	0.22
Small banks	5.75	5.59	4.46	6.97	0.70

Source : NBB.

TABLE 10 IMPACT ON CAPITAL REQUIREMENTS OF AN INCREASE IN PD BY ONE STANDARD DEVIATION

(June 2002; Bank-level data; in percentages of risk-weighted assets)

Probability of default

	Corporate	Corporate SME	Retail SME		
	0.48	1.19	2.09		

Credit risk plus operational risk

	Mean	Median	Min.	Max.	Stdev.
Large banks	7.50	7.51	7.34	7.64	0.16
Small banks	7.11	6.85	6.24	8.74	0.92

Source : NBB.

Our analysis suggests that the system seems to 'push' banks towards the IRB approach. Indeed, there are several additional factors which may reinforce the incentives suggested by the figures. First, credit risk mitigating techniques can lower capital requirements (especially given that IRB banks lending to SMEs will benefit from the wider recognition of collateral[28]). Second, banks are not expected to move to the IRB approach simply because of capital relief. Other incentives, such as potential market pressure and willingness to improve risk management systems, may be important. Thirdly, through the supervisory review process in the context of the second pillar of the New Accord, supervisory authorities may require banks (in particular systemically important banks) to adopt the IRB approach. Finally, we need to be very cautious when drawing conclusions about such incentive effects, however, as we need to bear in mind that the evidence reported here is subject to the " Lucas critique ", namely that structural changes are likely to occur after the implementation of risk-based capital requirements which

may affect the distribution of firm lending. Here the results were obtained for a given structure of bank lending.

3.3 Sensitivity analysis

In this section, we perform an analysis to see how sensitive the results on capital requirements are to the PD. Analysing the impact of varying PD on capital requirements is important, given that it allows us to account for potential PD variations between banks' portfolios. Furthermore, data limitations induced us to make some assumptions (e.g. we used a more restrictive definition of default) which may have biased the figures in the exercise. This suggests the importance of establishing and elaborating datasets, possibly as an industry-level

[28] If we for example decrease the LGD in Table 10 to 40 p.c., then capital requirements covering credit and operational risk for large banks have a mean of 5.80 p.c. and for small banks 5.68 p.c.

TABLE 11 IMPACT ON CAPITAL REQUIREMENTS OF AN INCREASE IN PD BY TWO STANDARD DEVIATIONS

(June 2003; Bank-level data; in percentages of risk-weighted assets)

Probability of default

	Corporate	Corporate SME	Retail SME		
	0.66	1.49	2.49		

Credit risk plus operational risk

	Mean	Median	Min.	Max.	Stdev.
Large banks	8.29	8.35	8.02	8.42	0.18
Small banks	7.68	7.31	6.57	9.54	1.07

Source : NBB.

initiative, which are compatible with the new Basel concepts of PD, LGD and EAD.

For this analysis we make use of the information on PD standard deviations presented in Chart 2. Table 8 shows the impact of an increase in PDs by one standard deviation on the figures presented in Table 9. This increases the PD for corporates from 0.30 p.c. to 0.48 p.c., for corporate SMEs from 0.89 p.c. to 1.19 p.c. and for retail SMEs from 1.69 p.c. to 2.09 p.c. As expected, we notice an increase in capital requirements. However, the general conclusions from the previous section remain the same.

In a next step, we investigate by how many standard deviations we need to increase the PD to bring capital requirements under the IRB approach in line with those under the SA. Table 9 shows that this implies increasing the PD by two standard deviations. As this covers variations between Belgian banks, we can safely conclude that the above-mentioned results are robust.

Conclusion

In this paper we have given an overview of the Basel II proposal with a special focus on the treatment of loans to SMEs, as these constitute an important part in Belgian banks' portfolio. Moreover, we have analysed the rationale of this treatment and the implications of the proposal on capital requirements for SME lending. This has been performed by combining information on credits granted in Belgium and individual firm balance sheet data. As the paper has highlighted the complexity of assessing the impact of the Basel II proposals on capital requirements for SME lending, its conclusion should therefore be treated with caution.

The lower risk weights that Basel II has put forward for loans to retail SMEs and to corporate SMEs for a given probability of default has been justified by the special characteristics associated with SMEs. Although small firms have on average a higher default probability, Basel has argued that this higher risk is mainly caused by idiosyncratic risk which can be diversified away in a large portfolio. The extent to which non-borrower-specific risk is responsible for default probability can be analysed by looking at correlations. Research on foreign and Belgian data has confirmed the positive firm size dependence of asset correlation, as is assumed in Basel II.

From the analysis of the impact of the treatment of SME loans in Basel II, one can safely argue that firm lending will not be made more expensive in terms of capital requirements when moving from Basel I to Basel II. This is especially true of the IRB approach, which does seem to imply lower capital requirements than the SA approach for Belgian banks, whether for large or small banks or for corporates and SMEs. This can only reinforce the presumption that most SME lending in Belgium will be granted by banks operating under the IRB approach. Furthermore, it also suggests that Basel II does not seem to induce any credit rationing for SMEs.

In this empirical exercise, data limitations required us to make some assumptions (e.g. we used a more restrictive definition of PD), which may have slightly biased the figures in the exercise. This points to the importance of establishing and elaborating datasets, possibly as an industry-level initiative, which are compatible with the new Basel concepts of PD, LGD and EAD. However, the robustness exercises in Section 3 suggest that the uncertainty that surrounds the parameters of the model does not invalidate the results. Specifically, if one were to bring the capital requirement on aggregate firm lending to its Basel I level, individual average probabilities of default would have to reach levels that are in excess of observed entry rates into bankruptcy. Note that our results have nevertheless been obtained for a given structure of bank lending.

Finally, although far from an integrated portfolio management approach, Basel II is an important step towards the convergence of regulatory capital and economic capital. As banks develop more sophisticated risk measurement methods, they are encouraged to move along the spectrum of available approaches in Basel II. The most advanced approach is expected to be pursued by the most sophisticated institutions and is expected to pave the way for the eventual acceptance of the use of banks' own credit risk portfolio models in determining regulatory capital. Basel II is a significant step in the right direction which is likely to be followed by revisions which might lead to a full convergence between regulatory and economic capital.

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Annex

Robustness on probability of default

As default rates may fluctuate over time and with the business cycle (see e.g. Nickell et al, 2000), we tested whether the calculated default rates are stable by carrying out simulations on the historical default rate. Specifically, we performed a bootstrap analysis, which is a method for estimating the distribution of an estimator by resampling the data. The bootstrap procedure involves choosing random samples with replacement from a data set. It is based on the idea that the sample is a good representation of the underlying population. The bootstrap analysis is a type of non-parametric Monte Carlo analysis as it combines Monte Carlo methods with the analysis of real data. The main advantage of this method is that it preserves the distribution that may exist in the underlying data. See Greene (2000), Horowitz (1997) and Jeong and Maddala (1993) for a detailed description of the methodology.

We resampled the data sets 10 000 times[29] under the assumption that the number of elements in each bootstrap sample equals the number of observations in the original data set. Table 10 reports some basic statistics on the histogram of the simulated PDs. They suggest that the resulting distributions resemble the normal distribution. Kurtosis is a measure of the tallness or flatness of the distribution. In each class, the measure is close to 3, which is the kurtosis value of the normal distribution. However, in case of the corporate class and the corporate SME class, the value is slightly below 3 (platykurtic distribution). In case of the retail SME the kurtosis value is slightly above 3, (leptokurtic distribution). Skewness is a measure of asymmetry of the data around the sample mean. Again in all cases skewness is close to that of the normal distribution, that is, zero. Only the skewness of the retail SMEs is slightly negative, which indicates that data points are spread out more to the left of the mean.

Table 10 reports the simulated histogram, postulating a 95 p.c. confidence level.. Both the lower and the upper confidence level are very close to the simulated mean. This analysis suggests that the observed historic average default rate provides us with a good proxy of the true average default rate.

