

# Financial Stability Review 2008



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# Foreword

by Guy Quaden, Governor



The credit and liquidity crisis that started in the summer of last year has put an abrupt end to a prolonged period of stable financial conditions and a generally buoyant operating environment for financial institutions. Higher than expected losses on US subprime mortgage loans were the initial catalyst for the substantial repricing of credit and liquidity risk that has taken place in many fixed-income markets. However, the root causes of the turbulence extended well beyond the excessive weakening of lending standards in a subsegment of the US mortgage market. They included excessive leverage in a context of abundant liquidity, mispricing of a whole range of financial products, misguided reliance on a large-scale transfer of risks from banks' balance sheets or overestimation of the real liquidity of markets in times of stress. The financial turmoil, which at the same time has turned out to be much further-reaching and more protracted than initially expected, has contributed to a significant slowdown of growth in the US economy and may affect other economies too, as highlighted for example by the results of recent bank lending surveys.

The crisis has revealed significant – though not necessarily irremediable – weaknesses in the “originate and distribute” business model on which the modern global financial system had come to rely for intermediating credit between investors and borrowers. Agency problems and incentive misalignments between various participants in this fragmented and market-oriented business model have not always been adequately mitigated and managed. Markets have relied excessively on the expert opinion of rating agencies for the redistribution and subsequent pricing of newly securitised loans. A substantial share of the investments in highly-rated tranches of securitised and structured finance instruments were financed with short-term debt through ABCP conduits, SIVs or hedge funds. In response to the simultaneous evaporation of market and funding liquidity which had resulted from the revelation of higher than expected losses on securities backed by subprime mortgage loans, credit institutions have been hoarding liquidity. This in turn has led to serious dislocations in large segments of global money markets, which had to be managed and moderated by extraordinary measures from central banks.

Through the issuance of tradeable securities, exposures to US subprime mortgage loans have been spread throughout the global financial system, generating losses at financial institutions in the US, Europe and other parts of the world. The degree of exposure varied significantly between individual financial institutions, however. In a limited number of European and US banks, very large exposures resulted in heavy writedowns and losses that had to be compensated for by injections of new equity to shore up solvency. Many of these writedowns have involved tranches of subprime

RMBS and ABS CDOs that had carried the highest possible ratings before the onset of the crisis. In the case of Belgian banks, writedowns recorded on these asset classes have so far been moderate, though material in some individual cases. A subprime-related 2.5 billion euro increase in impairment losses on financial assets in 2007 was a major factor behind the decline in the overall net bottom-line profit for the Belgian banking sector – a first-order shock absorber to deal with unexpected adverse changes in the operating environment – from 9.7 billion euro in 2006 to 6.7 billion euro. A more detailed assessment of the resilience of the Belgian financial sector to the present turmoil is presented in the Financial Stability Overview introducing this FSR.

The risk of a disorderly deleveraging process appears to have somewhat subsided at the time of finalising this FSR, following the Bear Stearns rescue operation in the middle of March 2008 and the recapitalisation efforts undertaken by global credit institutions. However, there is no reason for complacency about the potential challenges still facing the financial system.

The cyclical outlook and the operating environment for financial institutions are likely to remain important challenges in the quarters ahead, against the backdrop of a major economic slowdown in the US and concerns over economic growth in other regions of the world. The global financial system will now probably have to cope with a more classical downturn in the credit cycle, which could actually be more severe and even more protracted given the size of the shock that was imparted to major intermediaries in the financial system and the significant current or potential adjustments in several national real estate markets. Ongoing balance sheet repair through deleveraging in the household and financial sector may consequently usher in a period of less buoyant growth in large segments of retail, merchant and/or investment banking.

The recent period of financial turmoil has also raised issues of a more structural nature. Some of these relate to the existence of potential factors contributing to the regular recurrence of crises in the global financial system. Others are more specifically related to recent events, and mainly concern the flaws that have been revealed in financial institutions' risk management practices and areas where there is scope for strengthening financial sector supervision and regulation. In this regard, the report of the Financial Stability Forum for the G7 Ministers and Central Bank Governors or the initiatives taken at European Union level provide detailed roadmaps with proposals and recommendations to strengthen risk management practices in individual financial institutions and to put the global financial system on a more solid footing. The proposed measures are wide-ranging and multi-faceted.

Several components of these reform plans are illustrated in the various thematic articles featured in the third section of this FSR. To illustrate the need to strengthen prudential oversight of liquidity risk management and capital adequacy, one article shows how the growing proportion of structured assets and loans in the portfolios that banks hold for trading should be addressed through an adjustment of capital requirements for default risks in these trading books. Another article examines the implications of bank transparency for financial stability and reviews the regulatory approach to this issue in the framework of measures needed to enhance risk disclosure and valuation practices. The agency problems raised by the development of structured finance, which call for changes in the role and use of credit ratings, for instance, are reviewed in an article examining how they are addressed in the specific case of Collateralised Loan Obligations (CLOs). Finally, the need for robust arrangements for dealing with stress is illustrated by an article examining the conditions under which several countries could agree to share the burden of a crisis affecting a large cross-border banking group with potential systemic consequences.

The second section of this FSR examines the resilience of financial infrastructures, as the increasing interdependence which has developed between the various payment and settlement systems constitutes a potential channel for contagion. As illustrated in an article of this section, these systems have weathered the market turmoil in 2007 and the first quarter of 2008 very well. While this reliability is reassuring, it should not be taken for granted. With the presence of two major international platforms (Euroclear SA and SWIFT) in Belgium, the NBB considers the oversight of the resilience of financial infrastructures as a key component of its surveillance of financial stability conditions. The broad lines of this oversight activity are further detailed in two other articles in the second section, while the last article of this same section presents the main features and lessons of a financial crisis simulation exercise conducted in Belgium at the end of 2007, with the participation of the NBB, the Banking, Finance and Insurance Commission (CBFA) and the Ministry of Finance. Indeed, the state of preparedness to deal with a crisis has to be checked not only for financial institutions and infrastructures but also at the level of the authorities. This national exercise falls into line with similar tests which have been carried out between the central banks of the Eurosystem or, at EU level, between central banks, supervisors and Ministries of Finance of all Member States.

One of the overriding objectives of the ongoing collective private and official efforts to strengthen financial sector stability should be the mitigation of factors contributing to the observed pro-cyclicality in the system. Unsustainable risks are built up during periods of benign economic conditions – stimulated by rising asset prices, strong credit growth, reportedly robust solvency positions and low incurred credit risks – in order to be reversed, often in a disorderly way, during periods of financial stress with potential side effects on other sectors of the economy. As pro-cyclicality can be fostered by certain aspects of accounting standards, solvency regulations, regulatory arbitrage or backward-looking risk management tools, the mitigation and monitoring of this risk is likely to require a multi-pronged approach. It implies, as well, that micro-prudential and macro-prudential supervisors exchange information and assessments about risk exposures within and outside the regulated financial institutions.

Another illustration of a fruitful cross-pollination between central banks and supervisors is the close cooperation evident between the Bank and the CBFA in the monitoring of the liquidity situation in the Belgian banking sector since the start of the crisis in August 2007. This cooperative effort has been greatly facilitated by the earlier joint work undertaken in the framework of liquidity stress tests for the major credit institutions, which were conducted for the first time in 2006.

Brussels, June 2008

# Executive summary

## 1. Overview

### 1.1 Banking sector

Several years of low financial market volatility, narrow credit and liquidity risk premiums, and generally favourable market conditions for financial institutions came to an abrupt end in the summer of 2007, when higher than expected delinquencies on recent vintages of subprime mortgage loans in the US caused unprecedented havoc in credit and money markets worldwide. As two thirds of the US subprime mortgage loans had been funded in the global capital market through the issuance of tradeable securities, exposures to this asset class were spread throughout the global financial system, generating losses at financial institutions in the US, Europe and other parts of the world. Many of these writedowns involved tranches of subprime RMBS and ABS CDOs that had carried the

highest possible ratings before the onset of the crisis. However, the degree of exposure varied significantly between individual financial institutions. In a limited number of European and US banks, very large exposures resulted in heavy writedowns and losses that had to be compensated for by injections of new equity to shore up solvency.

In Belgium, the impairments that banks booked in 2007 on assets with exposure to subprime mortgage loans were moderate, but nevertheless material, and mainly concerned investments in subprime-related ABS CDOs. This subprime-related impairment of debt securities was the main reason for the 2.5 billion euro increase in impairment losses on financial assets that the Belgian banking sector recognised last year in its profit and loss account, as credit losses on the other portfolios remained close to the historically low level reached in 2006 (Table 1 and Chart 1). The published quarterly accounts of the

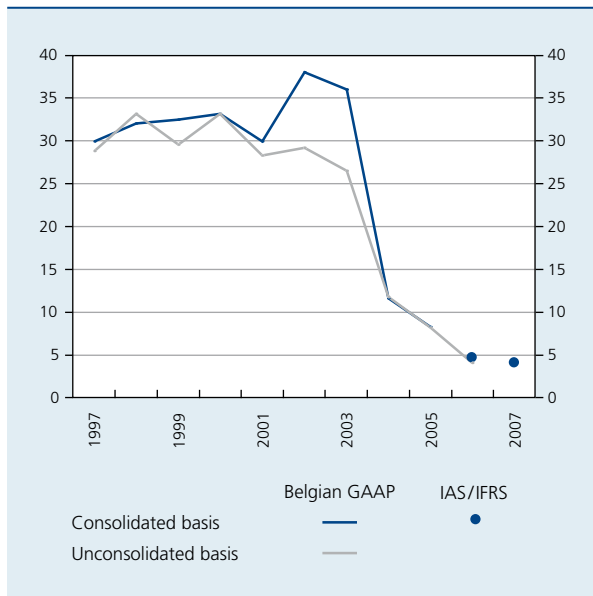
**TABLE 1** NET IMPAIRMENTS OF FINANCIAL ASSETS RECOGNISED IN THE PROFIT AND LOSS ACCOUNT  
(consolidated data, billion euro)

	Net impairments (including reversals)	
	2006	2007
Available-for-sale financial assets .....	0.00	2.50
Loans and receivables .....	0.37	0.38
Other financial assets not measured at fair value through profit and loss .....	0.00	0.00
Other impairments <sup>(1)</sup> .....	0.00	0.02
<b>Total</b> .....	<b>0.37</b>	<b>2.89</b>

Sources: CBFA, NBB.

(1) This item covers *inter alia* impairments for property, plant and equipment, for investment properties, for goodwill and other intangible assets, and for investments in associates and joint ventures accounted for using the equity method.

**CHART 1** LOAN LOSS RATIO<sup>(1)</sup>  
(basis points)



Sources : CBFA, NBB.

(1) The loan loss ratio is the net flow of new impairments for credit losses, expressed as a percentage of the stock of total loans (one basis point is one hundredth of one percent). The 2006 and 2007 figures relate to the loan loss ratio for the IAS/IFRS category "Loans and receivables".

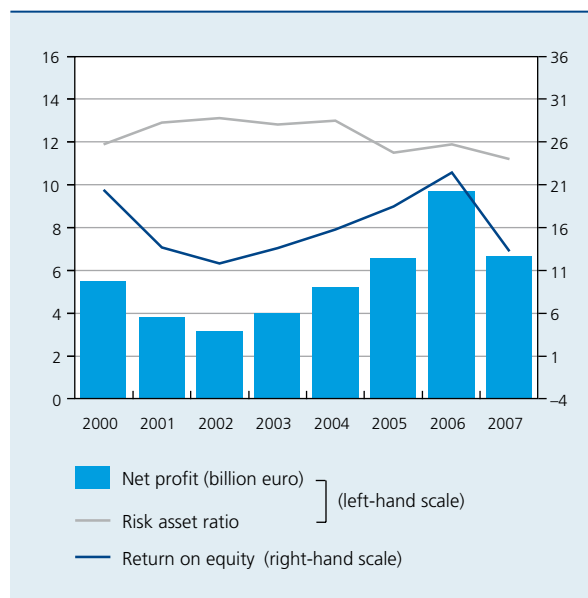
main *bancassurance* groups for the first quarter of 2008 showed additional material impairments for subprime-related assets, but they also confirmed that the credit losses in other portfolios remained limited.

Yet, the significance of the higher than expected delinquencies in a high-risk subsegment of the US mortgage market for the global financial system went well beyond the direct adverse impact on financial institutions and investors with exposure to subprime-backed assets. The problems revealed in the case of subprime-related securitised debt instruments triggered indeed a more general re-evaluation of investor confidence in structured finance instruments and of the ratings attached to these securities. The adverse effect which this investor apprehension over the fair value and risks of structured finance instruments exerted on the secondary market liquidity of these instruments was further amplified by the (re)financing difficulties faced by ABCP conduits, Structured Investment Vehicles (SIVs) and hedge funds, and resulted in large declines in the observed market prices of many structured finance instruments. These observed changes in market prices were often generated by fire sales of assets by investors under pressure to liquidate some of their

structured finance investments, and represented large discounts relative to the perceived "fundamentals-based" value of these securities, as calculated on the basis of expected cash-flows in a hold-to-maturity perspective.

The total exposure of the Belgian banking sector to structured credit instruments – including in the form of derivatives – amounted to around 80 billion euro at the end of 2007, according to data published by the main *bancassurance* groups.<sup>(1)</sup> This represents around 5 p.c. of the sector's total balance sheet. As the bulk of Belgian banks' debt securities are held in IAS/IFRS accounting portfolios where financial assets have to be marked every quarter to their fair value, the above-mentioned declines in the prices of structured finance instruments affected the book value of related securities in Belgian banks' fixed-income security portfolio. This portfolio amounted to 296.2 billion euro (or 18.8 p.c. of total assets) at the end of 2007. Fixed-income securities issued by central governments (slightly less than half) and by credit institutions (27 p.c.) together account for around three quarters of the total. Fair value losses on asset-backed and structured finance securities nonetheless contributed to a decline in the stock of unrealised capital gains or losses on "Available-for-sale" (AFS) financial assets, which are incorporated in accounting own funds and do not pass through the income statement. They fell from a net unrealised gain of 2.8 billion euro at the end of 2006 to a net unrealised loss of 0.6 billion euro at the end of 2007 (equivalent to

**CHART 2** PROFITABILITY AND SOLVENCY  
(consolidated data, percentages, unless otherwise stated)



Sources : CBFA, NBB.

(1) Figures for Dexia Group only cover the exposures of Dexia Bank Belgium.



0.3 p.c. of the market value of outstanding AFS assets). Some of these negative revaluations of securities may ultimately be reversed if the application of mark-to-market accounting in a period of illiquid secondary markets led to the recognition of artificially low prices in the fair value of AFS debt securities.

These overall unfavourable developments in the fair value of fixed-income securities in 2007 did not affect the regulatory solvency ratios, as changes in unrealised gains and losses on AFS bonds are not taken into account for the calculation of regulatory capital, following the application of the prudential filters. Chart 2 shows that the risk asset ratio of the Belgian banking sector amounted to 11.2 p.c. at the end of last year, above the regulatory minimum of 8 p.c. The net bottom-line profit also remained at a high level (6.7 billion euro), even if it was down from the exceptionally high figure recorded in 2006. This revealed resilience of the profitability and solvency buffers against unexpected adverse developments in the operating environment suggests that Belgian banks coped rather well with the change in operating conditions that occurred in the second half of 2007.

Such a conclusion also prevails for the resistance of the Belgian banking sector to the unprecedented dislocations in the interbank and wholesale funding markets during that period. These tensions in global money markets were initially triggered by the transmission of liquidity shocks in ABCP conduits and SIVs to the banks that had provided backstop liquidity lines to these off-balance-sheet investment vehicles, and by the seizure of primary securitisation markets that prevented credit institutions from off-loading loans in the capital markets. The associated concerns over a potential unexpected expansion of their balance sheet, laying claim on their liquidity and capital reserves, prompted banks to hoard liquidity on a short-term basis and made them much more reluctant to reinvest their funds on the money market for long tenors, including within their lending to other banks. These pressures in interbank markets in turn required extraordinary intervention by central banks.

The Belgian banking sector did not witness important funding liquidity tensions as such, although some institutions found it more challenging to roll over or refinance their normal mismatch position and obtain new long- or medium-term wholesale funding at reasonable conditions. Unsecured money market funding had to be obtained at higher prices and shorter maturities. Furthermore, on the secured segment of the market, where funding is obtained through repurchase agreements, it emerged that securities previously considered as very liquid, such as certain structured credit products, could no longer be

used in secured money market transactions. The turmoil and inherent risk aversion towards financial institutions' debt increased the funding cost associated with the issuance of medium- and long-term paper. Conduits sponsored by banks found it more difficult to roll over maturing commercial paper, but the amounts involved were manageable, as Belgian banks' exposure to these off-balance-sheet vehicles had been moderate from the start and did not involve SIVs.

The liquidity and funding position of some Belgian banks was thus mainly affected indirectly by the recent events, i.e. through the consequences of a generalised lack of confidence on financial markets. In fact, the events triggered a general and market-wide liquidity crisis and, in that context, a number of features of the banks' initial liquidity position appear to have been an important factor in determining their exposures to the current events. Institutions with larger maturity mismatches, lower liquidity buffers, a more wholesale-oriented funding profile and less access to a diversified set of funding sources were on average more exposed than others. In that respect, the sizeable securities portfolio, a liquidity buffer that can be monetised through secured repo transactions, and the fairly high level of retail funding of a number of Belgian banks proved mitigating factors.

All in all, the review of Belgian banks' operations and financial conditions in 2007 thus shows that the impact of the financial turmoil in terms of credit losses or liquidity pressures was rather moderate in 2007, and well below the scale of the tensions that some other European and US financial institutions had to cope with. Yet, as highlighted by the developments during the first months of this year, the operating environment in 2008 and possibly beyond is likely to remain quite challenging for financial institutions in general, notwithstanding the fact that the threat of a disorderly deleveraging process appears to have subsided with the Bear Stearns rescue operation in the middle of March 2008, and that a large amount of expected losses on exposures to subprime-related assets has been provisioned for in the global financial system (after three quarters of writedowns). Against the backdrop of a major economic slowdown in the US and concerns over economic growth in other regions of the world, it is indeed likely that the global financial system will now have to cope with a period of less benign market conditions for revenue growth and a more classical downturn in the credit cycle, which could however be more severe and protracted given the size of the shock that was imparted to major intermediaries in the financial system and the significant ongoing or potential adjustments in several national real estate markets.