TABLE 12   DESCRIPTIVE STATISTICS ON DISTRIBUTION OF SIMULATED PDS

	Corporate	Corporate SME	Retail SME
Mean	0.30 p.c.	0.89 p.c.	1.69 p.c.
Standard deviation . .	0.0504 p.c.	0.0823 p.c.	0.1100 p.c.
Kurtosis	2.8815	2.8684	3.0853
Skewness	0.1024	0.0426	−0.0448
Lower confidence level	0.21 p.c.	0.75 p.c.	1.47 p.c.
Upper confidence level	0.40 p.c.	1.06 p.c.	1.91 p.c.

Source : NBB.

[29] The bootstrap analysis has also been performed by resampling the dataset 50 000 and 100 000 times and no significant differences in the results were noticed.

The Governance of the International Monetary Fund with a Single EU Chair

Géraldine Mahieu, Dirk Ooms, Stéphane Rottier

1. Introduction and main issues

The introduction of the euro and the strengthening of the co-ordination of economic policies in the European Union (EU) are fuelling a reflection on the representation of Europe in the international financial institutions. Both in Europe and elsewhere, calls are mounting for European position taking and representation in international fora to be streamlined, a process which could end in a single EU representation, as in the World Trade Organisation (WTO). The issue has received much attention at the European Convention, and is – at least in the view of many current member states of the Union – a long-term objective.

In the light of the establishment of a single monetary policy, the question of a single external EU representation is of particular relevance with regard to the International Monetary Fund (IMF), which is at the core of the international financial system. Through its almost world-wide membership, the surveillance which it exerts over its members' policies, and the assistance and conditional emergency financing which it provides, the Fund is a major instrument contributing to macroeconomic and financial stability.

The establishment of a single EU representation would constitute an historical change in the IMF membership, and would raise major governance issues in various fields. While this exploratory article focuses on governance issues raised with regard to the IMF itself, it also touches upon the possible impact on the internal functioning of the Union, and "spill-over effects" for the governance of other international financial institutions and fora.

These issues have to be approached within the perspective of the ongoing, broad debate on the governance of the Fund. With the collapse of the Bretton Woods system of fixed exchange rates in the early seventies, the Fund had lost its core function with regard to balance of payments crises, and thereby also – in the eyes of many – its raison d'être. The institution has nevertheless come back to the foreground, in particular as an instrument for the prevention and resolution of financial crises. However, since the succession of crises in the nineties, which were primarily capital account driven, the effectiveness of the Fund's surveillance and its governance have been increasingly questioned. Basically, the Fund has been under criticism for being insufficiently transparent, independent and accountable[1]. The organisation was able to react positively to many of the reproaches made; the progresses realised with regard to transparency are illustrative in this field.

It follows from the analysis developed in this article that the creation of a single EU chair may affect two of the major controversies still in the forefront in this respect: excessive politicisation of the Fund's decision-making, and unbalanced representation of its members.

First, critics point to what is seen as the current disproportional influence over Fund decision-making of the Fund staff on the one hand, and of the Group of Seven (G7) on the other. The G7 countries are believed to bring into the IMF decision-making process their own geopolitical considerations, which can be at odds with sound

[1] See for instance De Gregorio et al. (1999).

governance of the institution. While many acknowledge that political considerations are difficult to discard when deciding whether or not to provide Fund financing, it is often stressed that the IMF's surveillance activities should be exerted in a more objective and independent way. From the analysis below it follows that establishing a single EU chair may, on the one hand, provide a countervailing power for the perceived imbalances. On the other hand, it could also further exacerbate the trend towards polarisation in IMF governance, as the result could be a duopoly at the head of (the G7 and) the IMF, the ability of which to provide real leadership remains to be demonstrated. It will be further argued that the extent to which the EU will be willing and able to define a common external policy could be crucial in this respect.

A second criticism addressed to the IMF is the insufficient voice, both in terms of voting power and in terms of number of Executive Directors (EDs), given to emerging economies and developing countries, while industrialised countries, and Europe in particular, are deemed to benefit from excessive influence. In this respect, the establishment of a single EU chair could provide a window of opportunity for bringing the actual quotas in the Fund more in line with newly calculated quotas. The quota of the EU chair could indeed be set significantly below the sum of the actual quotas of the EU member states, and there might be a quite fundamental reallocation of quotas and EDs among the Fund membership. A single EU chair might involve the interesting paradox that a reduction in the number of European EDs, in the global voting power of Europe and in its contribution to the Fund's general resources could go hand in hand with an increase in the Union's impact on IMF decision-making.

A single EU chair would also affect the co-operative nature of the Fund. Originally, this nature was underpinned by the possibility for each member to become both a Fund creditor and a Fund debtor, depending on the member's needs. Over the years, the relative economic development of IMF members has led to a growing separation between creditor and debtor countries. Nevertheless, EU countries, through their involvement in mixed constituencies, have so far mitigated the potential detrimental effects on the co-operative nature of the IMF of too strong a division between creditor and debtor chairs. The number and impact of mixed constituencies in the Fund could, however, be reduced significantly by the establishment of a single EU chair.

Whatsoever, the emergence of a single EU chair at the IMF would inevitably entail a fundamental and comprehensive debate on the governance of that institution. Much, however, will also depend on the way in which such an EU chair would be set up, which in turn hinges on the future internal governance of the Union. In this respect also, this contribution can only be a first exploratory exercise, the conclusions remaining very tentative due to the many political imponderabilia.

A political willingness of the Member States will undoubtedly be a vital prerequisite for the process to be set in motion. After that, the effective impact will very much depend on the governance of the EU chair itself (i.e. the way in which its positions are determined, and, more broadly, how its functioning is organised). It can be argued that a common EU foreign policy constitutes a prerequisite for the single EU chair to be able to perform an effective leading role in the decision-making process at the IMF. However, as is reflected by the current debate within the European Convention, a unique EU membership at the IMF might be arranged before a binding consensus is reached on the establishment of a common foreign policy. EU positions at the Fund should then be prepared either through co-ordination mechanisms between national authorities (which already function today, be it – evidently – within a different framework, the Fund remaining a country-based institution), or via a more independent EU institution (existing or newly created).

The conclusion is that a single EU chair, by affecting profoundly the balance of power at the Fund and through its inextricable links with the internal governance of the Union, will inevitably lead to a further and comprehensive debate on the governance of the international financial system. What can be seen as a positive step on the long road to further European integration, will undoubtedly have major implications extending far beyond the borders of the Union, and the functioning of the IMF as such. Hence, the European Union has to consider carefully all the implications of possible actions in this field.

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The remainder of the article is structured as follows. In a second chapter we analyse the potential impact of a single EU chair on the IMF members' quota shares. Chapter 3 examines the possible impact of a single EU chair on IMF finances, in particular the Fund's liquidity position, access to Fund financing, and Special Drawing Rights (SDR) allocations. Chapter 4 then focuses on the potential consequences for the governance of the IMF, assessing the impact on the decision-making process at the IMF and the importance of the EU internal governance in this process. Some legal issues are touched upon in chapter 5, while chapter 6 considers the impact on other international organisations.

2. Considerations on Fund quotas

Each country's capital subscription to the Fund is referred to as the country's IMF quota. A member's quota is at the core of its relations with the Fund. In addition to fixing its contribution to the general resources of the IMF, a member's quota determines its voting power[2], affects its borrowing capacity and determines its part in the allocation of SDR.

2.1 Historical evolution of quota allocations

At the Bretton Woods negotiations in 1944, the quota question was central and highly political. America's main negotiator, the US Treasury chief international economist (and later first US ED) Harry Dexter White, took the position that the aggregate voting power of the British Commonwealth as determined by the quotas should not exceed the quota share of the US (36.2 p.c.). The UK, represented by its chief negotiator John Maynard Keynes, got a large quota; it ranked second with 17.1 p.c. France was "given" a quota totalling one-third of the UK's. European countries such as Germany, Italy and Spain were not invited to the conference.