**TABLE 2** BREAKDOWN OF TOTAL LOAN EXPOSURES<sup>(1)</sup>  
(consolidated data)

	Billion euro		Percentages of the total	Breakdown by residency of the counterparty (percentages of the total)		
	2006	2007		Belgium	Euro area	Rest of the world
Credit institutions .....	285.7	320.8	32.5	1.5	15.9	15.2
Corporate .....	260.9	313.5	31.8	9.8	8.7	13.3
Retail .....	260.1	276.2	28.0	15.3	10.5	2.1
Central governments .....	11.4	16.4	1.7	1.0	0.2	0.5
Non-credit institutions <sup>(2)</sup> .....	58.6	60.1	6.1	3.1	0.8	2.2
<b>Total</b> .....	<b>876.7</b>	<b>987.0</b>	<b>100.0</b>	<b>30.6</b>	<b>36.1</b>	<b>33.3</b>

Sources: CBFA, NBB.

(1) The total includes the small amount of loans and advances (39.1 billion euro) that are classified under "Held for trading".

(2) The counterparty "Non-credit institutions" covers *inter alia* loans to financial institutions other than banks and to local government authorities.

In such a more forward-looking assessment of potential financial stability risks, it appears likely that the Belgian banking system as well will have to deal with a less favourable operating environment than was experienced in recent years, when conditions were in many respects very benign, be it in terms of asset price developments, volume growth or credit losses. The repricing of risk that has occurred will benefit banks' newly originated volumes of credit, but is also likely to contribute to a turn in the credit cycle in many asset markets in the course of 2008, so that banks will probably have to recognise more credit losses in their profit and loss account in the course of this year. In this connection, the Overview maps the two principal sources of counterparty exposures (in gross terms) in the Belgian banking system, namely the large volume of bank loans (62 p.c. of total assets) and the extensive fixed-income security portfolio.

This review reconfirms the generally well-diversified composition of the loan portfolio (Table 2), which moreover is mainly concentrated in risk classes with low associated probabilities of default. The geographic breakdown of the large claims on non-residents – including through (structured) debt securities – highlights nonetheless some significant exposures on the private sector in countries where housing market adjustments appear to be taking place (US, UK, Spain and Ireland), where concerns have been voiced about housing market valuations (Netherlands, France) or where strong credit growth has gone hand in hand with the extension of risky mortgage loans in foreign currency (a number of Central European countries). Recent indicators also show a cooling of the Belgian mortgage and residential property markets, as highlighted for example by the stabilisation in the average size of new

mortgage loans and the progressive slowing in the annual rate of house price inflation. This transition towards a less buoyant domestic residential real estate market does not raise significant concerns at this stage, as its earlier vigour was associated with the persistence of generally conservative mortgage loan practices, including the absence of a subprime mortgage loan segment in Belgium. The financial position of the Belgian household sector also remains strong, characterised by comparatively low levels of indebtedness and high holdings of financial assets.

The scope for rating migration appears to be larger in the corporate loan and (structured) debt securities portfolios of the Belgian banks, notwithstanding the generally still robust financial position of many non-financial corporations in Belgium and other parts of the world, following the extensive balance sheet restructuring and restoration of higher profit margins that took place in this sector in the years after the collapse of the stock market bubble in 2000. While this sector continued to enjoy high levels of profitability in 2007 in the US and Europe, supported by strong economic growth in many areas of the world, the results published by non-financial corporations in the first quarter of 2008 were already showing some signs of the impact of slower economic growth (in the US) on net profits, which could be the harbinger of a period characterised by much less favourable developments in non-financial corporate sector profits. This would in turn tend to keep the financing gap – a measure of the gap between capital expenditures and internal funding resources – in positive territory, and lead to an associated need for external financing, exposing corporations to changes in lending conditions in the bank lending and capital markets.

## 1.2 Insurance sector

The profitability of the Belgian insurance sector improved significantly in 2007, compared to 2006, bolstered by a strong rise in the income from investments that is recorded in the non-technical result. The insurance companies thus consolidated their profit recovery, which set in after 2002, when the adverse stock market climate and high insurance and operating costs expressed as a percentage of premium income were reflected in a loss of 0.8 billion euro for the sector as a whole. In 2007, the net bottom-line result amounted to 3.8 billion euro.

The good performance of the insurance sector was underpinned by a strong growth of life insurance premiums in 2007 (11 p.c.). This growth needs to be qualified somewhat, as life insurance premiums had dropped to a low level in 2006, following an exceptionally high level of collected premiums in 2005 (Chart 3). These developments were related to shifts in premiums between 2005 and 2006, as a result of the introduction on 1 January 2006 of a tax of 1.1 p.c. on premiums paid for individual life insurance contracts. Since households had anticipated this tax by paying additional premiums in the final months of 2005, and then reduced their payments in 2006, the net results for 2005 and 2006 were first artificially driven up and then depressed, compared to the picture which

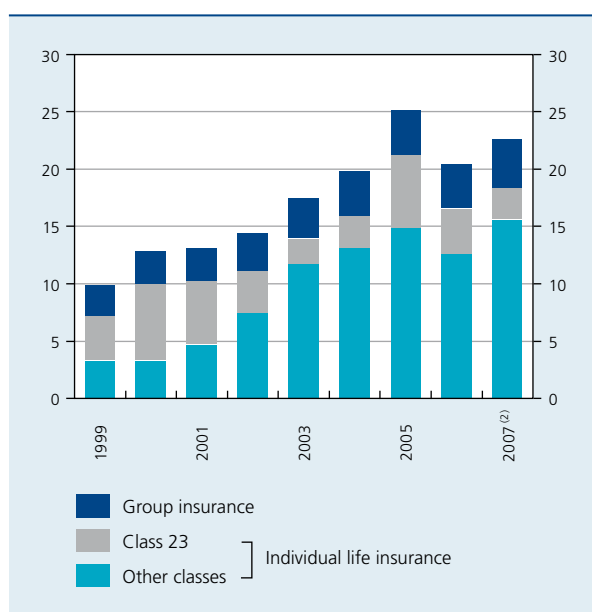
would have been expected in the absence of the new tax measure. Compared to the average annual level of premiums collected in the period 2004-2006 (of 21.8 billion euro), the growth rate in 2007 nevertheless still amounted to 3.7 p.c.

Non-life insurance premiums grew in line with nominal GDP in 2007 and exceeded 9.7 billion euro last year. The combined ratio – expressing insurance and operating costs as a percentage of net premium income – remained stable at 102 p.c. This reverse measure of the profitability of insurance activities proper (excluding investment income) has been close to this level over the period 2003-2007, after having exceeded 110 p.c. during the period 2000-2002. The significant improvement in the combined ratio that took place from 2003 onwards is due to higher premiums, better cost control and more rigorous management of the risks covered in insurance branches recording a deficit.

In both the life and non-life branches, a significant part of the securities portfolio is invested in bonds. At the end of 2007, these represented 72.4 p.c. of the total portfolio, with equities and undertakings for collective investments (UCIs) respectively accounting for only 11.5 and 5.6 p.c. In recent years, in order to increase the return on their investments, insurance companies have boosted the share of corporate bonds, so that they represented 41.5 p.c. of the total bond portfolio at the end of last year, compared to 34 p.c. in 2002. For the insurance activities undertaken by the four largest *bancassurance* groups through institutions of Belgian law, a stock-taking by the CBFA found that the share of asset-backed and structured finance securities was not higher than 7.5 p.c. of the total investment portfolio, with negligible exposures to subprime-related assets.

In addition to the said investments, which are related to traditional insurance activities undertaken through institutions incorporated under Belgian law, more specialised insurance activities are also undertaken, through foreign subsidiaries. One of these activities consists in the provision of financial guarantees to municipal and asset-backed bonds, also known as bond insurance. This bond insurance sector has suffered significant financial pressures since the onset of the subprime credit crisis, as a result of the credit insurance that many of these institutions had provided to highly-rated tranches of subprime-backed MBS or ABS CDOs. A number of monoline bond insurance companies, whose business model traditionally relied on their AAA-rating, were downgraded, while others raised fresh capital to shore up their solvency.

**CHART 3** LIFE INSURANCE PREMIUMS <sup>(1)</sup>  
(unconsolidated data, billion euro)



Sources: Assuralia, CBFA, NBB.

(1) Premiums collected on direct insurance operations in Belgium.

(2) The 2007 figures are based on estimates by Assuralia.

## 2. Resilience of financial infrastructure

### 2.1 Overview of the NBB's oversight activities

The NBB oversees a wide range of systems, including two card payment schemes, a Real Time Gross Value System, three Securities Settlement Systems (SSS), a central Clearing counterparty, and the services provider SWIFT. This oversight activity has been developed under a variety of international cooperative arrangements: for SWIFT, the NBB is lead overseer with the support of the central banks of the G-10; for Euroclear, the NBB cooperates closely with the Belgian prudential supervisor, the CBFA, among others as lead authorities for the oversight/supervision of Euroclear SA (ESA); for the card schemes oversight and the oversight of TARGET2, specific cooperative arrangements have been set up within the Eurosystem.

The NBB's oversight of SSS remains largely based upon the CPSS-IOSCO standards. For the oversight of the Euroclear ICSD system, particular attention has been paid to the standards on credit and liquidity risks, and on risks in cross-border links. During 2007, the NBB further intensified its cooperation with the CBFA, which is the prudential supervisor of Euroclear Bank, the operator of the ICSD's settlement system.

In January 2008, the ESCB Governing Council published oversight standards for card schemes, ushering in a new phase in the oversight of card schemes in the euro area. In 2008 the NBB will assess the Belgian national scheme, Bancontact-MisterCash, against these standards, and will lead the assessment group of Eurosystem NCBS which will conduct the assessment of MasterCard Europe against these standards.

For SWIFT, the High Level Expectations (HLEs), which are in fact the central banks' oversight standards for SWIFT, have taken a central place in the oversight activities. The HLEs serve as basis for a self-assessment by SWIFT, and provide overseers with a clear and explicit framework for reviewing SWIFT's activities, for setting priorities in the oversight activities, and for structuring the dialogue with SWIFT.

### 2.2 The assessment of Euroclear Belgium against the CPSS-IOSCO Recommendations

In 2001, the Committee on Payment and Settlement Systems (CPSS) of the central banks of the Group of Ten countries and the Technical Committee of the International Organisation of Securities Commissions (IOSCO) published

a set of standards: the *Recommendations for securities settlement systems*. In 2003, the CPSS-IOSCO also developed an assessment methodology. The objective of these recommendations is to contribute to financial stability by strengthening the securities settlement systems that are an important component of the financial markets infrastructure.

In September 2007, the NBB – as an overseer – assessed the Euroclear Belgium systems against the CPSS-IOSCO recommendations. Euroclear Belgium is a wholly-owned subsidiary of the Euroclear holding company ESA. The Euroclear Belgium systems settle equity trades concluded on Euronext Brussels and selected over-the-counter trades. The results of the assessment show that the systems are fully compliant with fifteen recommendations, whereas three recommendations (7, 12 and 19) are “broadly observed”. The system operator intends to address these issues in the context of the implementation of the Euroclear Settlement of Euronext-zone Securities (ESES) custody and settlement platform, scheduled for November 2008.

### 2.3 How Belgian payment and settlement infrastructure weathered the market turmoil in 2007 and the first quarter of 2008

The Belgian payment and settlement infrastructures stood up well to the financial turmoil, and continued to function safely and efficiently during the second half of 2007 and the first quarter of 2008.

Their operational capacity limits have not been threatened. No contagion risk has been witnessed between payment and settlement systems, and there was no need to apply any exceptional contingency measures. The risk management procedures and the close monitoring of market developments enabled the various systems to cope with the challenges to which they were exposed.

The market turmoil has nevertheless brought about some changes in the behaviour of participants, especially as regards the mobilisation and use of collateral. ELLIPS participants have sharply increased the amount of collateral which they lodge with the NBB. This has resulted in a parallel rise in their credit limit with the central bank. At the same time, the type of collateral deposited with the NBB was significantly changed, including a growing proportion of asset-backed securities.

## 2.4 Assessment and lessons of the first Belgian financial crisis exercise

In February 2007, the Financial Stability Committee (FSC) decided to organise for the first time in Belgium a financial crisis management exercise in which the NBB, the CBFA and the Ministry of Finance would all take part.

The exercise took place on 30 November 2007 and simulated a financial crisis triggered by a fraud in a fictitious banking group which, for maximum realism, was designed with reference to a banking group operating in Belgium. The objective of the exercise was to test the functioning of the individual frameworks which have been set up by each institution to deal with a financial crisis, and the coordinating procedures established between the three authorities through MoU's.

Even though a crisis exercise has a number of limitations compared with a real-life situation, the authorities were able to draw valuable lessons from their participation. The exercise confirmed the importance of having a comprehensive and well-structured crisis management framework, allowed the stress-testing of the national MoU's, reminded the authorities of the importance of information issues and of having crisis management frameworks developed at international level, too, and stressed how important it is for the authorities to develop a common approach in terms of external communication strategy. Further to the exercise and to the lessons drawn from it, practical recommendations to strengthen the Belgian financial crisis management framework have been approved by the FSC and addressed to each participating institution.

A special box is also dedicated in this article to the description of cooperation arrangements involving Belgian authorities in the field of crisis management.

## 3. Thematic articles

### 3.1 Burden-sharing agreements: the cart before the horse?

The burden-sharing theme has attracted a lot of attention from policymakers in recent times. A burden-sharing agreement can be defined as an agreement between countries to share the burden of a crisis either on the basis of pre-specified criteria (agreement on a burden-sharing rule) or on the basis of a scheme to be determined ex-post (agreement on a burden-sharing principle). The article identifies some conditions that need to

be fulfilled in order for a burden-sharing agreement to succeed.

These conditions are structured around three different aspects. A first basic condition relates to the fact that a burden-sharing agreement can only be applied when the institutional structure guarantees a sufficient degree of confidence between the signatories of the agreement. Second, there are some conditions to be met relating to the existing crisis management framework. In particular, authorities should have an agreement on the objective of crisis management in general, and there should be a mechanism ensuring that, in a crisis, signatories will develop a common opinion on the optimal crisis resolution policy to be implemented. Third, there are some conditions to be met relating to the design of the burden-sharing agreement. They concern the legality of the burden-sharing agreement, the way in which the agreement would make it possible to oblige signatories to actually transfer funds calculated according to the agreement, or the compatibility between the objective of the burden-sharing agreement and the institutional environment. In this regard, the article distinguishes between an environment in which the optimal resolution policy can be enforced and one in which it cannot. The article argues that an agreement on a burden-sharing rule can be implemented in the former, but not in the latter, where only an agreement on a burden-sharing principle can be applied.

These conditions are currently not fully met in the European Union. However, they establish a good agenda for future regulatory initiatives. To that extent, improving cooperation, and in particular investigating whether the framework for reaching a common opinion on crisis resolution can be implemented, seem to be the most important elements authorities should focus on. In addition, authorities wishing to negotiate a burden-sharing agreement should realise that the present European environment can only support an agreement on a burden-sharing principle. This will be the case as long as there is no framework guaranteeing that the optimal resolution policy can be externally enforced.

### 3.2 Transparency in banking

In recent years, there has been an increased emphasis on bank transparency through a new regulatory framework and new accounting rules. These initiatives have been motivated by the growing complexity of the financial system, which has increased banks' opacity. During recent months, the subprime mortgage crisis has brought to the forefront the issue of disclosure in banking. While the difficulty of valuing complex instruments in a volatile

environment characterised by low levels of liquidity raises a problem of transparency in itself, some banks were also criticised for not being transparent enough about their subprime-related exposures and for the speed with which they disclosed writedowns and losses following the eruption of the crisis. As a result, it may be necessary to strengthen bank disclosure requirements concerning valuation techniques or accounting practices.

This article discusses various issues involved with the concept of bank transparency. After reviewing the implications of bank transparency for financial stability, it summarises two recent regulatory standards which have had an impact on disclosure by banks: Pillar 3 of the Basel II framework and the International Financial Reporting Standards. This article also examines the recent credit turmoil in the light of the arguments relating to transparency. More specifically, it discusses how heterogeneous levels of disclosure across banks may have impacted on the turmoil. Finally, the article outlines some recent suggestions for improvements in regulation and market practices.

### 3.3 Agency problems in structured finance – a closer look at European CLOs

The current turmoil in the credit markets has led to a debate about the desirability of securitisation and the viability of the “originate and distribute model” of banking. The crisis originated with problems involving securitisation of US subprime mortgages, but quickly spread to the global financial system due to the widespread use of off-balance-sheet vehicles, which raised the concern among market observers that the securitisation process was itself fundamentally flawed, and that there were adverse incentives for participants along the various links of the chain. This suggests that imprudent behaviour may also have occurred in the securitisation of other asset classes, such as leveraged loans.

This article focuses on leveraged loan securitisation, and specifically on possible incentive problems in the management of Collateralised Loan Obligations (CLOs). CLOs are the most important type of special purpose vehicles in the leveraged loan market, and their managers appear to have a considerable impact on performance. This article analyses the potential incentive, or agency, problems facing CLO managers, and the mechanisms that have been put in place to mitigate these problems.

The article shows that agency problems do matter in CLO management, and highlights the different dimensions in which those problems may occur. It also describes the

various constraints that have been put in place to address the major issues of agency problems, and argues that they are fairly effective. However, the analysis reveals some gaps which may allow managers to engage in certain adverse strategies. Specifically, the article raises concerns about the reliability of constraints on overall portfolio risk, the so-called portfolio tests, and about the effectiveness of reputation as a disciplining device. Both concerns are related to the benign market conditions until the summer of 2007 which – at least until now – prevented, any “stress-testing” of CLOs and differentiation between managers.

The observation of the article that market participants most often recognise relevant conflicts of interest themselves and seek to establish measures to alleviate them suggests a fruitful avenue for future assessment of securitisation markets. Each participant could be required to disclose the conflicts of interest that affect them and the measures they have taken to address these conflicts. This self assessment could be useful for improving the functioning of securitisation markets and of market discipline.

### 3.4 Measuring default risk in the trading book

Regulators have recently proposed a new capital requirement for default risk in the trading book that will be incremental to the 1996 capital requirement for market risk. The decision was motivated by concern about increasing levels of default risk in banks’ trading books, the desire to guide the development of more adequate tools that can capture default risk in that book, as well as to minimise any distortion in banks’ incentives from differences in the regulatory treatment of similar types of risk in the banking and trading book.

This article starts with a description of the present regulatory treatment of market risk and of the new regulatory proposals to include a capital requirement for default risk. An important aspect of these proposals is that capital standards for default risk depend on the liquidity of the markets for trading default-risky securities. Second, the article discusses how standard models of default risk, which typically do not account for the active management of exposures in the trading book, can be adjusted to take account of the specific character of the trading book. Third, using simulations, the article illustrates the potential effect of liquidity on capital requirements for default risk in the trading book and compares this with the effect of a change in credit quality.

The new trading book rules for a default capital charge aim to strengthen banks' resilience to losses. Experience during the recent crisis, however, suggests that even if the new trading book rules for default risk had already been implemented, it is likely that they would not have covered some of the trading book losses. This suggests that it is worth devoting further attention to adequately measuring the different types of risk in trading books, including the types of risk that have led to current losses, such as rating migration risk. Indeed, the Basel Committee is currently analysing how to extend the scope of the existing proposed rules for default risk to include other potential risks in the trading book.

# Financial Stability Overview

## 1. Banking sector

Several years of low financial market volatility, narrow credit and liquidity risk premiums, and generally favourable market conditions for financial institutions came to an abrupt end in the summer of 2007, when higher than expected delinquencies on recent vintages of subprime mortgage loans in the US caused unprecedented havoc in credit and money markets worldwide.<sup>(1)</sup>

As two thirds of the US subprime mortgage loans had been funded in the global capital market through the issuance of tradeable securities, exposures to this asset class were spread throughout the global financial system, generating losses at financial institutions in the US, Europe and other parts of the world. The degree of exposure varied significantly between individual financial institutions however. In a limited number of European and US banks, very large exposures resulted in heavy writedowns and losses that had to be compensated for by injections of new equity to shore up solvency. Many of the writedowns involved tranches of subprime RMBS and ABS CDOs that had carried the highest possible ratings before the onset of the crisis. Together with comparatively more moderate amounts of value adjustments on other financial assets such as leveraged loans, CMBS or other US mortgage-backed securities, global financial sector writedowns since the summer of 2007 thus soared to more than 300 billion US dollar at the end of April, the bulk of which were recorded by banks (including investment banks) in the US and Europe.

However, as evidenced by the unprecedented and long-lasting tensions in credit and money markets worldwide, the significance of the higher than expected delinquencies in a high-risk subsegment of the US mortgage market went well beyond the adverse impact on financial institutions and investors with exposure to subprime-backed

assets. Among the various factors that can be highlighted to explain this contagion, one of the more fundamental appears to be that the subprime credit crisis revealed a number of substantial – but not necessarily irremediable – flaws in the “originate and distribute” credit intermediation model, through which increasing amounts of newly originated debt had been redistributed to final investors since 2000.

One of the deficiencies revealed related to the incomplete mitigation and management of some agency problems and incentive misalignments between various participants in this fragmented and market-oriented business model for intermediating credit between savers and borrowers, which had contributed to an excessive weakening of credit standards in the origination of subprime mortgage loans in the US.

The second lesson pertained to the vulnerability of a financial system that relied very heavily on the expert opinion of rating agencies for the distribution and subsequent pricing of newly securitised loans. Many investors had overlooked the inherent limited scope of debt ratings (focused only on credit risk) and the previously well-flagged – but apparently less well appreciated – specific features and risks of ratings of structured finance instruments, such as their high sensitivity to assumptions about default correlations in the underlying pool of loans.

Yet the weakness in the “originate and distribute” system that arguably contributed the most to the severe dislocations in broader credit and funding markets was the fact that a substantial share of the investments in highly-rated tranches of securitised and structured finance instruments

(1) A more extensive discussion of the causes and features of the subprime-related credit and liquidity shocks affecting the global financial system in the second half of 2007 can *inter alia* be found in the National Bank of Belgium's 2007 Annual Report (Chapter 8, pp. 159-168).



were financed with large amounts of short-term debt through ABCP conduits, SIVs or hedge funds. The backstopping and unwinding of investment positions in these vehicles has arguably been one of the major causes of stress in financial markets in the past 10 months. While the liquidity shocks in the ABCP conduits and SIVs were quickly transmitted to the banking system (through backstop liquidity lines), the emergence of an overhang of highly-rated debt securities in many markets undermined the secondary market liquidity for these securities and depressed their prices to levels well below what would appear to be a fair price on the basis of the underlying cash flows. Due to drawings on their committed credit lines or other forms of support for off-balance-sheet investment vehicles, some banks had to cope with an unexpected expansion of their balance sheet. This laid claim on their liquidity and capital reserves, at a time when the seizure of primary securitisation markets prevented them from loading off loans in the capital markets.

Although the risk of a disorderly deleveraging process appears to have subsided with the Bear Stearns rescue operation in the middle of March 2008, and expected losses on exposures to subprime-related assets are now probably largely provisioned for in the global financial system (after three quarters of writedowns), the operating environment for financial institutions is likely to remain challenging in the quarters ahead. Against the backdrop of a major economic slowdown in the US and concerns over economic growth in other regions of the world, it is indeed likely that the global financial system will now have to cope with a more classical downturn in the credit cycle. This one could however be more severe and protracted given the size of the shock that was imparted to major intermediaries in the financial system and the substantial ongoing or potential adjustments in several national real estate markets.

**TABLE 1** KEY INDICATORS FOR THE THREE MAIN *BANCASSURANCE* GROUPS<sup>(1)</sup>  
(consolidated data, billion euro, unless otherwise stated)

	Fortis Group	KBC Group	Dexia Group
Total assets			
End 2006 .....	775.2	325.4	566.7
End 2007 .....	871.2	355.6	604.6
End March 2008 .....	927.8	358.2	613.7
Net annual profit			
2006 .....	4.35	3.43	2.75
2007 .....	3.99	3.28	2.53
Net quarterly profit			
First quarter 2007 .....	1.17	1.00	0.72
First quarter 2008 .....	0.81	0.55	0.29
Return on equity (p.c.)			
2001 .....	17.9	13.2	18.7
2002 .....	4.3	12.7	16.2
2003 .....	19.3	12.7	16.5
2004 .....	25.6	17.9	19.8
2005 .....	23.0	17.6	20.0
2006 .....	22.0	24	23.1
2007 .....	17.1	21	17.8
Risk asset ratio (banking) (p.c.) <sup>(2)</sup>			
End 2006 .....	11.1	11.1	10.3
End 2007 .....	10.1	12.2 <sup>(3)</sup>	9.6
End March 2008 .....	11.0 <sup>(3)</sup>	12.0 <sup>(3)</sup>	12.1 <sup>(3)</sup>

Sources: Annual and quarterly accounts of Fortis Group, Dexia Group and KBC Group.

(1) Consolidated data at group level, as published in the groups' annual and quarterly accounts.

(2) As a percent of risk-weighted assets.

(3) As calculated according to Basel II.

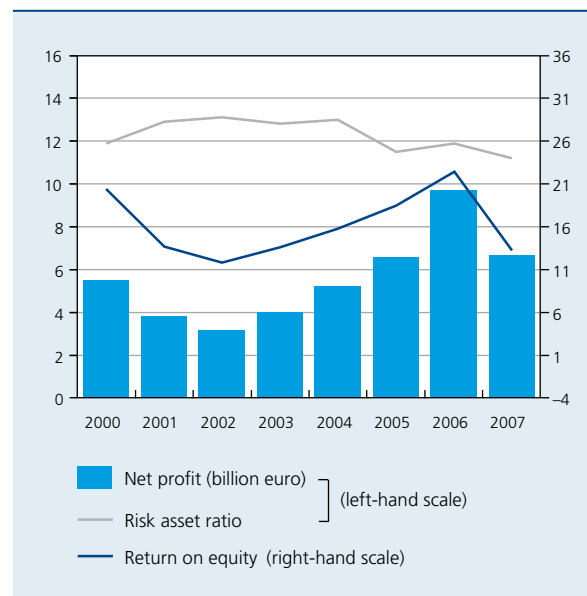
The analysis in this Overview focuses on the financial position of the Belgian banks and insurance companies as at the end of 2007 and tries to map the main risk exposures that are relevant for appreciating the institutions' resilience to – what appears to be – a forthcoming period of much less favourable operating conditions than has been experienced in recent years. This analysis of the resilience and risk exposures of the Belgian financial institutions is mainly based on the data that banks and insurance companies in Belgium reported to the Banking, Finance and Insurance Commission (CBFA) for the end of 2007, according to standardised supervisory reporting schemes. Table 1 provides for reference an overview of some key indicators for three main *bancassurance* groups in the Belgian financial system at group level, based on their published annual accounts.<sup>(1)</sup> An update is also given in this table for the quarterly net profit and for the risk asset ratio for the first quarter of 2008, on the basis of the results published by the *bancassurance* groups as this Overview went to press. These first quarter results showed a lower level of net profits – as compared to the levels recorded in the equivalent period of 2007 –, weighed down by additional material value adjustments on US mortgage-related assets and by other fair value losses on financial instruments. The latter were mainly caused by the significant repricing of a whole range of financial instruments that took place during this period, in the context of a generalised deleveraging within the global financial system.

### 1.1 Profitability and solvency

The ability to generate profits and a good level of solvency are banks' two main buffers against unexpected adverse developments in their operating environment. Chart 1 shows that Belgian banks' profitability and solvency ratios deteriorated somewhat in the second half of 2007. Their overall financial position remained strong, nevertheless, with a risk asset ratio of 11.2 p.c. at the end of 2007 and a net bottom-line profit of 6.7 billion euro. While this net profit is lower than the exceptional

**CHART 1** PROFITABILITY AND SOLVENCY

(consolidated data, percentages, unless otherwise stated)



Sources: CBFA, NBB.

level of 9.7 billion euro recorded one year earlier, it compares favourably with the average 5.9 billion euro for the years 2004-2005.

Table 2 shows the main aggregates of the Belgian banking sector's income statement. It reveals that the 3 billion euro decline in net profit between 2006 and 2007 mainly resulted from two developments. The first element is the 2.5 billion increase in the level of impairment losses on financial assets. This mainly reflects the writedowns by one particular financial institution of its investments in subprime-related ABS CDOs.

The second development relates to a sharp decline in the item "other non-interest income" which in turn results from a 1.6 billion euro fall in "net gains on the derecognition of assets other than held for sale". The movement in this income source may be influenced significantly by one-off transactions that do not reflect underlying changes in non-interest income. In order to filter out the impact of this volatile income component, the Table thus also shows the adjusted non-interest income and total operating income. Compared with the headline decline of 1.1 p.c. in total operating income, this underlying income aggregate shows a 4.9 p.c. increase in 2007. As operating expenses grew by 8.4 p.c., the underlying cost/income ratio deteriorated from 60.1 p.c. in 2006 to 62.1 p.c. in 2007. Reasons for the strong rise in expenses were investments in growth businesses, including the further commercial

(1) As discussed in more detail in FSR 2005 (pp. 55-57), the supervision of the main *bancassurance* groups is conducted at three levels, namely sectoral supervision of banking and other financial subsidiaries, sectoral supervision of insurance companies, and supplementary supervision at holding company level. The above-mentioned standardised reporting schemes are related to the sectoral (and separate) supervision of the groups' insurance companies and banking subsidiaries for which the CBFA carries first-line supervision responsibility, on account of the legal structure of the group and/or the home-host supervisory arrangements concluded for the sectoral and supplementary group supervision. As a consequence, these reporting schemes do not include data on all the groups' subsidiaries. In the case of the Dexia group, for example, the prudential sector aggregates for the Belgian banking sector cover only the activities of Dexia Bank Belgium (and its subsidiaries), leaving out the operations conducted by the group's subsidiaries in the US (Financial Security Assurance), France (Dexia Cr dit Local), Luxembourg (Dexia BIL) and Turkey (Denizbank). The information collected by the CBFA for the supplementary supervision at holding company level – on the basis of non-standardised group-specific reporting frameworks – naturally covers all the groups' subsidiaries.

**TABLE 2** MAIN AGGREGATES OF THE BELGIAN BANKING SECTOR'S INCOME STATEMENT  
(consolidated data)

	Billion euro		Percentages of operating income
	2006	2007	
<b>Net interest income</b> .....	<b>12.76</b>	<b>13.30</b>	<b>50.5</b>
Interest income from assets			
"Held for trading" and "Hedging derivatives" .....	97.02	139.14	
Interest expenses on liabilities			
"Held for trading" and "Hedging derivatives" .....	-95.42	-137.09	
Other interest income .....	51.12	63.06	
Other interest expenses .....	-39.95	-51.81	
<b>Non-interest income</b> .....	<b>13.86</b>	<b>13.01</b>	<b>49.5</b>
<i>Excluding gains and losses on derecognition of assets other than held for sale</i> .....	<i>11.92</i>	<i>12.61</i>	
Net fee and commission income (excluding commissions paid to bank agents) .....	6.67	7.35	27.9
(Un)realised gains or losses on financial instruments <sup>(1)</sup> .....	3.90	3.76	14.3
Other non-interest income .....	3.29	1.91	7.2
<b>Total operating income (bank product)</b> .....	<b>26.62</b>	<b>26.31</b>	<b>100.0</b>
<i>Excluding gains and losses on derecognition of assets other than held for sale</i> .....	<i>24.70</i>	<i>25.91</i>	
<b>Total operating expenses</b> .....	<b>-14.84</b>	<b>-16.08</b>	<b>61.1<sup>(2)</sup></b>
Staff expenses (including commissions paid to bank agents) ...	-9.03	-9.15	34.8
General and administrative expenses (including depreciation) ..	-5.81	-6.93	26.3
<b>Total impairments and provisions</b> .....	<b>-0.43</b>	<b>-3.18</b>	
Impairment losses on financial assets not measured at fair value through profit and loss .....	-0.37	-2.89	
Other impairments .....	-0.01	-0.02	
Provisions .....	-0.05	-0.28	
<b>Share of profit or loss of associates and joint ventures accounted through the equity method</b> .....	<b>0.48</b>	<b>0.63</b>	
<b>Net operating income</b> .....	<b>11.82</b>	<b>7.71</b>	
<b>p.m. Net profit or loss (bottom-line result)<sup>(3)</sup></b> .....	<b>9.67</b>	<b>6.66</b>	

Sources: CBFA, NBB.

(1) This item includes the net realised gains (losses) on financial assets and liabilities not measured at fair value through profit or loss, the net gains (losses) on financial assets and liabilities held for trading and designated at fair value through profit or loss, and the net gains (losses) from hedge accounting.

(2) This figure is the cost/income ratio of the Belgian banking sector.

(3) The amounts of exceptional results, taxes and minority interests, which are items explaining the difference between net operating income and the net bottom-line result, are not broken down in this table, but can be found in Table 10 of the Statistical Annex.

development of branch networks and activities in Central European countries and Turkey.

With shares of respectively 50.5 p.c. and 27.9 p.c., the main components of operating income are net interest income and net fee and commission income. The rest consists mainly of net (un)realised gains or losses on financial

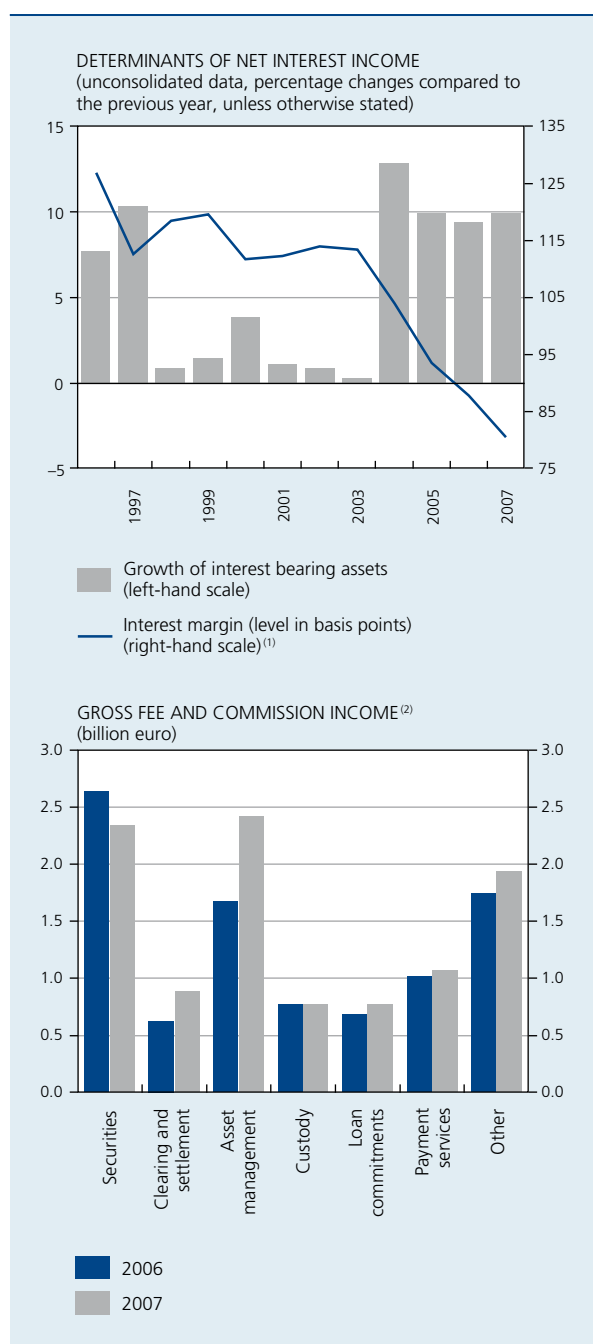
instruments, whose share remained stable at around 14 p.c. in 2007.