Over the years, many members have acceded to the Fund, while some others have withdrawn – sometimes temporarily –, such as Cuba, Poland and Czechoslovakia. The Fund grew from a club with 44 countries to a world association of 184 members. Currently, only Andorra, Cuba, Liechtenstein, North Korea and some island- and city-states have not (yet) joined.

It is difficult to draw lessons from the history of the Fund for the process of the establishment of a single EU chair. One could refer to the division of Czechoslovakia and Ethiopia, on which occasions the new countries[3] together received a larger quota than the original quota of the country they replaced. But the most relevant experience may be the case of the United Arab Republic. In 1958, Syria and Egypt merged politically and informed the Managing Director that they wanted to become a single member of the IMF "with a single quota and subject to the provisions of its Articles". The Executive Board took a pragmatic approach towards this request, finding it unnecessary for the Board of Governors "to adopt a membership resolution establishing terms that had been laid down already and requiring actions, such as the payment of subscriptions and the agreement on par value, that had been taken already". The new member inherited the sum of the quota of Syria and Egypt, but only got the basic votes of a single member. Joseph Gold (1974) notes that the Fund continued to "hold the currencies of

the two regions, have separate depositories in Cairo and Damascus for the currencies, deal through two fiscal agencies, make separate calculations of monetary reserves for the purpose of repurchase obligations and conduct separate consultations". At the end of 1961, Syria requested reinstatement of its Fund membership and original quota. Again, the Executive Board accepted the request.

The Syrian-Egyptian case is interesting, as the merger was instigated by the political will of two IMF members, to which the Fund formulated a very pragmatic response. However, it does not constitute a real precedent for the unification of Europe's representation in the Fund. The number of countries and the importance of the economies involved in the latter process make the economic, political and legal issues at stake much more complex.

2.2 The establishment of a single EU quota

A single EU chair could be set up in various ways. In a first scenario, all EU countries could remain Fund members individually, while being grouped in a single EU constituency. Or, as in the United Arab Republic case, there might be a single EU chair that would take over the actual quotas of the countries it replaces, but with the basic votes of a single member. Both possibilities would imply a status quo for the actual quota shares of all other IMF members, while the EU chair would inherit a vast voting power. Bini-Smaghi (2003) however considers a single EU constituency with an adapted quota share.

In a second scenario, the EU could become a "fully fledged" single member, for which a new "fully fledged and single" quota would need to be established. The starting point for the determination of a Fund member's quota is its calculated quota. This number is the outcome of five specific formulas, based on economic variables related to the different functions that quotas perform. First, a country's potential contribution to the IMF's general resources is determined by its economic size, its foreign reserves and the strength of its balance of payments position. Second, the quota formulas are intended to reflect a country's economic and financial impact on the rest of the world. Third, as quotas also determine normal access limits to Fund financing, the formulas relate to the potential borrowing needs of a country, in turn a function of the size of the country, its openness and current account imbalances, the variability of its receipts, and the amount of its reserves.

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(2) For the moment, 97.87 p.c. of voting power depends on quotas and 2.13 p.c. on basic votes, which are identical for all members.

(3) Respectively the Czech and the Slovak Republic, Ethiopia and Eritrea.

The quota calculations for a single EU chair would logically be based on data for the EU as a whole, excluding intra-EU flows. The outcome of these calculations, in per cent of total Fund quotas, will be smaller than the sum of the former individual (calculated and actual) quota shares of the EU member states. It should be kept in mind that any change in the EU quota share logically and inevitably entails a change in the quota shares of the other IMF members.

If and when the European quota share is adapted / reduced towards its new calculated quota share, the other IMF members will gain a part of the difference. This redistribution could be done in an equiproportional way, according to existing actual quotas. However, the adaptation of the EU quota share might also trigger a general reshuffle, with the quota shares of all IMF members being adapted towards their new calculated quota shares.

Recomputing Calculated Quotas

The actual quota shares of the IMF members were lastly adapted on the basis of calculated quotas computed for the eleventh general review of quotas (CQ11)[1]. However, due among other things to the primacy of equiproportional adjustments (distributed to all members according to their existing, actual quota shares) in general quota reviews, there still exist relatively substantial differences between the calculated and actual quotas.

We have computed new calculated quota shares (NCQS) for the option under which a new single quota would be attributed to the EU chair, representing the current fifteen member states of the Union. Our computations are based upon the five existing quota formulas and use the data from the most recent (twelfth) quota review. Although there have been in recent (and earlier) years many discussions on a revision of the current quota formulas, it is very likely that any potential future alternative formula will still largely be based on GDP and balance of payments data.

The first columns of the chart show the calculated quotas (CQ11) as they were computed for the eleventh quota review for the largest members and for various relevant groups of countries. The second columns indicate the actual quota shares of these members (Actual), which for various, technical and political, reasons differ from the CQ11. The third columns give the new calculated quota shares (NCQS).

It appears from our computations that the EU chair and the US have a very similar new calculated quota share[2]. This mainly follows from a downward adjustment of the single EU quota share, as compared to the aggregate quota share of the fifteen EU countries, largely due to the exclusion of the current account flows among the EU members from the computations. Every non-EU country gains a part of the difference. In addition, the recent relative economic development of the Fund members also plays a role in the adjustment, as the NCQS are based on more recent economic data than the data underlying the current quotas. While these effects may be substantial for some emerging countries, for European economies they are almost negligible at present, as the recent growth rate of this group of countries is relatively close to the world average growth rate.

(1) The eleventh and twelfth general quota reviews were respectively closed in 1997 and 2002 and based on 1982-1994 and 1987-1999 data. The eleventh review led to an adaptation of actual quotas, the twelfth did not.

(2) Note that our calculated quotas are different from the ones calculated by the Quota Formula Review Group (QFRG) or Cooper Report (IMF (2001 b)). This QFRG was an external panel of experts, chaired by Professor Richard Cooper, which was commissioned by the IMF in 1999 to submit an independent report on the adequacy of the quota formulas and to make proposals on a formula which would more closely reflect members' relative positions in the world economy as well as their ability to contribute to, and their need for, IMF resources. This group found a calculated quota share for the EU-15 of 28 p.c., much larger than the US quota of 19.6 p.c., as it only excluded intra-EU trade in goods. It did not exclude other current account flows (services, income and current transfers), as we did.

QUOTA OF IMF MEMBERS
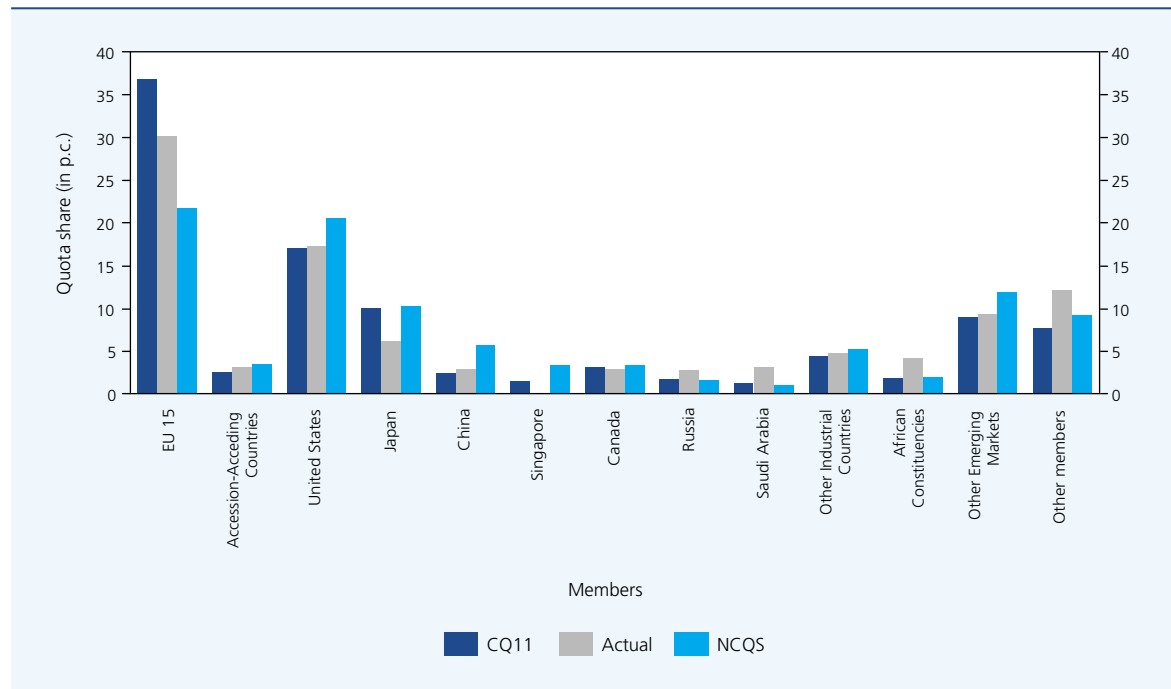
Sources : IMF, NBB.
CQ11 are the calculated quota shares computed for the eleventh quota review and based on 1982 - 1994 data.
NCQS are the new calculated quota shares based on 1987 - 1999 data, used for the twelfth quota review.