Net interest income expanded 4.2 p.c. in 2007, underpinned by strong growth of deposit and loan volumes. This growth was reportedly particularly pronounced in the retail markets in Central Europe and Turkey and

in the activities catering for large corporate and institutional clients. Yet, the data on an unconsolidated basis suggest that this strong volume effect was offset to some extent by a further decline in the average margin earned on these interest bearing assets and liabilities through

maturity transformation and/or commercial margins, continuing a trend of recent years (Chart 2, upper panel). A flat yield curve, a shift in the retail deposit base from savings deposits to comparatively more expensive term deposits, and higher funding costs in the interbank market appear to account for the further decline in the interest margin on an unconsolidated basis. These opposing developments in the price and volume determinants – which are partially linked to the strong volume growth in low-margin business activities, such as (reverse) repurchase agreements –, appear to have compensated each other to a large extent in the period 2004-2007, as the overall growth of net interest income over this period was quite weak.

**CHART 2** MAIN DETERMINANTS OF OPERATING INCOME



Sources: CBFA, NBB.

(1) The interest margin corresponds to the difference between the average implicit interest rate received and paid respectively on banks' average stock of interest bearing assets and liabilities. The averages are calculated over a one-year period.

(2) Including the fee and commission income of Euroclear Bank, which is an important part of the sector total in the areas of custody and clearing and settlement.

Belgian banks nonetheless continue to obtain a large part of their earnings from net interest income, which has traditionally been a comparatively more stable source of income than net fees and commissions or capital gains on financial instruments. The latter are more sensitive to unfavourable price or volume developments in global capital markets, as was demonstrated for example by the 15 p.c. reduction in Belgian banks' net fee and commission income between 2000 and 2003, when sharp falls on global equity markets, high corporate bond default rates and weak demand for external funding by corporations weighed on capital market-related income sources.

With growth of 10.2 p.c. in 2007, the net fees and commissions earned by the Belgian banking sector have so far continued to show buoyant growth, lifting their share in total operating income to 27.9 p.c. (up from 25.1 p.c. in 2006). Gross fee income increased by 11.4 p.c., mainly reflecting a surge in the revenues from asset management services, where gross income expanded from 1.67 billion euro to 2.42 billion euro thanks to an increase in funds under management as a result of net new inflows, in spite of less favourable market conditions in the second half of 2007 (Chart 2, lower panel). Clearing and settlement activities made the second largest contribution to the growth in gross fee and commission income. This strong growth may be related to the large volumes that were traded on financial markets during several periods of heightened stress as the credit crisis developed (see also the related article in this FSR "How Belgian payment and settlement infrastructure weathered the market turmoil in 2007 and the first quarter of 2008"). Securities activities – which constituted the largest component of gross fee income in 2006 – were the only item registering a drop in revenue. This may be partly related to reduced activities in securitisation and structured finance, as large segments of the primary markets in these securities dried up in the second half of 2007 on both sides of the Atlantic.

**TABLE 3** BREAKDOWN OF THE (UN)REALISED GAINS OR LOSSES ON FINANCIAL INSTRUMENTS IN THE INCOME STATEMENT  
(consolidated data, billion euro)

	2006	2007
(Un)realised gains or losses on financial assets and liabilities "Held for trading" <sup>(1)</sup> .....	2.23	2.15
of which:		
Equity instruments and related derivatives .....	1.12	0.76
Interest rate instruments and related derivatives .....	0.48	-0.92
Foreign exchange trading .....	-0.07	0.07
Credit risk instruments and related derivatives .....	0.80	1.83
Commodities and related derivatives .....	0.03	0.47
Other .....	-0.14	-0.06
(Un)realised capital gains on other financial assets and liabilities .....	1.67	1.61
of which:		
(Un)realised gains or losses on financial assets designated at fair value through profit and loss .....	0.05	0.23
Realised gains or losses on financial assets not measured at fair value through profit and loss .....	1.35	1.15
Gains or losses from hedge accounting .....	0.27	0.23
<b>Total</b> .....	<b>3.90</b>	<b>3.76</b>
<b><i>p.m. As a percentage of total operating income</i></b> .....	<b>14.6</b>	<b>14.3</b>

Sources: CBFA, NBB.

(1) The trading results exclude the interest income and expense flows related to the assets and liabilities "Held for trading", as these are booked in net interest income.

All in all, the data in Chart 2 suggest that fees and commissions are generated by a diverse range of activities, which should help to limit their overall cyclicality in the context of a potential transition to less favourable market conditions for asset management and fee-generating capital market activities.

As was shown in Table 2, the share of (un)realised gains or losses on financial instruments in the aggregate income statement of Belgian banks remained stable at around 14 p.c. in 2007, even if the absolute amount of this item declined somewhat. This income item is potentially vulnerable to unfavourable developments on capital markets. The composition of these gains and losses on financial instruments is, however, quite diversified and stems from different sources (Table 3).

Of all the capital gains recorded in the income statement in 2007, 57.2 p.c. were related to net (un)realised capital gains on financial instruments held in the IAS/IFRS accounting portfolio "Held for trading". These assets and liabilities accounted for respectively 16 and 12 p.c. of total assets and liabilities at the end of last year. They are booked on the balance sheet at their fair value, and changes in this fair value are recorded in the income

statement. They include capital gains realised through market-making or proprietary trading, but also cover the marked-to-market changes in the fair value of derivatives used for hedging that are not explicitly recognised as "Hedging derivatives" under IAS/IFRS (which impose strict conditions in this regard). The breakdown of the (un)realised capital gains on assets and liabilities "Held for trading" according to the type of financial instrument or derivative in Table 3 confirms that these elements can be very volatile from one year to the other, in part related to financial market price developments affecting the net gain or loss on short and long positions.

The (un)realised capital gains on financial instruments that are not "Held for trading" made up the remaining 42.8 p.c. of the capital gains recorded in the income statement in 2007, which is quite low if consideration is taken of the large amount of financial instruments that is booked outside "Held for trading". This low figure partly reflects the fact that Belgian banks do not hold a large amount of assets and liabilities in the IAS/IFRS accounting portfolio "Designated at fair value through profit and loss". It is also the result of banks having realised relatively few net capital gains (1.15 billion euro) on their large stocks of financial assets and liabilities that are not measured at fair

value through profit and loss. On the assets' side, one main component of this group is the "Available-for-sale" (AFS) portfolio, which generated the bulk of the realised gains and losses in 2007. While gains were realised on the sale of non-strategic shareholdings, changes in the composition of the AFS portfolio suggest that banks also sold a large amount of government bonds in the course of last year, as the outstanding total of AFS securities – of which 96 p.c. is composed of debt securities – declined from 238.8 billion euro at the end of 2006 to 215.8 billion euro at the end of 2007. The share of government debt instruments within the total AFS debt portfolio declined from 57 p.c. at the end of 2006 to 47 p.c.

Unrealised changes in the fair value of AFS assets are not recorded in the income statement but are directly recognised in banks' accounting equity, unless these changes in fair value are considered to be permanent, in which case they are recognised as an impairment in the profit and loss account. At the end of 2007, these unrealised capital gains or losses incorporated in accounting own funds had dropped to a net amount of –0.6 billion euro (or 0.3 p.c. of the fair value of outstanding AFS assets), versus a positive net unrealised gain of 2.8 billion euro (1.2 p.c.) at the end of 2006. As changes in unrealised gains and losses on AFS bonds are not taken into account for the calculation of regulatory capital – following the application of the prudential filters –, these net marked-to-market losses on predominantly fixed-income securities did not affect the regulatory solvency ratios. It may be noted as well that some of these negative revaluations of securities may ultimately be reversed, if mark-to-market accounting had to be applied in the presence of illiquid secondary markets during the period under review, in the

context of widespread deleveraging. This may have led to some extent to the recognition of market price-based fair values of AFS debt securities that may deviate significantly from the fundamental value of these securities in a buy-and-hold perspective.

The above-mentioned net decline of 3.4 billion euro in the AFS revaluation reserve (in accounting equity) between the end of 2006 and 2007 occurred in spite of the booking of a 2.5 billion euro impairment on AFS assets (Table 4). These AFS impairments are recognised directly in the profit and loss account and substitute for – or reverse earlier – fair value adjustments in the AFS revaluation reserve. The impairment of AFS assets in 2007 in the Belgian banking sector resulted mainly from the write-down by one of the major *bancassurance* groups of the value of its investments in subprime-related ABS CDOs, on the basis of an assessment of the expected losses on the highly-rated tranches of these structured finance instruments. At the end of 2007, 2.2 p.c. of the sector's AFS debt securities were considered to be impaired, and the coverage ratio for these assets amounted to 55 p.c.

Disregarding this net impairment of 2.5 billion euro for AFS debt securities, there was virtually no change in 2007, relative to 2006, in the level of impairments that had to be recognised in the profit and loss account – in gross or net terms, with the latter taking account of reversals of earlier credit loss provisions. On the financial assets included in the IAS/IFRS accounting category "Loans and receivables", which represent 59 p.c. of total assets and account for 93 p.c. of the banks' total loan portfolio, the flow of new impairments for credit losses remained close to the historically low level registered in 2006. The related

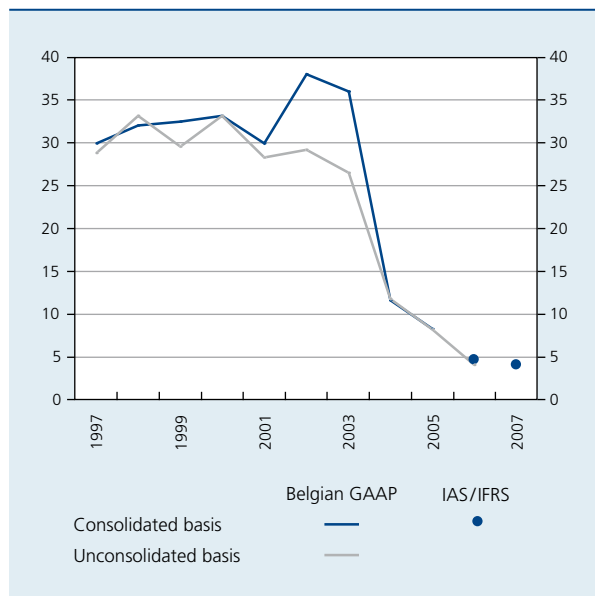
**TABLE 4** IMPAIRMENTS OF FINANCIAL ASSETS RECOGNISED IN THE PROFIT AND LOSS ACCOUNT  
(consolidated data, billion euro)

	Gross additions of impairments		Net impairments (including reversals)	
	2006	2007	2006	2007
Available-for-sale financial assets	0.02	2.51	0.00	2.50
Loans and receivables	2.04	2.04	0.37	0.38
Other financial assets not measured at fair value through profit and loss	0.00	0.00	0.00	0.00
Other impairments <sup>(1)</sup>	0.04	0.04	0.00	0.02
<b>Total</b>	<b>2.10</b>	<b>4.60</b>	<b>0.37</b>	<b>2.89</b>

Sources: CBFA, NBB.

(1) This item covers *inter alia* impairments for property, plant and equipment, for investment properties, for goodwill and other intangible assets, and for investments in associates and joint ventures accounted for using the equity method.

**CHART 3** LOAN LOSS RATIO<sup>(1)</sup>  
(basis points)



Sources : CBFA, NBB.

(1) The loan loss ratio is the net flow of new impairments for credit losses, expressed as a percentage of the stock of total loans (one basis point is one hundredth of one percent). The 2006 and 2007 figures relate to the loan loss ratio for the IAS/IFRS category "Loans and receivables".

concept of the loan loss ratio – which measures the net flow of new impairments for credit losses as a percentage of the stock of total loans –, thus also remained well below what would be considered an average level for a full credit cycle (Chart 3). However, as the credit cycle in

many asset markets is likely to turn in the course of 2008, it seems probable that banks will have to recognise more credit losses in their profit and loss account in the course of this year, pushing the loan loss ratio to a higher level.

## 1.2 Credit risk exposures

Credit risk can be defined in the widest sense as the risk of losses due to a counterparty's default or to changes in its creditworthiness (rating migration). In many of their commercial and financial activities – including derivative transactions, off-balance-sheet credit commitments and guarantees –, banks take on current or potential future exposures on counterparties, albeit to different degrees and with varying levels of associated credit risk. This section will review the two principal sources of credit risk exposures (in gross terms) in the Belgian banking system, namely the large volume of bank loans and the extensive fixed-income security portfolio. A last sub-section will discuss some issues related to the heightened perception of counterparty risk within the financial system.

### 1.2.1 Overall loan portfolio

The total loan portfolio of Belgian banks – which includes a very limited amount of loans and advances that come under the IAS/IFRS accounting category "Held for trading" – rose by 12.6 p.c. in 2007, resulting in an amount outstanding of 987 billion euro at the end of the year (Table 5). Its share of total assets remained stable at 62 p.c., meaning that loans grew in line with the total balance sheet of the sector (1578.4 billion euro).

**TABLE 5** BREAKDOWN OF TOTAL LOAN EXPOSURES<sup>(1)</sup>  
(consolidated data)

	Billion euro		Percentages of the total	Breakdown by residency of the counterparty (percentages of the total)		
	2006	2007		Belgium	Euro area	Rest of the world
Credit institutions .....	285.7	320.8	32.5	1.5	15.9	15.2
Corporate .....	260.9	313.5	31.8	9.8	8.7	13.3
Retail .....	260.1	276.2	28.0	15.3	10.5	2.1
Central governments .....	11.4	16.4	1.7	1.0	0.2	0.5
Non-credit institutions <sup>(2)</sup> .....	58.6	60.1	6.1	3.1	0.8	2.2
<b>Total</b> .....	<b>876.7</b>	<b>987.0</b>	<b>100.0</b>	<b>30.6</b>	<b>36.1</b>	<b>33.3</b>

Sources : CBFA, NBB.

(1) The total includes the small amount of loans and advances (39.1 billion euro) that are classified under "Held for trading".

(2) The counterparty "Non-credit institutions" covers *inter alia* loans to financial institutions other than banks and to local government authorities.

The largest contribution to the growth of total loans came from loans to corporates (growth of 20 p.c.) and loans to credit institutions (12 p.c.). In terms of amounts outstanding, these two counterparties each accounted for roughly one third of total loans and advances at the end of last year. The growth of loans to the third largest counterparty, namely retail clients, was limited to 6 p.c. and its share in total loans declined to 28 p.c. from 30 p.c. at the end of 2006. The share of central governments is low, reflecting the high exposure to this counterparty in the form of debt securities (see section 1.2.2).

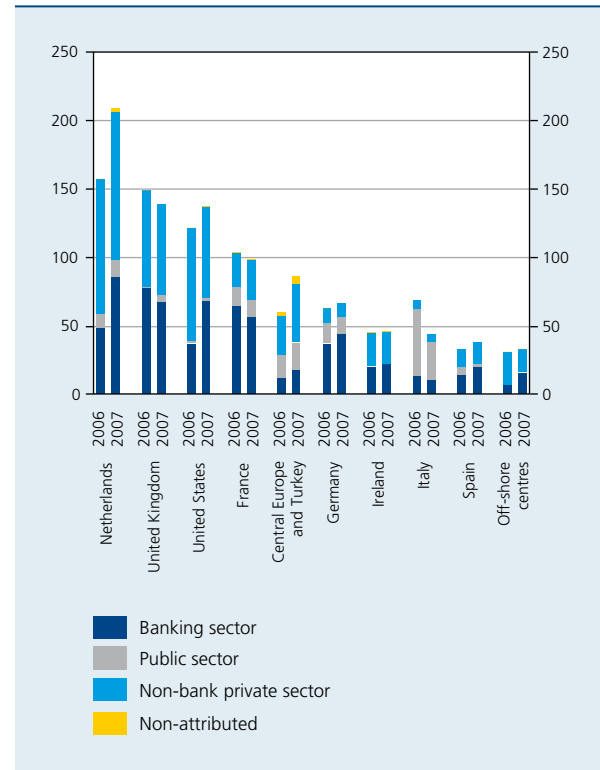
Non-performing loan ratios for corporate (1.9 p.c.) and retail clients (2.0 p.c.) declined slightly between the end of 2006 and 2007 and drove the overall non-performing loan ratio down from 1.4 p.c. to 1.2 p.c. These measures of credit risk are however essentially backward-looking, and may be flattered in periods of strong loan growth, due to the usual seasoning effect in the materialisation of credit risk. More forward-looking measures of probabilities of default, such as those collected from the four main Belgian banks in 2007 in the context of bottom-up stress tests for credit risk, confirm nonetheless a continuing high concentration of loan exposures in the rating classes with a low risk of default.

The geographical breakdown of the total loan portfolio in Table 5 shows that residents of Belgium, other euro area countries and the rest of the world each account for about one third of Belgian banks' loans. If one looks at the geographical division of the loans for the three main types of counterparties individually, this distribution is more skewed. The loans with the highest degree of internationalisation are those granted to credit institutions, and they make a major contribution to the high share of non-resident counterparties in the total loan exposure. Loans to the retail sector are the least internationalised. Yet, even here, the share of Belgian residents is not much higher than 50 p.c., as households from other euro area countries and the rest of the world make up respectively 37.5 p.c. and 7.5 p.c. of total retail loans. A significant amount of the corporate loans – which cover claims on financial and non-financial corporations – is granted to companies from outside the euro area.

Chart 4 provides some more information on the foreign exposures of Belgian banks, broken down on an individual country or group basis, and according to the type of counterparty. However, it should be noted that the foreign claims shown in this chart are broader than the loan exposures shown in Table 5 as they cover exposures through both loans and debt securities.

**CHART 4** BREAKDOWN OF BELGIAN BANKS' MAIN FOREIGN EXPOSURES, ACCORDING TO COUNTERPARTY

(billion euro)



Sources: CBFA, NBB.