The outcomes of our computations would not be affected significantly by the enlargement of the Union. Ten countries will accede to the EU in May 2004, plus Bulgaria and Romania probably in 2007, while Turkey could begin negotiations towards accession in 2004. The consequences of the potential inclusion of these thirteen countries in the EU chair are rather minor, due to their relatively limited economic weight in comparison with the current EU members, and to their close trade links with the Union[3]. The EU chair would still have a calculated quota relatively comparable to that of the US.

(3) The calculated quota share of the EU chair would increase by less than 3.5 percentage points when including these thirteen countries. However, these percentages overestimate the quota share of the enlarged EU chair, as we have not subtracted the current account flows of these members from and to the other EU members, due to the lack of data.

Between the "status quo" option (one EU constituency) and a full alignment of actual quota shares with calculated quota shares, there are many scenarios. History shows that on the sometimes-long road from calculated quota to actual quota, political considerations play an important role. There is a very strong probability that such considerations will play an equally prominent role in deciding the voting power of a single EU chair. Specific points concerning that topic will be discussed at a later stage, in chapter 4.

In case a single EU chair is created, a complete status quo seems politically very improbable, since this would imply an EU quota share twice as large as the quota share of the second largest IMF member, being the US. A single EU chair could thus conceivably lead to a certain convergence between the EU and US quotas. Both members would even have very similar quotas, if it would be agreed to stick closely to new calculated quota shares.

Before looking further into the governance implications for the Fund, more technical consequences with respect to IMF financing may be derived from the previous exercise.

3. Potential impact on Fund finances

The reshuffling of actual quotas that a single EU chair could bring about, will inevitably have consequences for IMF finances, in particular for the liquidity position of the Fund, the access to its financing and SDR holdings and allocations. We assess the potential impact in these fields by assuming that the nominal amount of total Fund quotas remains unchanged and is not affected by the creation of the single EU chair[4].

3.1 The liquidity position of the IMF

Quota subscriptions represent the overwhelming part of the IMF general resources. As these resources are not all available immediately – only currencies issued by members with strong enough external payments positions are qualified as usable –, the Fund establishes a financial transactions plan for each quarterly period, in order to manage its usable resources. It thereby selects the currencies to be used in transactions and allocates the financing of the transactions among members included in the plan. These members are selected on the basis of an assessment by the Executive Board of the strength of their external position (i.e. sufficiently strong balance of payments and reserve position). The participation of members aims to be broad, in order to reflect the co-operative nature of the Fund and to maximise the liquidity of its resources.

There are currently (March 2003) 44 members included in the financial transactions plan, among which are the fifteen current EU members and five EU acceding countries. A reduction in the quota of EU members would diminish the usable resources of the IMF if, as is currently the case, an attempt were made to balance the members' participation in transactions in proportion to their quotas. However, such a reduction would be partially compensated by the increase in the quota of other members, some of which are currently major contributors to Fund resources, such as Japan and the US.

The actual reserve positions in the Fund[5] of the current fifteen EU members amount to SDR 25.5 billion, representing on average 39.5 p.c. of their quota. If the contribution of each participant in the financial transactions plan is kept constant in proportion to its quota but each member's actual quota is set equal to its NCQS, the reduction of the EU quota would diminish the resources available to the IMF by SDR 7.1 billion. This would, however, be more than compensated by the increase in the quota of the other 29 members included in the financial transactions plan (increase of SDR 12 billion). On the other hand, if the members' reserve positions in the Fund were set uniformly at the current average proportion of all members concerned (32.94 p.c. of quota), the IMF usable resources would be reduced by SDR 10.2 billion due to the change in the EU quota share, but increased by SDR 4.9 billion due to the adjustment of the other members' quota share.

Another way of increasing the IMF's usable resources might be for the list of sufficiently strong members to be extended. Members who, at the time of establishment of the single chair, have experienced a sufficient, sustainable improvement in their balance of payments and reserve position could then be included.

3.2 Access to Fund financing

Quotas also determine the amount of financing members can obtain from the IMF under "normal" circumstances. Currently, annual and cumulative ceilings for access limits to IMF resources are set at 100 p.c. and 300 p.c. of quota[6]. In addition, conditionality and interest surcharges applied under the two facilities with explicit access limits increase with the amount of outstanding credit, in order to discourage substantial and prolonged use of IMF resources. A modification of the quota shares of countries would hence have implications for the amount of financing they can obtain from the IMF under normal circumstances, as well as affect the conditions, eligibility criteria and costs of these borrowings.

In recent years, emerging markets have relied on extensive Fund financing (between 1995-2002, the group of emerging markets benefited from 26 IMF packages, ten of which were beyond normal access limits). An increase in the actual quotas of this group towards the level of their NCQS would have some impact on the cost of the resources borrowed. For example, the outstanding credit of Turkey would represent a much smaller share of its quota based on the NCQS than is currently the case, while the contrary would apply to Argentina and Uruguay.

As far as the EU countries are concerned, the question of access to IMF financing is likely to be of decreasing relevance. First, even if France was the first IMF borrower and the UK is still among the largest borrowers in the history

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(4) The establishment of a single EU chair as such would not affect the potential financing needs of the Fund membership, nor the level of Fund resources deemed appropriate to cover these.

(5) The reserve position of a member is a liquid claim on the IMF received by this member for the reserve assets that it has contributed to the IMF. The use of a member's currency in a transfer, i.e. a purchase by another member in exchange for an equivalent amount of its own currency, increases the former member's reserve position in the Fund.

(6) Facilities including access limits are the Stand-By Arrangement (SBA) and the Extended Fund Facility (EFF). Financial assistance above these statutory limits can, however, be granted through two alternative avenues, i.e. the exceptional circumstances clause or the two facilities that are not subject to statutory limits – the Supplemental Reserve Facility (SRF) and the Contingent Credit Lines (CCL).

of the IMF[7] (Chart 1), the current members of the EU are unlikely to rely on IMF financing in the foreseeable future. Indeed, they are all net creditors of the IMF, the majority of them having not borrowed from the Fund since 1970. Italy, the UK, Greece, Spain, Portugal and Finland still received loans from the IMF in the 1980s. The last EU country to have borrowed from IMF resources was Portugal in 1987. Second, among the acceding countries, only Latvia and Lithuania are currently IMF debtors; the three accession countries, Bulgaria, Romania and Turkey, are in the same position. The likelihood of these countries requesting IMF financing is called to decrease further with the convergence process and their accession to the EU.

3.3 The future of SDR

Quotas also determine each member's share in an allocation of SDR. Until now, the total allocation of SDR amounts to SDR 21.4 billion[8], 33.7 p.c. of which being attributed to the current members of the European Union (representing SDR 7.3 billion)[9]. In addition to holding a substantial share of SDR, EU members actively participate in the SDR market and contribute greatly to its liquidity. Among the thirteen countries or institutions[10] which have concluded a two-way arrangement, allowing the IMF to conduct voluntary transactions in SDR within specific limits, on behalf of the members and without their preliminary agreement, eight are EU countries. The current (October 2002) holdings of SDR by EU members represent 55 p.c. of their net cumulative allocation.

CHART 1   TOP 12 IMF BORROWERS, 1947-2001 (CUMULATIVE NOMINAL DRAWINGS; BILLION SDR)
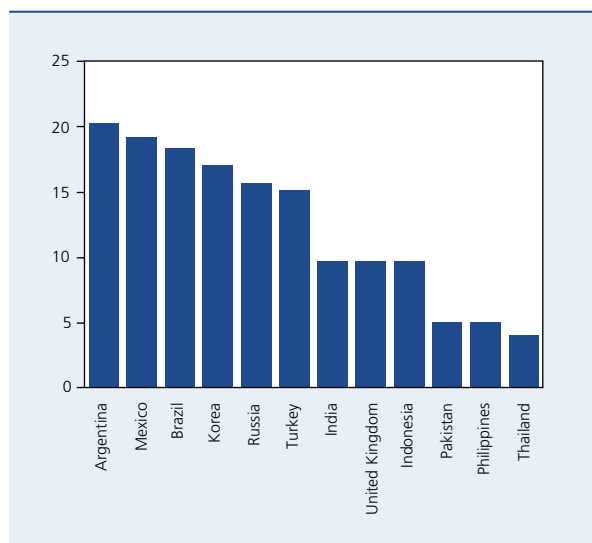
Source : IMF.

With the creation of a single EU chair, a decision would need to be taken regarding the existing SDR of the EU members. As long as the members of the EU chair remain participants in the SDR Department and observe the obligations of participants, they could keep the previously allocated SDR. However, in view of these members' strong foreign reserve position, other possibilities could be envisaged such as straightforward cancellation of the allocations, their partial or total donation to poorer economies[11], or measures to increase the liquidity of the SDR market (such as the conclusion of two-way arrangements with the IMF).

4. Implications for the governance of the IMF

4.1 Decision-making process at the IMF

A single EU chair at the IMF will have important political implications. It will obviously affect the composition of the Executive Board. Moreover, changes to the quotas of IMF members and thus their voting power will also affect the political governance of the IMF.

4.1.1 Changes in the composition of the IMF Executive Board

Article XII Section 3b of the IMF Articles of Agreement provides for 5 appointed and 15 elected EDs for the IMF Executive Board.

The 5 IMF members with the largest quota each appoint one ED representing their country. At the present time, these are the EDs of the US, Japan, Germany, France and the UK. With a single EU chair, Europe would give up two appointed EDs. If we stick to the NCQS ranking, these could be transferred to China and, surprisingly, Singapore[12], whereas the actual quotas would rank Saudi Arabia fourth and China and

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(7) The UK still ranks eighth, even if these nominal figures do not take inflation into account. Moreover, IMF financing has sharply increased in the late nineties with large financing packages for emerging markets.

(8) The fourth amendment of the IMF Articles of Agreement provides for a special one-off allocation of SDR 21.4 billion to correct the fact that many members have never received SDR (more than one-fifth of the current IMF members) or have not participated in all the allocations made. This amendment was approved by the IMF Board of Governors in 1997 but cannot take effect until it has been ratified by the US Congress, as the ratification by 123 members representing 73.74 p.c. of total voting power is not yet enough for implementation.

(9) For comparison, the net cumulative allocation of the US amounts to SDR 4.9 billion (22.8 p.c. of total allocation).

(10) Austria, Belgium, Denmark, ECB, Finland, France, Japan, the Netherlands, Norway, Sweden, Switzerland, UK, Venezuela.

(11) In accordance with Article XIX, Section 2(c), the Fund prescribes that a participant, by agreement with another participant, may donate SDR to the other participant and inform the Fund of the amount of SDR and the value date for the transfer.

(12) Thanks to its very open economy and strong economic growth, Singapore has a large calculated quota. Since Italy and the Netherlands would no longer be separate members, Singapore could, depending on the future development of its economy, even rank fifth. According to 1999 figures, its economy almost matches Canada. With GDP and current account growing faster for Singapore, this tendency may be confirmed.

Canada ex aequo fifth (Box 1). Such transfer would be welcomed by critics who claim that Europe is over-represented vis-à-vis emerging markets.

Alternatively, the number of appointed EDs could be cut, by changing Article XII. A reduction could indeed be appropriate in view of the gap in voting power between the EU/US, and the country ranking third.

As to the number of elected EDs, the Board of Governors may, by an 85 p.c. majority, reduce or increase it. At the moment, there are 19 elected EDs. Four of them are EU representatives: the Nordic[13], the Belgian, the Dutch and the Italian ED. They represent 4 constituencies totalling 37 countries altogether. For the moment, there are 10 EU countries in these 4 constituencies, but by the time a single EU chair becomes reality, there may be up to 12 more: all current acceding and accession countries except Poland[14]. The creation of a single EU chair would require a rescheduling of these constituencies. 15 countries would need to change places[15]; they might either become members of existing constituencies, or form new constituencies. In the process, the total number of constituencies could be reduced. Alternatively, one or two additional EDs could be made available to the rest of the membership, in particular to the less well represented developing countries.

4.1.2 The decline of mixed constituencies

Mainly for political reasons, Saudi Arabia, China and Russia elect an ED who only represents his own country. 16 EDs are elected by constituencies of several countries.

Some of these multi-country constituencies are very homogeneous, while others are much more heterogeneous: the so-called mixed constituencies.

Mixed constituencies have an important role in the governance of the IMF. They fulfil a bridge function between the interests of rich and poor, industrialised and less-developed, northern and southern countries, creditors and debtors. Their Executive Director has to take into account the interests of all member countries of his constituency and, depending on their importance and involvement in the issue at stake and on the internal governance mechanisms of his constituency, he will have to make up his mind and express the opinion of his authorities. The consensus built within his constituency may already prepare or prefigure a consensus in the Board, since the different interests within the Executive Board may be represented, on a smaller scale, within the constituency.

The heterogeneous composition of mixed constituencies may occasionally also push the EDs of these constituencies to a more neutral and technical stance. This was illustrated at the approval of Mexico's Stand-By Arrangement in February 1995[16] or at the recent Board decision on Argentina (January 2003),

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(13) Norway, Sweden, Finland, Denmark and Iceland rotate in the election of their ED. Sometimes, a non-EU ED thus represents the constituency.

(14) Poland is a member of the Swiss constituency.

(15) These are Belarus and Kazakhstan from the Belgian constituency; Armenia, Bosnia-Herzegovina, Croatia, Georgia, Israel, FRY Macedonia, Moldova and Ukraine from the Dutch constituency; Iceland and Norway from the Scandinavian constituency; Albania, Timor-Leste and San Marino in the Italian constituency.

What are Mixed Constituencies?

There is no clear definition or exact list of mixed constituencies. Authors usually refer to constituencies including countries with different interests. Some mention geographical or economic criteria while others vaguely refer to the creditor-debtor distinction. In the table hereunder we attempt to classify mixed constituencies according to different criteria.

A first criterion consists in a comparison of GDP of the countries within a constituency. GDP pro capita figures offer a more accurate reflection of the heterogeneity of economic development than absolute GDP figures, as the latter depend too much on the population size of the member countries of a constituency. A constituency with one large country and several small countries may then be classified as mixed while it may be economically homogeneous. Measuring the relative deviation of GDP pro capita within constituencies (first column of the table), the Australian (Australia versus the others), Belgian (Belgium, Austria and Luxembourg versus the others), Dutch (the Netherlands versus the others), Indonesian (Singapore and Brunei Darussalam versus the others), Spanish (Spain versus Latin America), Sub-Saharan and Swiss (Switzerland versus Central and Eastern Europe) constituencies can be considered as mixed. Although the two Sub-Saharan constituencies do only comprise economically poor countries, they are still heterogeneous because the GDP pro capita differences between the poor and very poor remain

very substantial. The relatively strong growth of countries like Gabon and Mauritius, for instance, is a major factor in the economic heterogeneity of the French-speaking African constituency.