The Netherlands have further reinforced their position as the largest geographical market for Belgian credit institutions in 2007, and this figure will further increase when the part of ABN AMRO (Business Unit Netherlands and Asset Management) taken over by Fortis is consolidated in these data. Claims on the Dutch non-bank private sector amounted to 108 billion euro at the end of last year.

The Belgian banks also record large claims on the non-bank private sector in the UK and the US, which are the second and third biggest geographic markets. Within the exposure to residents of the US, however, there was a shift in composition towards exposures to banks, at the expense of exposures to the US non-bank private sector.

The list of five largest foreign exposures is completed by France and by the group of Central European countries and Turkey.<sup>(1)</sup> The Belgian banking sector's foreign claims on Emerging Europe actually represent 10 p.c. of the total foreign claims of banks on this group of countries. Other

(1) Note that the exposure shown in Chart 4 does not include the Turkish subsidiary of Dexia group, which has a balance sheet total of around 11 billion euro.



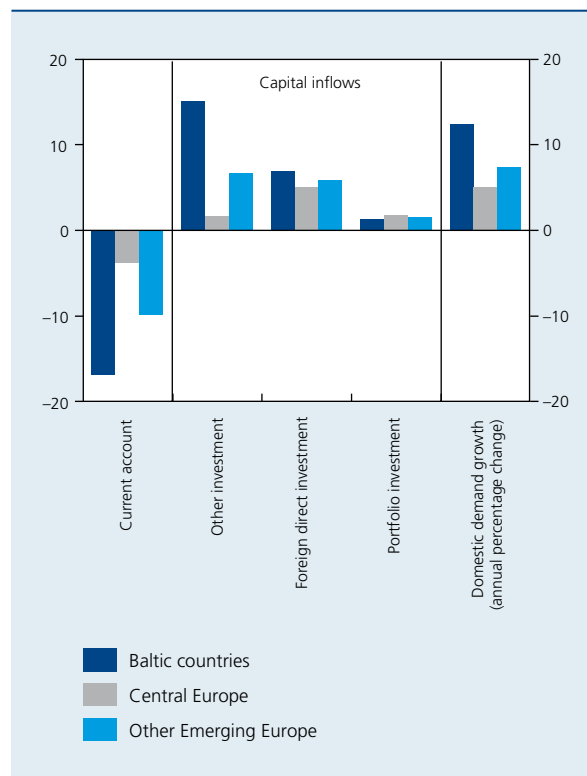
important claims on Emerging Europe can be found in the banking systems of Austria, Italy, Germany and France, accounting respectively for 23, 16, 13 and 11 p.c. of the total foreign claims on this region. Box 1 discusses the potential vulnerability of the Belgian financial system to financial stability risks in Emerging Europe.

The remaining foreign claims of the Belgian banking sector are spread between Germany, Italy, off-shore centres and two economies of the euro area where growth has been fast in recent years, but where signs of a housing market adjustment have already become evident (Ireland and Spain).

## Box 1 – How vulnerable is the Belgian financial system to financial stability risks in Emerging Europe ?

Current account deficits have been rising in many countries in Emerging Europe (EE) to levels that look high in a historical or global perspective (Chart 1).<sup>(1)</sup> Latvia, Bulgaria, Estonia, Lithuania, Romania and Serbia all have current account deficits in double digits in relation to GDP. Such high current account deficits are unusual and have often heralded financial turmoil and even crisis. In the region, they represent mainly private sector saving-investment imbalances and have been largely financed by foreign direct investment and bank lending (Other investment). In this context, the ongoing global repricing of risk represents a potential source of shock to these economies.

**CHART 1** EXTERNAL BALANCES AND DOMESTIC DEMAND GROWTH IN EMERGING EUROPE<sup>(1)</sup>  
(percentages of GDP, unless otherwise stated)



Source: IMF.

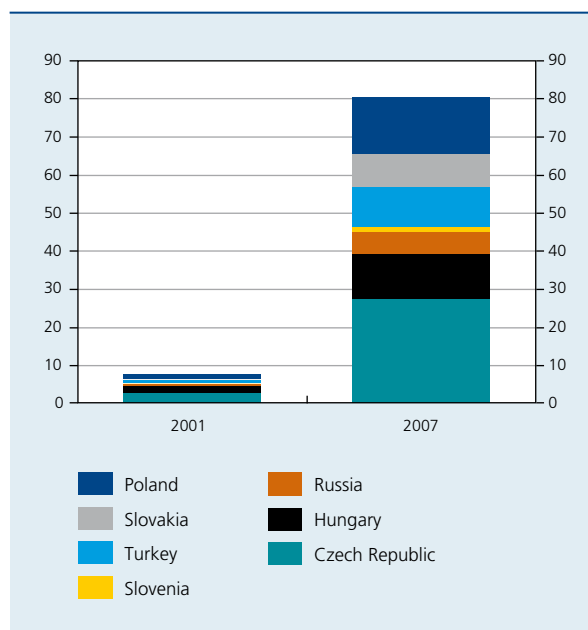
(1) 2007 data for current account balances, 2006 data for domestic demand growth, and 2004-2006 averages for capital inflows.

(1) Emerging Europe refers here to the new Central European and Baltic EU member states, the Balkan countries, Turkey and Russia.

Meanwhile, the exposure of Belgian banks to the region has increased, with foreign claims rising to around 80 billion euro at the end of 2007, up from negligible amounts in 2001 (Chart 2). Should a larger exposure and increased local fragilities be cause for concern ?

**CHART 2** BELGIAN BANKS' MAIN EXPOSURES ON EMERGING EUROPE

(billion euro)



Sources : CBFA, NBB.

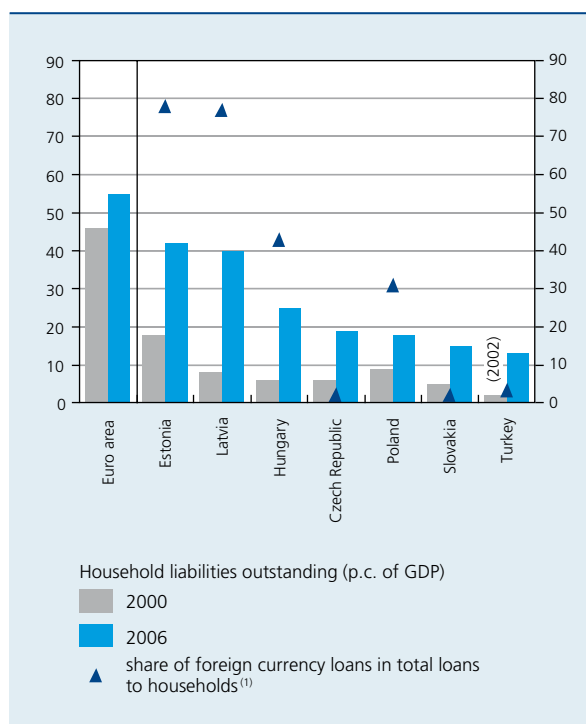
There is indeed evidence that some countries in Emerging Europe may have reached cyclical peaks. Inflation has been rising in many parts, including in the Baltic economies, South Eastern Europe, Russia and Turkey, fuelled partly by rapid growth of bank lending to the private sector and strong domestic and external demand (in Russia's case commodity-driven).<sup>(1)</sup> Private sector borrowing has been largely financed through intra-group loans from local banks' foreign parents. The share of the assets owned by foreign banks ranges from 20 p.c. in Russia to nearly 100 p.c. in Slovakia, the Czech Republic, Estonia and Lithuania. Rating agency Fitch estimates that, in contrast to the situation in other emerging market regions, gross external financial requirements in the EE countries have been rising steadily since 2000 to 250 billion euro in 2007. Turkey's reliance reflects a still relatively large externally financed public debt stock. In the new EU member states, in contrast, a substantial part of bank lending has been to the household sector in the form of consumer and mortgage loans, thus contributing to rapidly increasing property prices and rising household indebtedness (Chart 3). In some economies, hard pegs or currency boards impose constraints on the policy tools available to dampen demand pressures.

An additional and related vulnerability is the prevalence of foreign currency (indexed) lending, including to households, which are typically less hedged than corporations. Taking advantage of lower interest rates, households have been borrowing heavily, not only in euro, but also in other currencies such as the Swiss franc or

(1) Since the end of 2005, nominal credit over GDP has increased by over 30 p.c. in Latvia and Estonia and by over 20 p.c. in Bulgaria.



**CHART 3 HOUSEHOLD DEBT IN EMERGING EUROPE**  
(percentages, unless otherwise stated)



Sources : C. Rosenberg (2007), ECB and Unicredito.  
(1) Data for 2006, except for Turkey where data pertain to September 2007.

the yen, despite higher exchange rate volatility in relation to the domestic currency. Even in Hungary, which has no hard peg, the share of foreign currency loans in total loans to households amounted to around 40 p.c.

Finally, it is worth noting that rating agencies consider a number of local banking systems to be of relatively weak intrinsic quality. Fitch accords a “low” D intrinsic banking system strength to Poland, Hungary, Lithuania, Romania, Russia, Turkey, Bulgaria and Croatia.<sup>(1)</sup>

As international financing conditions tighten, the risk of foreign capital being reduced has thus increased. Common creditors may also facilitate contagion from one country to another. The Baltic countries share a few Nordic banks as major creditors, but also in Central Europe the same Austrian, Italian and Belgian banks hold a large proportion of domestic assets. Another risk scenario is that of the recent Portuguese economic credit cycle.<sup>(2)</sup> Following a marked acceleration in household consumption and large current account deficits between 1995 and 2001, Portuguese households suddenly scaled back expenditure and rebuilt balance sheets, contributing to a prolonged period of low growth. In such a scenario, banks’ profitability may suffer and buffers could be eroded.

Unsurprisingly, therefore, markets and rating agencies have become somewhat more cautious about the region’s outlook, resulting in a number of rating and outlook downgrades and, since July 2007, a more than doubling of CDS spreads in certain cases.

(1) Intrinsic banking system strength refers to the robustness of the banking sector in the absence of potential support from governments or shareholders, including foreign parents.

(2) Rosenberg C. (2008) “The Baltics – avoiding the Portuguese trap”, IMF.



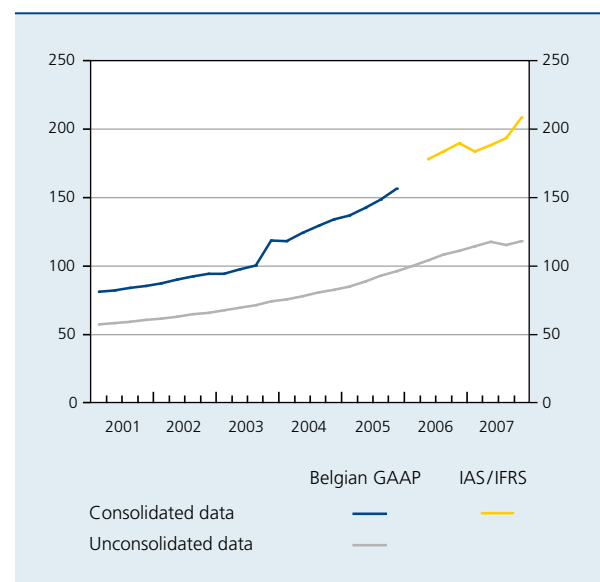
But while the risks have increased, there are a number of mitigants that reduce the risk of a “hard landing” and that moreover dampen any possible spillovers to the Belgian financial system. The “EU umbrella” and resulting increased economic and political integration suggests that perhaps parts of Emerging Europe can sustain higher current account deficits than previously thought. A low initial capital stock, strong productivity growth, access to large markets, improved governance and transparency, and political stability are all factors providing durable support for the transfer of savings and their sound allocation. On the whole, macroeconomic frameworks have fostered stability. And in countries where signs of overheating have emerged, policymakers have on many occasions intervened pre-emptively: in terms of prudential policies throughout the region (e.g. higher risk weightings for foreign currency loans); in terms of fiscal adjustments, such as in Hungary; and also by allowing more flexibility in the exchange rate, as in Hungary, Poland and Romania. The strategic presence of foreign banks has also encouraged financial integration and reduced information asymmetries, which in the past might have triggered sudden withdrawal of liquidity. Indeed, improved information flows may have contributed to increased financial market discrimination: in early 2008, five-year CDS spreads in Turkey soared to over 200 basis points, but the cost of insuring sovereign debt in Slovakia, the Czech Republic and Poland remained below 50 basis points, with some sovereign debt even being upgraded (e.g. the Czech Republic). This suggests that the risk of contagion between countries might be somewhat less than in the past. In addition, unlike in Portugal, where economic adjustments have been slow, due in part to significant nominal wage rigidities and low productivity growth, labour markets in many EE countries are considered relatively flexible. Finally, one should note that the Belgian banking sector’s exposure to the region remains small at around 5 p.c. of total banking sector assets. Moreover, it is distributed widely across this large region, with a large share situated in the Czech Republic, Slovakia and Poland, where credit growth has been more muted, leverage has remained at lower levels and risks stemming from unhedged foreign currency positions appear smaller.

### 1.2.1.1 Mortgage loans

Belgian banks’ mortgage loans continued to grow at a rapid pace in 2007, with a growth rate of 9.8 p.c. on a consolidated basis (Chart 5). The slightly lower growth on an unconsolidated basis (6.5 p.c.) highlights that credit extension in the foreign subsidiaries was more buoyant than in Belgium.

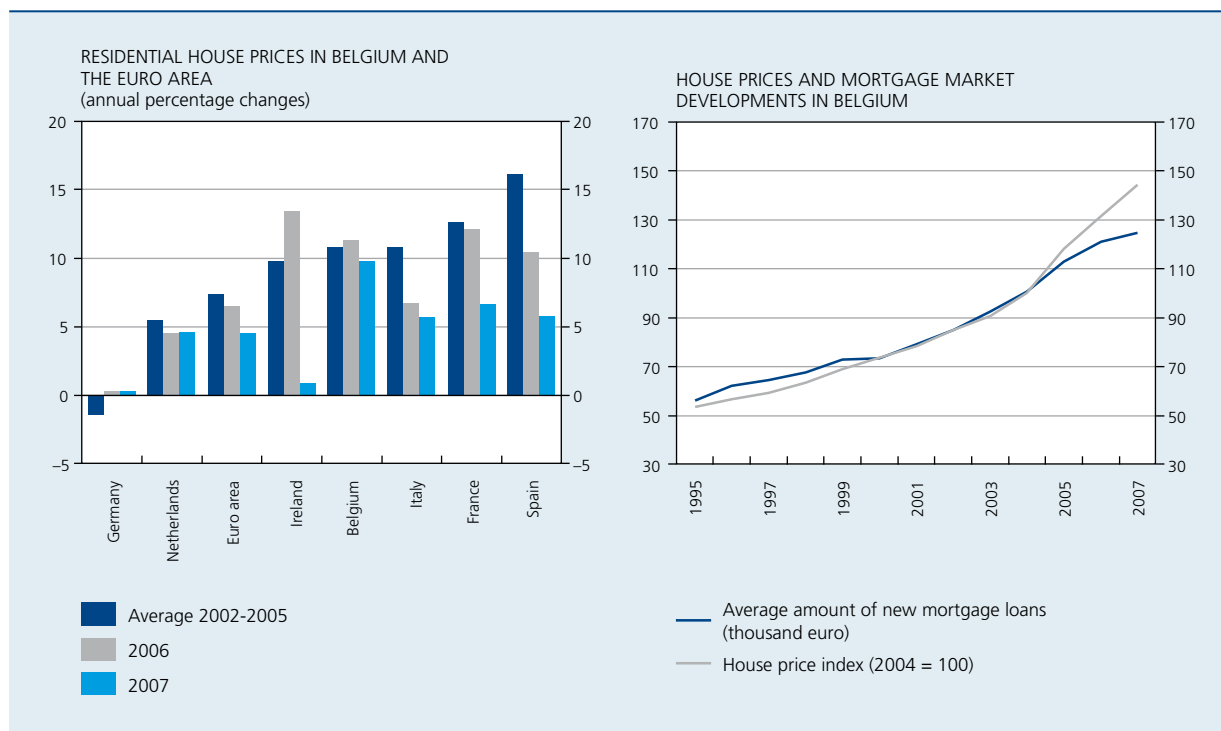
The geographic breakdown of Belgian banks’ foreign claims – in the form of loans or debt securities – highlighted significant exposures on the non-bank private sector in countries where housing market adjustments appear to be taking place (UK, Spain and Ireland) or where concerns have been voiced about housing market valuations (Netherlands, France) or mortgage loans in foreign currency (a number of Central European countries). In some of these countries, there are signs of a welcome cooling of house and mortgage markets, but this process could also give way to a more severe adjustment of house prices if it coincides with less favourable macroeconomic conditions and a tightening of lending standards by banks. Related concerns for the credit quality of loans extended by Belgian banks (including through the collateral channel) would apply, in particular, for those countries where strong house price growth has gone hand in hand with

**CHART 5** MORTGAGE LOANS  
(billion euro)



Sources: CBFA, NBB.

**CHART 6** HOUSE PRICES AND MORTGAGE MARKET DEVELOPMENTS IN BELGIUM AND THE EURO AREA



Sources : CBFA, ECB, Stadim, NBB.

sharp increases in household indebtedness or aggressive features in recently granted mortgage loans.