Secondly, dividing the world in broad geographical terms, we could classify the following constituencies as mixed : the Australian, Belgian, Canadian, Dutch, Indonesian and Swiss constituencies.

Eventually, as third criterion we could consider the creditor-debtor status of the member countries. This criterion provides the truest reflection of a country's IMF status : creditor and debtor countries have very different interests in the IMF. We define debtors as countries that used IMF resources during a ten years time-span (1992-2001). There were, of course, many more countries that were debtors between 1992 and 2001 than exclusively in 2001. But a ten-year analysis takes greater account of the vulnerability/fragility of lenders[1]. Under this criterion only one (the French-speaking African) constituency is entirely homogeneous. All other constituencies include both debtor and creditor countries. We hence fix a threshold and define constituencies with at least 75 p.c. debtors or creditors as homogeneous constituencies. Using this criterion, the Australian, Belgian, Canadian, Indonesian, Italian and Nordic constituencies can be considered as mixed constituencies.

[1] However, there is also a negative bias with a 10-year time span. A country that was an IMF debtor 10 years ago, such as Chile, may have become very sound and even a NAB member.

HETEROGENEITY OF MULTI-COUNTRY CONSTITUENCIES

Constituency	Relative Deviation of GDP pro capita[1]	Geographical	Share of Debtors[2]	Composition
Indian	0.3859		75	India and 3 neighbouring countries
Iranian	0.5514		83	Iran, Ghana, Pakistan and 3 Maghreb countries
Brazilian	0.6723		78	Brazil and 8 Latin-American countries
Argentinian	0.6905		83	Argentina and 5 South-American countries
Nordic	0.7397		38	5 Scandinavian and 3 Baltic countries
Italian	0.7859		33	Italy, Greece, Portugal, Albania, San Marino and Timor-Leste
Canadian	0.8718	Mixed	58	Canada, Ireland and 10 Caribbean countries
Egyptian	0.9622		23	Egypt, Maldives and 11 Arab countries
Belgian	1.1683	Mixed	70	Belgium, Austria, Luxembourg, Czech Republic, Hungary, Slovak Republic, Slovenia, Turkey, Belarus and Kazakhstan
Australian	1.2592	Mixed	43	Australia, Korea, Mongolia, New Zealand, the Philippines and 9 Pacific countries
Spanish	1.3038		75	Spain, Mexico, Venezuela and 5 Central-American countries
English-speaking African	1.3991		76	South Africa, Nigeria and 19 mainly English-speaking African countries
French-speaking African	1.4077		100	23 mainly French-speaking African countries
Dutch	1.4749	Mixed	83	Netherlands, Cyprus, Bulgaria, Romania, Israel, 3 Balkan and 4 CIS countries
Indonesian	1.6492	Mixed	58	Indonesia, Brunei Darussalam, Malaysia, Singapore, 6 Asian and 2 Pacific countries
Swiss	2.3325	Mixed	75	Switzerland, Poland and 5 CIS countries

Source : GDP pro capita (World Bank 2001) and Debtor ratio (IMF 1992-2001).
(1) Standard deviation within the constituency of GDP pro capita is divided by GDP pro capita average of constituency.
(2) Share of debtor countries between 1992 and 2001 in the constituency.

where EDs of mixed constituencies abstained. Mixed constituencies thereby may contribute to balance political positions within the IMF.

In several cases, the EDs of mixed constituencies have played a decisive role in striking a balance between the interests of industrial countries and developing countries. While sharing industrial countries' views on many issues, they have also often taken the same position as developing countries, and even helped to outvote industrial countries. For instance, during the 2000 Review of Fund facilities, several mixed constituencies supported the EDs of developing countries in resisting an increase in the rate of charge[17] advocated by the G7.

In the end, mixed constituencies may often be a better mouthpiece for developing countries than constituencies of less-developed countries, as the influence of the former generally is much higher.

The creation of a single EU chair at the IMF would greatly reduce the number of mixed constituencies. According to economic, geographic and debtor-creditor criteria, an EU constituency would be a homogeneous constituency[18]. There would thus be fewer institutional bridges between industrialised European countries and other countries at different levels of development.

4.1.3 Growing political importance of the EU

In 1958, when the European Economic Community was established, its 6 founding members held 15.75 p.c. of total IMF voting power, while the US held 25.78 p.c. Up to now, the aggregated quota share of the EU members has been growing: not only has the number of Union members risen to 15 (and will shortly total at least 25), but their overall share in the world economy, and thus their calculated quota, has also increased. The growth in the number of IMF members (from 45 to 184) is the main reason why the share of the US has decreased to today's 17.4 p.c. (Chart 2). With this share, the US nevertheless remains the only member with a veto right (for 85 p.c. majority votes[19]) and by far the largest member (almost three times bigger than the next largest). The nation's political and economic power obviously reinforces this position. Moreover, since the IMF headquarters are located in the territory of the member having the largest quota, US ideas and opinions are relatively influential because they are close at hand. In practice, the single US position at the IMF was only seldom confronted with a strong and single European voice. However, helped by shared values and reenforced coordination mechanisms since the advent of EMU, EU countries increasingly find themselves on the same side on essential issues, such as the establishment of a Sovereign Debt Restructuring Mechanism.

A scenario in which a single EU chair would inherit the actual quotas of the EU membership and thus have a veto power for 70 p.c. majority votes[20] may not seem very plausible from a political point of view. Since the economic data relevant for quota calculations are very similar for the US and the EU, there are objective arguments in favour of convergence of the actual quotas of the two chairs. The quota for the EU chair could hence be significantly below the sum of the actual quotas of the EU member states. One element in the forthcoming - ultimately political - discussion might nevertheless be the observation that, in the process, Europe would stand ready to give up 6 of its current 7 EDs.

An interesting paradox in this field is that a reduction in the number of European EDs, in the global voting power of Europe and in its contribution to the Fund's general resources (as explained in chapter 3), could go hand in hand with an increase in the Union's impact on IMF decision-making. A single EU chair would indeed have both the power to veto important decisions, and substantial constructive power to foster decisions. Leech (2002) illustrates this by calculating power indices for IMF members. His results prove that for ordinary IMF decisions requiring a 50 p.c. majority, the US currently has political power far in excess of its voting weight, since it does not need many other members to form a winning coalition. According to such indices, a single EU chair would have more power than the EU members taken together.

Note that adapting actual quotas towards calculated quotas for the entire Fund membership might go against the current trend of strengthening the voices of the low-income countries. One way of compensating for this might be to increase the basic votes, i.e. the number of voting rights each Fund member automatically receives, regardless of its quota.

(16) See Van Houtven (2002).

(17) See Van Houtven (2002).

(18) With 25 countries, the EU would have a GDP pro capita relative deviation of 0.66 and a debtor ratio of 8 p.c. With 28 countries, these indices would be respectively 0.76 and 18 p.c.

(19) An 85 p.c. majority is required in 16 categories of decision, such as adjustment of quotas and votes, provisions for general exchange arrangements, allocation and cancellation of SDR and amendments to the Agreement.

(20) A 70 p.c. majority is required for many financial and operational decisions and the suspension of voting rights.

CHART 2   EVOLUTION OF IMF VOTING POWER
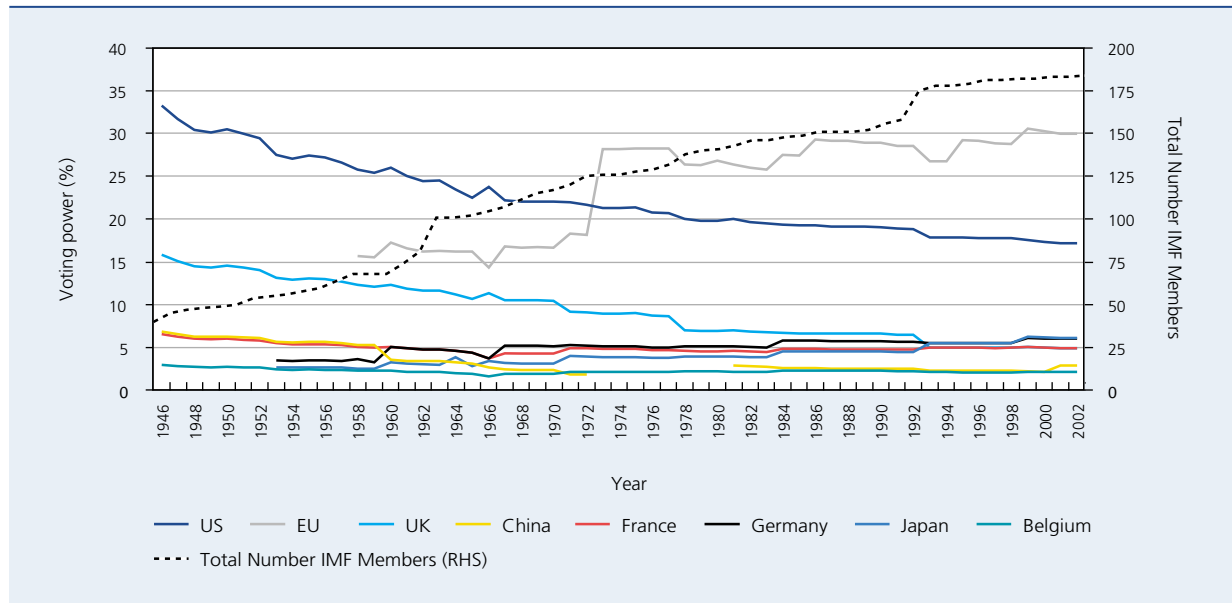
Source : IMF.

4.1.4 Increased polarisation of the IMF governance

The creation of a single EU chair would drastically change the balance of power at the IMF. There would be two large blocks : the EU chair and the US, each with a veto power for 85 p.c. majority votes. But together they would also be able to veto 70 p.c. majority decisions. And for simple majority decisions (50 p.c.), an alliance of Japan, Europe and the US would be sufficient. In order to obtain IMF financing, a member country will automatically have to convince the two main members. Once both chairs agree on a specific issue, it would be difficult to go against or block their agreement. It however remains a moot point whether in real life a Fund with two main players would function better than under the now prevailing structure.

At the current juncture, there is already a tendency towards creditor/debtor polarisation in IMF governance. The decline of mixed constituencies and the importance of the two largest members might further impair the co-operative nature of the IMF, which risks becoming a forum opposing creditors to debtors, where minority debtors can ask for financing. Although the IMF at its origin was a co-operative where a country could be a creditor one year and a debtor another year, creditor and debtor countries have become two more clearly distinctive categories. The diversity of interests of EU countries, the functioning of mixed constituencies, and – more recently – the element of "peer review"

in surveillance and financial sector assessment activities, nevertheless still favour the co-operative nature of the IMF. The creation of a single EU chair with a clear, single European position and the waning importance of mixed constituencies it entails would affect this co-operative nature. However, much will depend on the positions taken by the EU chair. The internal decision-making process of the EU will therefore be very important.

4.2 Impact of internal EU governance on the IMF

The implications of the introduction of a single EU chair will depend very much on the internal governance of the EU. Specific mechanisms will have to be set up to operate, at the more technical level, the duties and rights of an EU chair at the IMF and to establish, at the political level, the European positions. These mechanisms would function either or not within the broader framework of a common European foreign policy.

Currently, the European Commission and the ECB have observer status at the IMF; the former however only at the International Monetary and Financial Committee, the latter at the Executive Board as well. Voting power lies entirely with the EU countries, the Fund remaining at the current stage a country-based institution. Nevertheless, co-ordination is increasing, both at a technical level (through the setting up of specific committees, in Brussels

as well as in Washington) and at the political level (in particular through the informal ECOFIN Council meetings).

A situation in which all EU countries would gather in one constituency (or a membership similar to that of the United Arab Republic) would less strongly affect the rights and duties of the countries concerned. Each EU member state would remain a member of the Fund individually, but Europe would have to speak with one voice, and to cast a single vote. The decision-making process in the constituency would be based mainly on a confrontation of national interests of the members, as is already the case in multi-country constituencies. A major difference in relation to the currently prevailing situation of increased co-ordination would be the need for an ex-ante commitment to reaching a common view, as an ED can only take one position. No changes would be necessary as to IMF financing, which could continue to be a matter of national competence.

When the EU, in another scenario, would become a "fully fledged" single member of the Fund, it would obviously inherit the duties and rights of the actual European IMF member states. This would have more far-reaching implications. The single EU member would contribute to IMF financing according to its quota. Equally, since the IMF only deals with its members and not with sub-entities, the Fund would exert surveillance under Article IV of the Articles of Agreement over the European Union as a whole, and could no longer eventually provide financing to individual member states of the Union.

Whether a single chair will be introduced, and which positions it will take in IMF decision-making, will largely depend on the progress made in the unification of foreign policies. If the European Union succeeds in formulating a common foreign policy, in addition to a common monetary policy, a single EU membership at the Fund would become inevitable. In such a situation, and obviously depending on the clarity of the common foreign policy, all conditions would be present for the European chair to be able to define and defend clear-cut positions.

However, if the EU were to opt for a single membership before foreign policy is unified, EU positions at the IMF would risk to become either watered down, or largely technocratic. The co-ordination of national positions would indeed be a cumbersome process, the outcome of which would risk being compromises reflecting the largest common denominator between still highly differing political views of member states. If and when IMF position-taking would be left to a more or less independent institution of the Union, a factor for tensions within the Union and between the Union and its member states would be built into the system, while at the same time the accountability of the Fund could suffer.

The link between EU and IMF governance obviously is a two-way relationship. The Union's internal organisation with regard to its single chair at the Fund will indeed undoubtedly be influenced by the degree to which the IMF will be a rules-based institution, providing a clear and transparent framework for decision taking, with well-defined objectives and proper accountability. The higher the degree of discretion in managing the Fund, the more difficult it could be to organise a well-functioning EU chair, able to reach well-defined positions within the often required short time-span.

5. Legal feasibility

The introduction of a single EU chair will require legal adaptations at different levels: the IMF Articles of Agreement, the European Treaties and, in many countries, domestic legislation will have to be amended. Moreover, legal settlements between the IMF and the EU member countries will be needed in order to solve specific transition problems.

The Fund's Articles of Agreement define the duties and rights of IMF members. Including monetary unions alongside countries in the definition of possible members of the IMF (Article II) could be a promising avenue for establishing a single, fully-fledged EU membership. The at first sight less complex creation of a single European constituency would also require amendments to the Articles of Agreement, mainly regarding the composition of the Executive Board. Article XII, for instance, does not allow the five largest members to join a constituency. As for the settlement of specific transition problems, Schedule J of the Articles of Agreement, ruling settlements of accounts with members withdrawing, and its application in cases like Poland, Czechoslovakia, Cuba or Indonesia, could provide some valuable insights.

Amendments to the EU Treaty may also be necessary to adapt internal governance mechanisms if the EU becomes a single member of the IMF. An interesting precedent in this field is the European representation within the World Trade Organisation.

Box 3

Legal considerations on differences in EC external representation: World Trade Organisation versus international financial institutions

Although their subject is different, Articles 111 and 133 of the EC Treaty have a very similar construction. On the one hand, Article 111 indicates the way to conclude agreements on an exchange-rate system for the euro in relation to non-EC currencies (or to formulate the general stance of exchange-rate policy in relation to these currencies), determines which EC body decides (under what conditions) on the arrangements for the negotiation and conclusion of such agreements, and which body decides (under what conditions) on the position of the EC at international level as regards issues of particular relevance to Economic and Monetary Union (EMU), and on its external representation. On the other hand, Article 133 indicates the way to conclude international trade agreements and determines which body decides (under what conditions) the arrangements for the negotiation and for the conclusion of such agreements.