Although the pace of house price inflation in Belgium slowed in the course of 2007, it remained quite high (annual average of 9.8 p.c.) in comparison with the other euro area countries (Spain, France, Italy and Ireland) where a recent moderation of house price inflation took place after several years of double digit growth (Chart 6, left panel). It was also somewhat out of line with recent developments in the average size of new mortgage loans, which have shown a tendency to stabilise since the end of 2006 at around 125,000 euro (Chart 6, right panel). The growing gap between the two aggregates may suggest that recent house price sales involved a relatively greater use of own funds to finance the real estate transaction (i.e. a lower loan-to-value ratio). Recent indicators point to a further cooling of the Belgian mortgage and residential property markets. This transition towards a less buoyant residential real estate market is welcome and does not raise significant concerns at this stage, as its earlier vigour was associated with the persistence of generally conservative mortgage loan practices. The Belgian mortgage market does not feature a subprime or home equity loan segment and aggressive features in mortgage loans to increase the borrowing capacity of households are

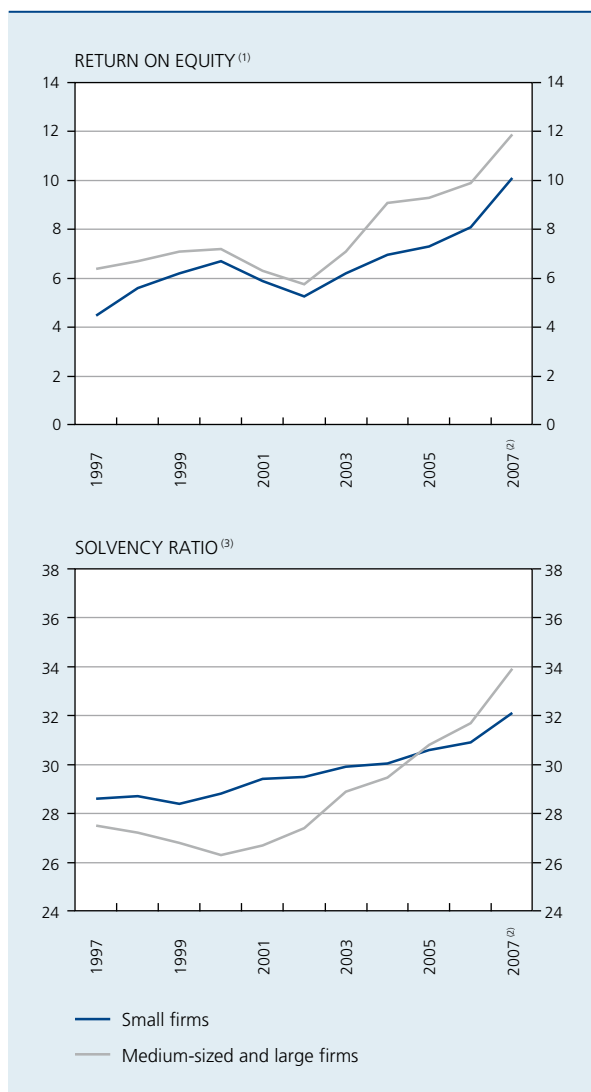
generally absent. The production of new mortgage loans is moreover dominated by fixed-rate mortgage loans. The average maturity of new mortgage loans has nonetheless shown a tendency to increase in recent years, to between 20 and 25 years. The aggregate financial position of the Belgian household sector remains very strong, characterised by comparatively low levels of indebtedness and high holdings of financial assets.

#### 1.2.1.2 Corporate loans

While commercial real estate loans or loans to highly leveraged companies can be singled out as potential areas of credit losses for Belgian banks in the relatively short term, the credit quality of the overall corporate loan portfolio could be affected by potentially more unfavourable macroeconomic developments in the quarters ahead.

In Belgium, the financial position of non-financial corporations continued to improve in 2007, as suggested by the further increase of the median profitability and solvency indicators shown in Chart 7. According to the developments observed within a sample of corporations for which annual accounts for 2007 were already available in the Central Balance Sheet Register, the return on equity of small firms and medium-sized and large

**CHART 7** MEDIAN PROFITABILITY AND SOLVENCY INDICATORS FOR BELGIAN NON-FINANCIAL CORPORATIONS



Source : NBB.

- (1) The return on equity is the ratio between the net after tax result and capital and reserves.
- (2) The medians in 2007 are calculated by applying to the 2006 medians the percentage of variation observed in a constant sample of early reporters in the Central Balance Sheet Register. A company is considered to be small when it submits its annual accounts to the Central Balance Sheet Register in accordance with the abbreviated reporting scheme. Medium-sized and large companies report in accordance with the full scheme.
- (3) The solvency ratio is defined as own funds divided by the balance sheet total.

firms is indeed projected to have risen to above 10 p.c. in 2007. For the two sub-categories of corporations considered, it amounts to a doubling of their profitability since 2002. The solvency ratio also continued to improve, aided since 2006 by the coming into effect of a more favourable fiscal regime for own funds, which abolished the duty on new issues of equity and allowed corporations to deduct from their earnings a “notional” interest cost for own funds (calculated by multiplying an

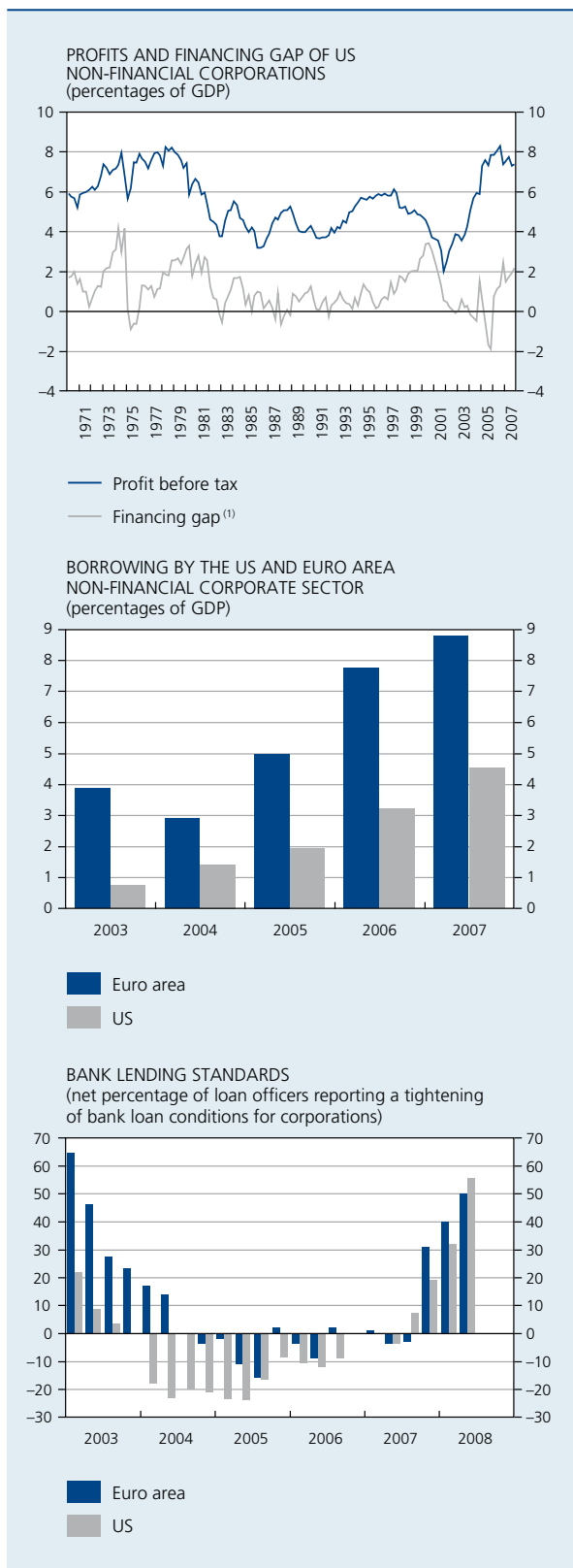
adjusted book value of equity by the yield on 10-year government bonds).<sup>(1)</sup>

As concerns the exposures of the Belgian banks to non-financial corporations from the euro area or the rest of the world, it may be noted that, for the global non-financial corporate sector, there appear to be fewer signs of worrisome financial imbalances than was the case at the beginning of this decade. Following a period of extensive balance sheet restructuring and restoration of higher profit margins in the years following the collapse of the stock market bubble in 2000, the sector continued to enjoy high levels of profitability in 2007, supported by strong economic growth in many areas of the world. In this connection, Chart 8 nonetheless shows that, for the US non-financial corporate sector, corporate profits have risen to a very high level in terms of GDP, which may not necessarily be sustainable. The results published by non-financial corporations in the first quarter of 2008 already showed some signs of the impact of slower economic growth (in the US) on net profits, and could be the harbinger of a period characterised by less favourable profit developments. This would in turn tend to keep the financing gap – a measure of the gap between capital expenditures and internal funding resources – in positive territory, and lead to an associated need for external financing, exposing corporations to changes in lending conditions in the bank lending and capital markets.

Net borrowing through bank loans and debt instruments by US and euro area non-financial corporations has risen quite significantly since 2003, when borrowing was more moderate as a result of corporate deleveraging and balance sheet repair in the wake of the collapse of the equity market bubble and the corporate finance scandals. This revealed higher need for external financing since 2003 has resulted *inter alia* from the debt financing of record amounts of equity buy-backs that corporations in the US and the euro area have undertaken more recently, re-leveraging their balance sheets in the process. It also reflected a substantial increase in the number of mergers and acquisitions in the period up to the second quarter of 2007, notably fuelled by a high level of leveraged buy-outs (LBOs) by private equity firms. While the financing of ever larger LBO-transactions was facilitated at that time by high liquidity on the primary markets for high-yield bonds and leveraged loans – which both concern debtors with a low credit rating – issuance on these markets came to an abrupt halt in July 2007. The failure of a large LBO transaction and increasing investor uncertainty over the value

(1) For a more detailed description of the two measures introduced in 2006 to ensure a more equal tax treatment between debt financing and equity financing, see FSR 2006, Box 2, pp. 33-35.

**CHART 8** RECENT DEVELOPMENTS IN THE FINANCIAL CONDITION OF THE US AND EURO AREA NON-FINANCIAL CORPORATE SECTOR



Sources : ECB, Thomson Financial Datastream, US Federal Reserve Board.  
 (1) The financing gap equals capital expenditures less internal funds and inventory valuation adjustments. A positive gap indicates a need for external financing.

of structured finance instruments – in the wake of the large number of downgrades of subprime-related RMBS and ABS CDOs – led investors to withdraw from these markets. In Europe, where these markets have enjoyed particularly dynamic growth in recent years, the market remained closed up until the end of the first quarter of 2008, partly as a result of a reduced demand from managers of CLOs.

While investment-grade corporations have so far experienced few difficulties in raising finance on the bond markets or through bank loans, there is a risk that lending conditions could become more restrictive for these borrowers as well, if macroeconomic conditions were to take a less favourable turn. In this regard, surveys of bank lending standards in the US, the UK and the euro area have signalled a tightening of bank lending conditions for non-financial corporations since the second half of 2007. In the euro area, less favourable funding liquidity conditions for the banks and deteriorating outlooks for general economic and firm-specific conditions reportedly contributed to this tightening of bank lending standards, which *inter alia* took the form of higher margins on (riskier) loans, increased collateral requirements and more restrictive loan covenants.

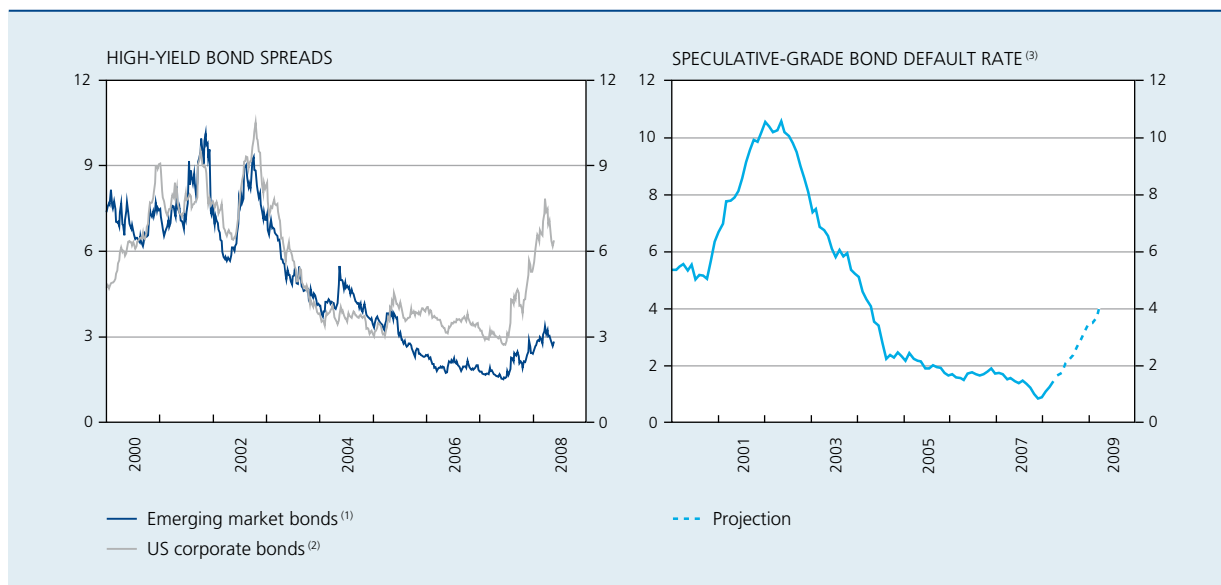
### 1.2.2 Debt securities

Risk repricing also took place in the corporate bond market, where spreads, measured against risk-free assets, increased sharply after having fallen to historically low levels in the first half of 2007 (Chart 9). For US high-yield corporate bonds, for example, the spread in relation to US Treasury bonds increased from under 300 basis points in June 2007 to more than 750 points in the first quarter of 2008, before subsiding slightly from these high levels in the course of April. This development was part of a more general reappraisal of risks on financial markets towards the end of 2007 and in the first quarter of 2008, in a context of growing concern over the economic outlook in the United States and throughout the world. On the stock markets, this heightened uncertainty contributed to a decline in stock market indices and a rise in implicit volatility, which is an inverse measure of investors' risk appetite.

This rise in risk premiums on high-yield corporate bond markets – which may reflect to some extent an increase in the liquidity risk premium – occurred in the context of the persistence of a historically low default rate on speculative-grade bonds, which dropped to its lowest level since 1981 in the course of the last quarter of 2007. However, that default rate is a “delayed” indicator of corporate credit quality, and the twelve-month projection for

**CHART 9** HIGH-YIELD BOND SPREADS AND DEFAULT RATES

(percentages)



Sources: JP Morgan Chase, Merrill Lynch, Moody's, Thomson Financial Datastream.

(1) EMBIG index; spread relative to interest rate on US Treasuries with a corresponding maturity.

(2) Corporate bonds denominated in US dollar with a rating lower than BBB/Baa3; spread relative to the interest rate on ten-year US Treasuries.

(3) The global speculative-grade bond default rate is an issuer-weighted, 12-month trailing figure, measuring the number of speculative-grade bond defaults as a percentage of the number of rated issuers.

this parameter suggests a gradual return to the long-term average of 4.8 p.c.

During the period under review, the bulk of credit-related losses on debt securities – due to defaults or rating migration – was concentrated in structured debt securities with exposure to high-risk US mortgage loans, such as subprime RMBS or ABS CDOs backed by tranches of subprime RMBS. The exposure of the Belgian banking sector to these asset classes was moderate, but nevertheless material, within a total exposure to structured credit instruments – including in the form of derivatives – of around 80 billion euro at the end of 2007, according to data published by the main *bancassurance* groups.<sup>(1)</sup> This represents around 5 p.c. of the sector's total balance sheet. While the moderate exposure to subprime RMBS and ABS CDOs led to the recognition of some impairments in the profit and loss account (see section 1.1), the other exposures did not lead, so far, to credit losses. This *inter alia* reflects the concentration of exposures in highly-rated tranches and the diversified composition of this structured credit exposure in terms of the underlying collateral and geographically, with investments spread across different types of US MBS and ABS, corporate CDOs and European MBS.

(1) Figures for Dexia Group only cover the exposures of Dexia Bank Belgium.

The debt securities portfolio of the Belgian banking sector amounted to 296.2 billion euro (18.8 p.c. of total assets) at the end of 2007, and continues to be dominated by debt instruments issued by central governments. As a 36 billion euro decline in the holdings of government bonds was partly compensated by a 12 billion increase in bank bonds and a 7 billion increase in corporate bonds, the share of central government bonds has nonetheless declined to less than half of the total in 2007. Securities issued by credit institutions and corporates account respectively for an additional 27 p.c. and 24 p.c., with non-credit institutions making up the remaining 3 p.c.

### 1.2.3 Other counterparty credit risks

While banks obviously incur counterparty credit risk in their loan and debt securities portfolios, many of their other commercial and financial activities also give rise to current or potential future exposures on counterparties, through channels such as derivative transactions or guarantees.

Large writedowns of assets at a number of individual financial institutions and the rescue operations for a number of others (IKB, Northern Rock) contributed to a significant rise in the perception of counterparty risk within the financial system, which may have been



exacerbated – in the first instance – by a general lack of information about the exposure of individual institutions to potentially problematic assets. One indicator of this perception of heightened counterparty risk in transactions with other financial firms is the rise in the cost of buying protection against default on debt issued by financial institutions. Chart 10 shows the movement in the average premium (in basis points) on five-year credit default swaps referencing the senior debt of financial companies in Europe. This measure of the cost of hedging counterparty risk in the European banking sector rose significantly during the period under review. While its surge in the course of the first quarter of 2008 was undoubtedly exacerbated by generalised liquidity problems in financial markets at the time – in the context of deleveraging –, it nevertheless also reflected the market’s rising concern about the possibility of defaults within the financial sector, including on the part of key financial intermediaries. This concern was eventually vindicated by the problems that led to the Bear Stearns rescue operation in the middle of March.

The management of these counterparty risks between professional counterparties within the financial sector relies heavily on principles of close-out netting of bilateral transactions – within ISDA Master Agreements – and, for the net exposures that remain, on the use of collateral to secure the claims on other counterparties. Due to the exponential growth in derivatives transactions and the essentially OTC nature of many of these transactions, this important financial market segment is receiving increased

attention from the authorities as a potential channel of contagion of financial stress.

The emergence of financial pressures in the monoline bond insurance sector – whose main activity consists in providing financial guarantees to municipal and asset-backed bonds – was another manifestation of the heightened counterparty risks in the global financial system, due to the subprime credit crisis. The credit insurance that many of these institutions had provided to highly-rated tranches of subprime-backed MBS or ABS CDOs exposed them to potential claims, as the much higher than expected losses on the underlying loans increased the probability that investors in these tranches would call on the financial guarantors to make good on the coupon and principal payments contractually due to them. A number of monoline companies – whose business model traditionally relied on a AAA-rating – were downgraded, while others raised fresh capital to forestall such an event. The deteriorating financial health of these guarantors in turn led to the provisioning of related counterparty risks in a number of financial institutions, as the value of the credit protection bought from these monoline insurers was discounted. Box 4 in section 2 provides some more background information on recent developments in the monoline bond insurance sector.

**CHART 10** EUROPEAN FINANCIAL SECTOR CREDIT DEFAULT SWAP PREMIUM  
(basis points)



Sources : Markit, Thomson Financial Datastream.  
(1) Itraxx Europe Financials Senior (5 years).

### 1.3 Asset and liability position and liquidity risk

Belgian banks have been affected, like their counterparts in the US and other European countries, by the simultaneous evaporation of market and funding liquidity within the financial system. They have had to face this tightening by managing a volume of assets and liabilities which has been strongly expanding in recent years through the development of new activities. While the total balance sheet of Belgian banks had only increased by an annual average of 2.7 p.c. between 1999 and 2003, the annual rate of growth accelerated to about 11 p.c. during the four subsequent years. True, the balance sheet total partially mirrors recent changes in the consolidation scope of Belgian banks, although there were also significant mergers and acquisitions around the turn of the century, and it should be added that the 2007 financial statements do not yet take account of the acquisition of a large part of ABN AMRO by Fortis. The value of assets and liabilities has also been influenced by the introduction, in 2006, of IAS/IFRS accounting standards. Nevertheless, the increase in the balance sheet total reflects to a large extent strong endogenous growth, supported by the buoyant economic environment that prevailed in previous years and banks’ diversification into a wide range of new markets.

To manage their liquidity, Belgian banks have traditionally relied on two main elements. The first one is their strong franchise on the domestic retail and corporate market, which ensures a stable source of deposit funding. This source is supplemented by a large portfolio of marketable securities which is actively used to get additional funding through its mobilisation on the interbank market where Belgian banks have traditionally been active participants.

As a result, interbank loans and deposits represent a higher share of their balance sheet than is the case for other EU banks. At the end of 2006, borrowing and lending from the interbank market amounted respectively to 29.2 and 19.2 p.c. of the total Belgian banks' balance sheet, compared to 16.9 p.c. and 13.1 p.c. in the EU (Chart 11).

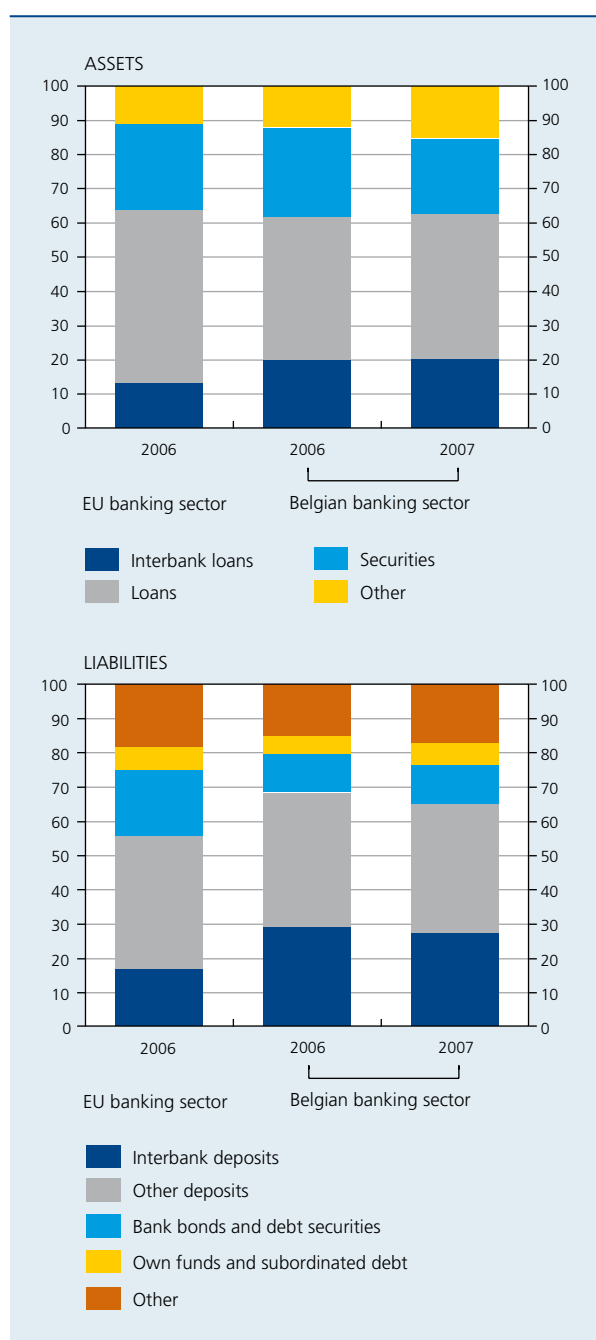
These interbank positions partially reflect the important intermediary function played by some Belgian banks on the repo market, as well as intra-group transactions with foreign entities which are not consolidated in the prudential reporting schemes. Such operations tend to inflate both sides of the balance sheet. Nevertheless, in net terms, Belgian banks are more reliant on interbank funding as their net borrowing in this market, including their operations with central banks, amounted to 10 p.c. of their balance sheet in 2006 compared to 3.8 p.c. in the EU.

The higher share of interbank loans on the asset side is compensated by a lower percentage of loans to customers. Belgian banks' securities portfolios, which used to be very substantial and still exceeded 30 p.c. of balance sheet in 2000, have been gradually reduced to about 22 p.c. so that, by the end of 2007, they could have fallen below the level observed for EU banks. On the liability side, the proportionally higher interbank borrowings of Belgian banks are compensated by a much lower level of debt securities. There is no covered bank bond market in Belgium while the low level of long-term interest rates has limited the attractiveness for households of uncovered bank bonds issued on-tap under the form of savings notes (*bons de caisse*). As a result, Belgian banks are much less relying on these longer-term sources of funding than other EU banks.

While this international comparison has shed some light on the global liquidity position of Belgian credit institutions, it is still only a rough indicator, as aggregate structures conceal the sometimes widely varying positions of individual banks. The large Belgian groups do not have equally developed retail networks. They do not have similar proportions of loans and securities on the assets' side, and the characteristics of those securities portfolios may also be quite different.

The tight liquidity conditions presently prevailing on financial markets and the crucial role to be played by central banks in the maintenance of global banking and market liquidity have led the National Bank of Belgium (NBB) to enhance its monitoring of liquidity management in key systemic banking groups. Box 2 (see below) presents the state of play of these NBB initiatives, taken in

**CHART 11** BANKS' ASSETS AND LIABILITIES IN BELGIUM AND IN THE EU



Sources: CBFA, ECB, NBB.

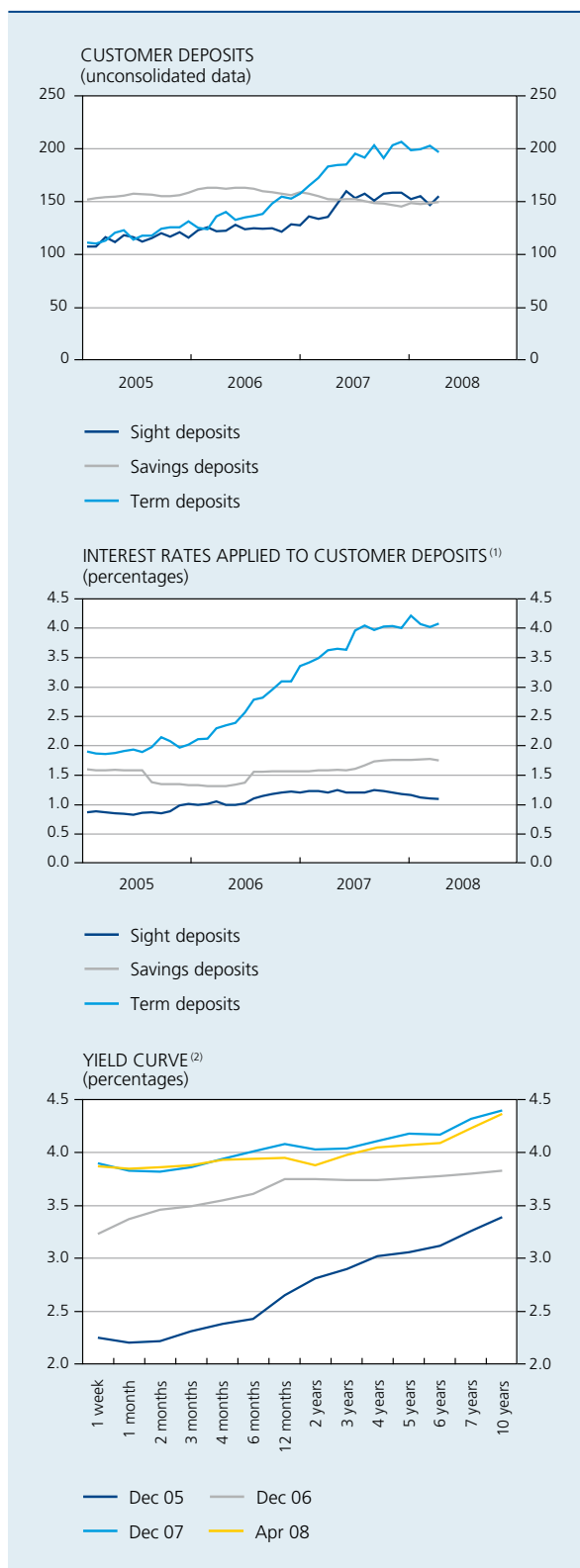
coordination with the CBFA, and discusses some lessons concerning the impact of the recent turmoil that could be inferred from regular discussions with the treasurers and liquidity risk managers of the institutions involved. These regular contacts enhance, at Belgian level, the liquidity risk management work pursued at the international and EU levels, under the aegis of the Basel Committee for Banking Supervision, the Committee of European Banking Supervisors and the Banking Supervision Committee.

The first component of Belgian banks' liquidity, i.e. the stable base of customers' deposits, has not been seriously affected by the recent turmoil. Nevertheless, the composition of these deposits has changed recently. Savings deposits, for many years a favoured form of investment for Belgian households, thanks to their favourable tax treatment<sup>(1)</sup>, have recently been superseded by term deposits as the primary source of retail funding. The return is the main factor motivating this shift. The interest rate differential between the two products, which was as low as 30 basis points in early 2005, has gradually increased to reach a maximum of 245 basis points at the end of 2007 (Chart 12, middle panel).

In setting the rates on savings deposits, Belgian banks are sensitive to the role played by this product in the management of their interest rate risk.<sup>(2)</sup> As shown in the upper panel of chart 12, savings deposits usually record fewer short-term fluctuations than sight- and term deposits. This is not only due to the fact that the former are almost exclusively held by households, unlike the latter which include a large portion of corporate deposits, traditionally more volatile. It also follows from the savings deposit remuneration structure which combines a base rate and a growth or loyalty premium, specifically designed to reinforce the stability of those deposits.

The middle panel of chart 12 also indicates that interest rates on savings deposits tend to be more stable than rates on term deposits, which are renegotiated at each maturity date. This means that the operational duration of savings deposits is actually quite high, largely exceeding one year, so that these instruments are actively used to finance longer-term bank assets such as mortgage loans. However, the present shape of the yield curve is quite flat and even shows a slight dip for the two years maturity (Chart 12, lower panel). This makes it difficult for banks, which use their savings deposits to finance medium-term

**CHART 12** OUTSTANDING AMOUNTS OF CUSTOMER DEPOSITS AND INTEREST RATES



(1) Up to an amount of 1 630 euro of annual interest income per taxpayer, those deposits are exempted from the fully discharging withholding tax (currently 15 p.c.).  
 (2) For a more detailed description of the role of savings deposits in the management of Belgian banks' interest rate risk, see the FSR 2005 article "Measuring the interest rate risk of Belgian regulated savings deposits" (pp. 137-150). This article presents, in particular, an estimation of the duration of savings deposits.

Sources: CBFA, NBB.  
 (1) Data from the monthly MIR survey in the case of new deposits.  
 (2) Based on monthly averages of yields on Belgian treasury certificates for maturities up to one year and Belgian government bonds for other maturities.

assets, to align their savings deposits rates with the current level of short-term money market rates.

While important, this debate has to be put in the perspective of the relative share of Belgian household deposits in the total non-bank deposit base of Belgian banks. On the one hand, at the end of 2007, about 48 p.c. of those deposits were collected abroad, of which 20 p.c. in the euro area and 28 p.c. in the rest of the world. On the other hand, the collection of those non-bank deposits is almost equally divided between households and corporates.

At the same time, deposits are far from being the only products through which the major Belgian financial groups collect household savings. These groups are also very active in the management and marketing of mutual funds, as well as in insurance. Life insurance products, in particular, have grown strongly, going up from 15 p.c. of Belgian household financial assets at the end of 2000 to 24 p.c. at the end of 2007.

As a second main source of potential liquidity, Belgian banks rely on their important portfolio of marketable securities. In fact, a substantial part of this securities portfolio is already used as collateral to guarantee borrowing in the interbank market, in the form of repurchase agreements (repo), whereby amounts borrowed by banks are covered by pledged tradeable securities. Indeed, at the end of 2007, the total amount of repurchase agreements contracted by Belgian banks was equivalent to 55 p.c. of their global securities holding. This transfer of collateral was, however, fully compensated by securities received as the counterpart of bank lending in the form of reverse repurchase agreements (reverse repo). The latter securities can, in turn, also be reused as collateral to guarantee new borrowings.

Secured transactions are not only effected with banks but also with corporations and other non-credit institutions. At the end of 2007, about one-fifth of borrowing and

lending transactions with these two categories of non-bank depositors took the form of repos or reverse repos.

The collateral used for both legs of banks' secured borrowing and lending is not necessarily of the same nature nor of the same liquidity. Banks often mobilise their traditional government and corporate bonds portfolio to finance less liquid, but higher yielding forms of assets. This has to be managed in an environment where securities are located with several national or international Central Securities Depositories ((I)CSDs), so that their mobilisation in the different entities of a banking group may require cross-border settlements through links between infrastructures functioning in different time zones. At the same time, to participate in payment and securities settlement systems, banks need to tie up a certain amount of collateral which consequently ceases to be available to guarantee interbank transactions.

Besides bilateral repos and reverse repos, banks are making increasing use of triparty repo transactions. These transactions are a specific type of repos or reverse repos whereby a credit institution exchanges cash and collateral, the collateral not being managed directly by the lender but by a third party. This system allows more flexibility, as a wide range of collateral can be used as stipulated in the triparty repo contracts. In this context, where the volume and location of the available collateral is constantly changing, collateral management has become a key component of liquidity risk management. As lenders (or collateral-takers), banks have to analyse the potential market risks related to the various categories of collateral they accept as mitigant of their counterparty risk. They will, accordingly, set their pricing and fix the haircut (i.e. the percentage deducted from the value of the various securities to determine the maximum amount against which they can be used as collateral). As borrowers (or collateral-providers), credit institutions have to measure the opportunity costs associated with the various kinds of assets which they are ready to mobilise as collateral, taking into account the eligibility criteria for transactions in interbank markets or with central banks.

## Box 2 – Liquidity risk management during recent market events: the Belgian experience so far

The tightened liquidity conditions on money markets and other financial market segments also impacted Belgian banks' liquidity management during the recent turmoil. While they did not witness important funding liquidity drains as such, some institutions found it more challenging to roll over or refinance their normal mismatch position and obtain new long- or medium-term wholesale funding at reasonable conditions. Unsecured money



market funding had to be obtained at higher prices and shorter maturities. Furthermore, on the secured segment of the market, where funding is obtained through repurchase agreements, it emerged that securities previously considered as very liquid, such as certain structured credit products, could no longer be used in secured money market transactions. The turmoil and inherent risk aversion towards financial institutions' debt increased the funding cost associated with the issuance of medium- and long-term paper. Conduits sponsored by banks found it more difficult to roll over maturing commercial paper.

The liquidity and funding position of some Belgian banks was mainly affected indirectly by the recent events, i.e. through the consequences of a generalised lack of confidence on financial markets. In fact, the events were associated with a general, market-wide liquidity crisis, and, in that context, a number of features of the banks' initial liquidity position appear to have been an important factor in determining their exposures to current events. Institutions with larger maturity mismatches, lower liquidity buffers, a more wholesale-oriented funding profile and less access to a diversified set of funding sources were more exposed than others, on average. In that respect, the sizeable securities portfolio, a liquidity buffer that can be monetised through secured repo transactions, and the fairly high level of retail funding of a number of Belgian banks proved mitigating factors.

As part of the liquidity contingency procedures, some banks took liquidity enhancing measures such as increasing the centralisation of liquidity management, intensifying the liquidity monitoring process, lowering the mismatch limits for specific entities, limiting cash consuming activities etc. In that sense, contingency funding plans and liquidity contingency procedures have experienced a use-test and seem to have functioned reasonably well.