Article 111

1. [...], the Council may, acting unanimously on a recommendation from the ECB or from the Commission, and after consulting the ECB [...], after consulting the European Parliament [...], conclude formal agreements on an exchange-rate system for the [euro] in relation to non-Community currencies [...].

2. [...], the Council, acting by a qualified majority either on a recommendation from the Commission and after consulting the ECB or on a recommendation from the ECB, may formulate general orientations for exchange-rate policy in relation to these currencies [...].

3. [...], the Council, acting by a qualified majority on a recommendation from the Commission and after consulting the ECB, shall decide the arrangements for the negotiation and for the conclusion of agreements [concerning monetary or foreign-exchange regime matters]. These arrangements shall ensure that the Community expresses a single position. The Commission shall be fully associated with the negotiations [...].

4. [...], the Council, acting by a qualified majority on a proposal from the Commission and after consulting the ECB, shall decide on the position of the Community at international level as regards issues of particular relevance to economic and monetary union and on its representation, [...].

5. Without prejudice to Community competence and Community agreements as regards economic and monetary union, Member States may negotiate in international bodies and conclude international agreements.

Article 133

1. The common commercial policy shall be based on uniform principles, particularly in regard to [...] the conclusion of tariff and trade agreements, [...].

2. The Commission shall submit proposals to the Council for implementing the common commercial policy.

3. Where agreements with one or more States or international organisations need to be negotiated, the Commission shall make recommendations to the Council, which shall authorise the Commission to open the necessary negotiations [...].

The Commission shall conduct these negotiations in consultation with a special committee appointed by the Council [...]

4. In exercising the powers conferred upon it by this Article, the Council shall act by a qualified majority.

5. Paragraphs 1 to 4 shall also apply to the negotiation and conclusion of agreements in the fields of trade in services and the commercial aspects of intellectual property, [...].

This paragraph shall not affect the right of the Member States to maintain and conclude agreements with third countries or international organisations in so far as such agreements comply with Community law and other relevant international agreements [...].

Given the strong parallelism between the two articles, the question arises how it can be that, in one case, the EC membership of the WTO is based on Article 133 whereas, in the other case, Article 111 did not (yet?) lead to a single EC membership of international organisations such as the IMF.

There are two complementary reasons for this seemingly inconsistent approach. First, these articles cover very different subjects: common commercial policy (Article 133) is (with limited exceptions) an EC exclusive competence[1] while issues of particular relevance to EMU[2] are either EC exclusive competences, shared competences, or Member States' exclusive competences.

Second, Article 133 says nothing about EC membership of any international trade organisation. For a very understandable reason: at the time Article 133 was adopted (1957, Treaty of Rome), no such organisation existed (the question of establishing the WTO was not raised until the Uruguay Round, 1986-1994); there were only international trade negotiations (General Agreement on Tariffs and Trade - GATT). The European Commission justified an EC membership in the WTO on the legal basis of Article 133. Before the Uruguay Round, disagreements on several topics were so insurmountable in the Council that negotiation directives given to the Commission were very broad and imprecise (as they were common denominator compromises). The Commission, combining these directives and the EC exclusive competence on common commercial policy, gained acceptance for the idea of an EC membership of the WTO. At the conclusion of the negotiations, this membership was confirmed by the Council, in the package deal constituted by WTO agreements (GATT, GATS or General Agreement on Trade in Services, etc.). Conversely, in the case of pre-existing international organisations such as the IMF, an evolution of the kind on the basis of Article 111 did not materialise. This article was indeed only inserted into the Treaty (1993, Treaty of Maastricht) long after the creation of these organisations.

For these two reasons, a single EC membership in organisations such as the IMF will necessitate several important amendments to the EC Treaty. Some people - Louis (2001) – have suggested an easy solution: an adaptation of Article 111, which could explicitly allow the single representation of the EC in international institutions. This adaptation could also conceivably be supplemented by specific rules determining internal EC governance and policy guidelines, as well as the allocation of tasks between the ECB, the Commission and possibly other EC or Member States bodies. However, it would probably not be sufficient to amend only this article of the EC Treaty, as this would not change the allocation of powers between the EC and its Member States. Indeed, a single EC representation would be difficult to imagine as long as Member States still have exclusive powers in some areas within the field of competence of the IMF.

[1] As confirmed by the European Community Court of Justice (case 22/70 (AETR), judgment of 31 March 1971, ECR., p.263; case 1/94, opinion of 15 November 1994, ECR, §44).

[2] E.g. in IMF matters: surveillance under Article IV over the common monetary and exchange rate policies of the euro area, surveillance under Article IV over the policies of individual euro area members, role of the euro in the international monetary system, world economic outlook, international capital markets reports, and world economic and markets developments.

6. Potential implications for other international economic and financial organisations

The creation of a single EU chair at the IMF would also affect other international economic and financial fora, and the global external representation of the EU countries. Apart from the IMF, there is a vast array of international groupings where EU countries are represented. The composition of these groups varies. In some of them, the European voice is already present via the European Commission and/or the ECB. In others, only some European countries are represented (Chart 3). The creation of a single EU chair at the IMF might be coupled with a review of how EU countries are represented in the other international financial spheres.

The creation of a single EU chair at the IMF would in all probability influence the governance of the World Bank. Should a single EU seat at the IMF also give rise to a single representation at the World Bank? Such a move might be facilitated by the relative similarity between the governance of the two institutions (the constituencies are identical, and their voting power very similar). In addition, the Bank and the Fund already collaborate closely on country programs and conditionality. On the other hand, it would probably be difficult to establish a single European position at the World Bank, in view of the often highly political development issues handled by this institution.

CHART 3   EXTERNAL REPRESENTATION OF THE EU COUNTRIES

	G7	G20	G10	IMF & Worldbank	OECD	UN	WTO
D	✓	✓	✓	✓	✓	✓	✓
F	✓	✓	✓	✓	✓	✓	✓
I	✓	✓	✓	✓	✓	✓	✓
UK	✓	✓	✓	✓	✓	✓	✓
B			✓	✓	✓	✓	✓
NL			✓	✓	✓	✓	✓
SV			✓	✓	✓	✓	✓
Other EU				✓	✓	✓	✓
Council		✓					
ECB		✓			✓		
Commission					✓		✓
Other members	3	15	4	169	15	175	129
EU Observers	Commission, Council, ECB*, Eurogroup*		Commission, ECB*,	Commission, ECB,		Commission	

* For some discussions.

The consequences of the single EU chair at the Fund will probably be quite noticeable within the G7. The G7 has a decisive influence on IMF decision-making, and the Managing Director of the Fund usually participates, by invitation, in the surveillance discussions of the G7 (or G8) finance ministers and central bank governors. The EU already participates in the G7 (Chart 3). If the EU countries start speaking with one voice within this group, a single European representation could replace the current EU member states' representatives. This group would hence become a group of four, with the EU and the US as major participants. The governance of the IMF with its two major blocks, the EU and the US, would thereby closely resemble the governance of the G7.

Similarly to the G7, the eleven participants to the General Arrangements to Borrow (GAB) - which also constitute the G10 - or the twenty-six participants of the New Arrangements to Borrow (NAB) are also selected groups of financially strong industrial countries (or their central banks). In the case of a single external European representation, the composition of the G10 and the G7 would become very similar (the only difference being the presence of Switzerland in the G10).

The number and impact of international institutions and fora, which moreover often cover considerable other fields in addition to mere financial and economic issues, again point to the complexity of a streamlining of the European Union's representation, the far-reaching consequences a single EU chair would entail, and the quasi inextricable links the issue has with the establishment of a common European foreign policy.

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