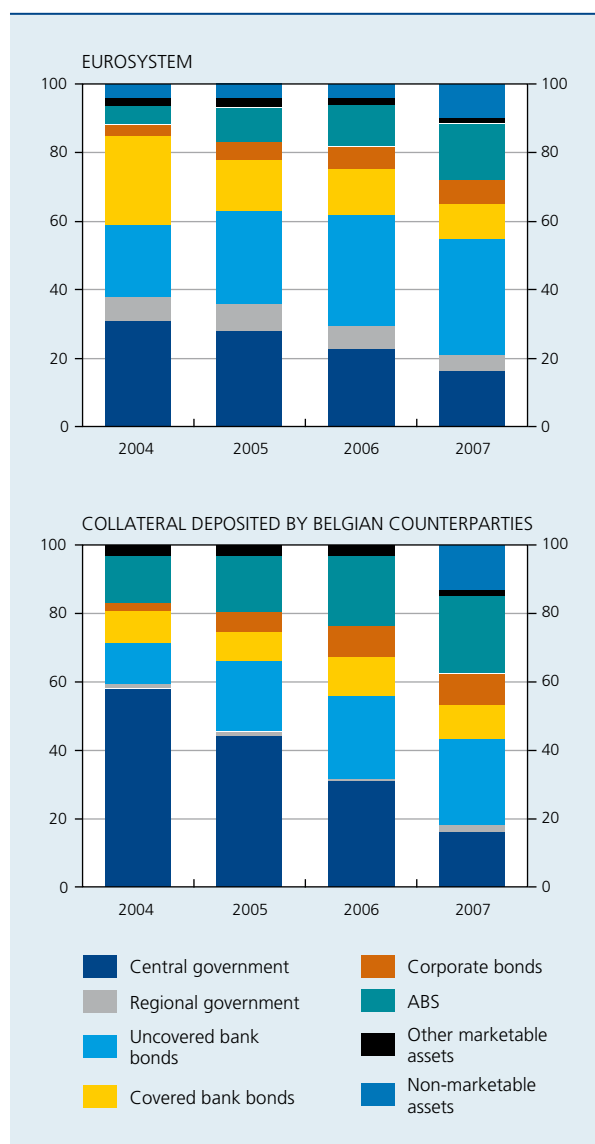
The events further emphasised the usefulness of liquidity stress tests as a management tool to detect the vulnerabilities of banks' liquidity positions. Regular liquidity stress tests conducted by the largest Belgian banking groups typically included a general market crisis scenario involving illiquidity on certain asset markets, as well as simultaneous difficulties in tapping unsecured non-central bank funding. However, the impact of the current adverse market conditions on banking groups' liquidity positions proved to be – at least for some aspects – more substantial than assumed under these scenarios. In this regard, the current events marked by a scenario of simultaneously illiquid asset-backed commercial paper markets, illiquid markets for structured credit products, a drying up of unsecured interbank markets for the longer tenors and a temporary decrease in liquidity on foreign exchange swap markets in major currencies point to the fact that stress-testing and limit-setting on the basis of stress tests should take sufficiently severe scenarios into account.

Apart from some fine-tuning, most banks made no significant changes to the actual framework of liquidity limit-setting, measuring, monitoring and stress-testing during the events, but revisions might be expected on the basis of the current experiences. A number of banks were already in the process of revising their liquidity framework before the recent events, *inter alia* in the context of initiatives taken by the Belgian authorities with respect to banks' liquidity risk management during recent years. The monitoring and reporting structures, contingency procedures, the stress-testing framework, scenarios and assumptions, and the internal limits and funding structure of some banks will be improved and adjusted as appropriate against this background.

Banks' liquidity risk and liquidity risk management were already receiving additional attention from the Belgian prudential authorities before the events, as evidenced by a number of initiatives such as the overhaul of the CBFA's prudential approach to liquidity risk in 2006 and the joint organisation by the NBB and CBFA of annual liquidity stress-test exercises with the largest Belgian banking groups since 2006.<sup>(1)</sup> The monitoring of major financial institutions by the Belgian prudential authorities was greatly intensified during the recent events. The frequency of reporting and bilateral contacts was increased and specific focused reports, discussions and self-assessments were requested. Close contacts were also established and maintained between authorities at both the national and international level. The permanent monitoring of the situation on financial markets and developments in the financial position of institutions remains of key importance in this context.

(1) For a more extensive description of these initiatives, see the FSR 2007 article "Liquidity risk in the banking sector: the Belgian perspective" (pp. 123-133).

**CHART 13** COLLATERAL DEPOSITED WITH THE EUROSYSTEM BY ASSET TYPE  
(percentages of total)



Sources: ECB, NBB.

In its monetary policy operations, the Eurosystem accepts a wide range of collateral.

As shown in chart 13, the share of central government bonds in the total pool of collateral deposited with the Eurosystem has been gradually decreasing, going down to 16 p.c. in 2007. While covered and uncovered bank bonds remain an important class of assets in the pool, the relative share of asset-backed securities (ABS) has significantly increased.

Since 1 January 2007, the range of eligible assets for Eurosystem credit operations has been extended to include credit claims, also referred to as bank loans. The share of this category of non-marketable assets in the overall amount of collateral deposited with the Eurosystem was still limited in 2007 and mostly concerned claims on public sector entities. It is expected to increase further in the coming years.

This extension of Eurosystem collateral to include bank loans is in line with a wider market development whereby credit institutions are trying to enhance the liquidity of their loan portfolio. To that end, they turn to the securitisation technique whereby a set of loans is converted into marketable securities that can be placed on the market and acquired by investors. While this technique was originally developed in the US, it has been gaining ground in Europe at a rapid pace since 2000.

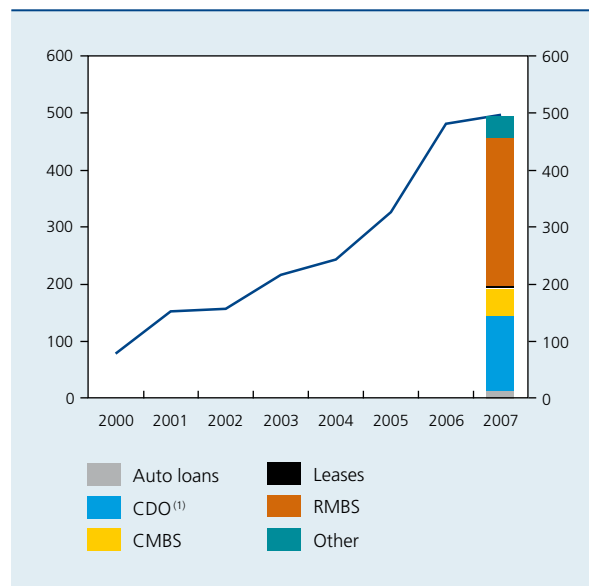
Box 3 describes the present structure of the European securitisation market and how the subprime mortgage crisis in the US could affect its future development.

### Box 3 – The European securitisation market and its future after the recent market turmoil

EU banks have not only been involved in securitisation as buyers of structured finance products, but have also been securitising domestic assets at an increasing rate. The European securitisation market has been growing rapidly, reaching just under 500 billion euro in 2007, up from 78 billion euro in 2000 (Chart 1). At the end of 2007, the underlying collateral was dominated by RMBS and CDOs, and was concentrated in the UK (43 p.c.), with Spain (15 p.c.), the Netherlands (11 p.c.) and Italy (10 p.c.) as other important markets (Table). With an

amount of 7.3 billion euro at the end of 2007, the stock of securitised Belgian assets is still small in absolute terms but appears somewhat more significant when expressed as a percentage of the outstanding debts of Belgian financial institutions. Moreover, issuance has been growing. According to the European Securitisation Forum (ESF), ABS (non-CDO) issuance in Belgium amounted to 4.1 billion euro in 2007, up from 2.6 billion euro a year before. Belgian banks also arrange securitisation through some of their foreign subsidiaries, most notably in the Netherlands.

**CHART 1** ISSUANCE OF ASSET-BACKED SECURITIES IN EUROPE  
(billion euro)



Source : European Securitisation Forum.  
(1) Only includes euro-denominated issuance.

Securitisation affects the banking sector through a number of channels. First, it allows banks to tap new and more diversified funding sources. That said, it is difficult to map the issuance of asset-backed securities shown in Chart 1 into bank funding. European banks may securitise outside the EU while corporates can directly securitise their assets or receivables via conduits, thus not providing any direct funding to banks. Moreover, synthetic CDOs (which account for the bulk of European CDO issuance) do not represent a source of funding. Still, the Bank of England estimates that for the median major bank in the UK, securitisation accounted for 10 p.c. of wholesale funding at the end of 2006, rising to over 40 p.c. for the 75th percentile bank.

Apart from funding, securitisation also aids the management of other banking risks. In particular, it has been used to reduce duration mismatches in banks' balance sheets. Prepayment risks, for example, inherent in some countries' mortgage markets, can be hedged through the issuance of amortising ABSs. Moreover, banks have been able to benefit from capital relief resulting from the transfer of credit risks, fuelling renewed lending. Finally, the structuring of exposures into CDOs and the management of financial conduits generated sizeable fees and commissions.



## SECURITISATION IN EUROPE

(values outstanding at the end of the third quarter of 2007)

	Billion euro	European market share (percentages)	Relative to financial institutions' issued debt stock (percentages)
Austria .....	3.6	0.3	1.5
Belgium .....	7.3	0.6	2.7
Denmark .....	6.8	0.6	2.3
France .....	28.9	2.5	2.2
Germany .....	74.1	6.5	3.3
Greece .....	9.9	0.9	16.9
Ireland .....	18.6	1.6	7.6
Italy .....	117.6	10.3	11.1
Netherlands .....	131.5	11.5	13.3
Portugal .....	29.1	2.6	21.0
Spain .....	173.1	15.2	15.0
Sweden .....	0.8	0.1	0.3
Switzerland .....	0.4	0.0	0.1
United Kingdom .....	492.6	43.2	29.5
Other .....	45.0	4.0	–
<b>Total .....</b>	<b>1,139.3</b>		

Sources: BIS, European Securitisation Forum.

Following the recent financial market turmoil, the ESF forecasts securitisation issuance to decline in 2008 to 272 billion euro, the lowest level since 2004, with the largest proportional declines expected for RMBS, CDOs and CMBS. According to Standard & Poor's, demand for CDOs will be more selective, concentrating on simple structures with highly transparent and diversified collateral pools. Underlying this cautious outlook, the spread between securitisation rates (funding costs) and interest rates on household secured loans (asset returns) has risen sharply, as illustrated by the situation prevailing in the UK, which is by far the largest participant in the European securitisation market (Chart 2).

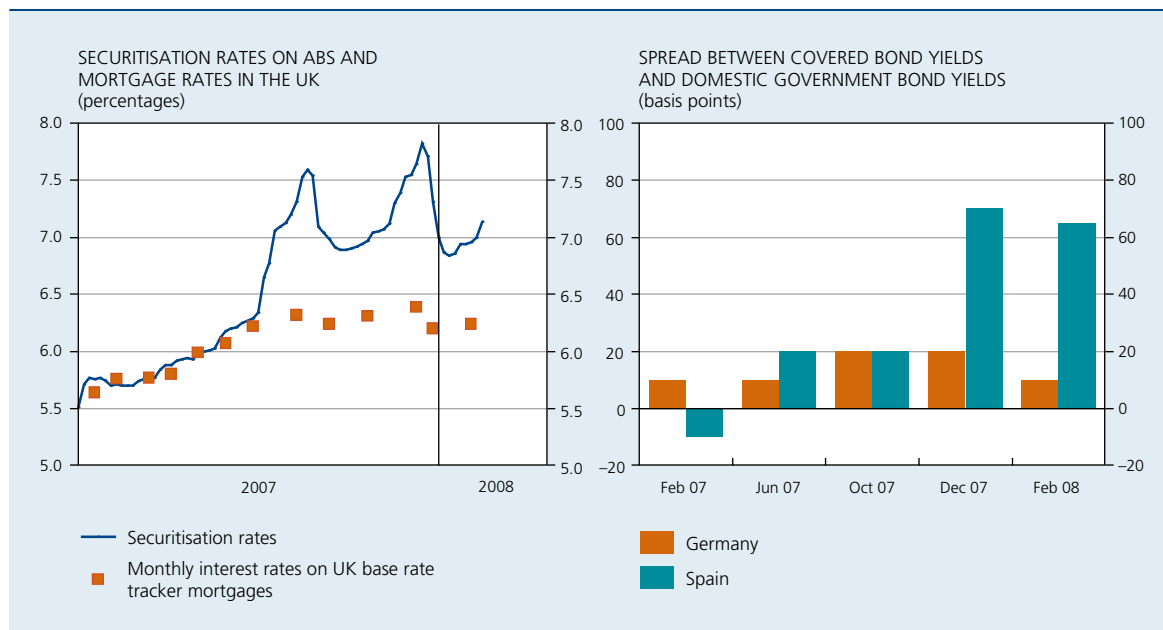
But reduced securitisation volumes may also reflect the anticipated slowdown in several EU mortgage and consumer credit markets, in particular in the UK, Spain and Ireland. The growth of euro area housing loans to households had already started slowing at the beginning of 2006, when it still amounted to 12 p.c. year on year, falling to 8 p.c. in the middle of 2007, on the eve of the financial turbulences. Thus, part of the decline in European securitisation may be a consequence, rather than the cause, of weakening mortgage and consumer credit markets. The inclusion of good-quality ABS in the pool of ECB eligible collateral could support securitisation markets. Taking into account eligibility criteria, around 60 p.c. of the European securitisation market is estimated to constitute ABS classed as eligible by the Eurosystem.<sup>(1)</sup>

(1) See "Securitization in the Euro-area." ECB, Monthly Bulletin, February 2008.





**CHART 2** YIELDS ON MORTGAGES, ABS AND COVERED BONDS IN EUROPE



Sources: Bank of England, Bundesbank and Bank of Spain.

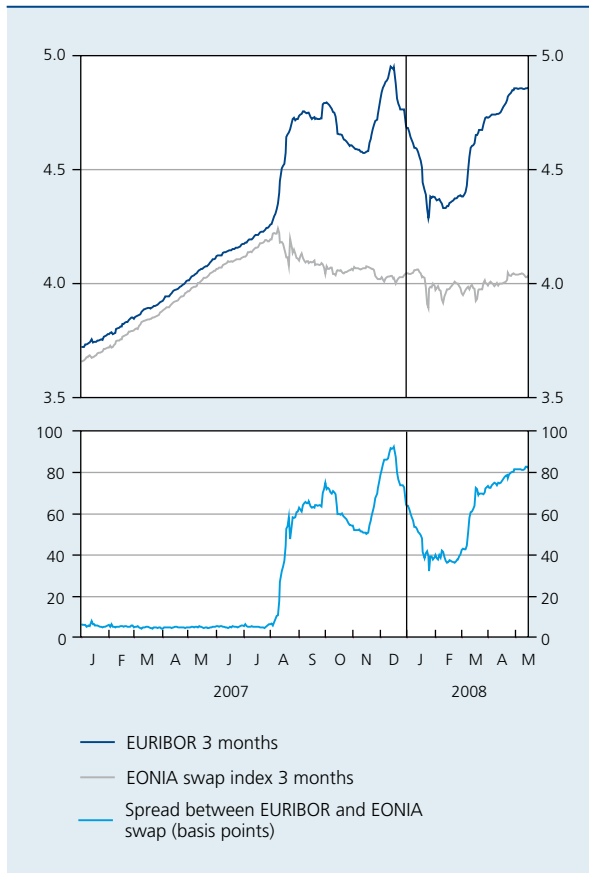
A possible alternative source of market funding to ABS could be offered by the issuance of covered bonds, i.e. securities that benefit from the double protection of a collateral pool and recourse to the issuer, and that remain on banks' balance sheets.

The global covered bond market which was estimated to amount to 1600 billion euro at the end of 2007 is concentrated in Germany (*Pfandbriefe*) with 47.1 p.c. of covered assets, France (*obligations foncières*) accounting for 12.8 p.c., UK (contractual covered bonds) for 12.3 p.c. and Spain (*cédulas hipotecarias*) for 10.8 p.c. The resilience of this market to the current market shocks has been uneven and dependent on jurisdictions, with a temporary suspension of market-making by the European Covered Bond Council in November 2007. While the German market has resisted well, the UK market suffered, with some banks being temporarily unable to raise funds.

Part of the explanation could be that covered bonds in Germany, France or Spain are issued under special legislation, while in other countries such legislation is lacking and the double investor protection is only provided by contractual arrangement. But even when such legislation is in place, markets may discriminate between jurisdictions. So, in Spain, the spreads between mortgage notes and Spanish government bonds widened during 2007, while in Germany the corresponding spread between *Pfandbriefe* and German government bonds remained stable.

Of course, covered bonds can only partially fill the role of ABS. For a start, assets remain on banks' balance sheets. Moreover, covered bonds generally pay fixed rates and have bullet maturities which may reduce their attractiveness in countries with substantial mortgage prepayments (like in the UK, Ireland and the Netherlands).

**CHART 14** MONEY MARKET RATES IN THE EURO AREA  
(percentages, unless otherwise stated)



Source : Thomson Financial Datastream.

The recent turmoil has had a very significant impact on the relative pricing conditions applied on the interbank market. Prior to the eruption of the crisis, those conditions were practically equivalent for secured and unsecured borrowings. Indeed, the spread between three-month Euribor, as the indicator of rates applied for unsecured transactions, and the three-month overnight interest swap rate, which reflects conditions for secured operations, was limited to a few basis points (Chart 14). In August 2007, this spread jumped to more than 60 basis points in a few weeks. After a temporary respite in October and early November, the spread reached a peak of more than 90 basis points towards the end of the year. While a new short-lived decrease took place at the beginning of 2008, the spread has again exceeded 70 basis points since the middle of March.

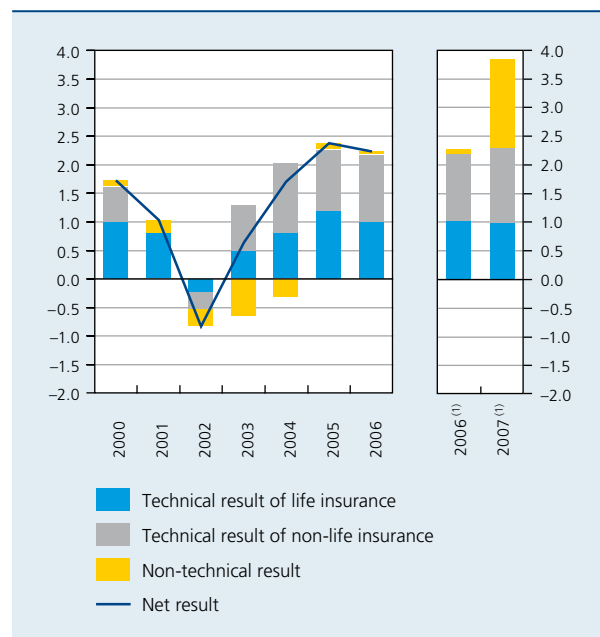
An important caveat is that the largest part of interbank transactions is contracted for a much shorter duration than 3 months, so that these rates are not necessarily representative of rates that banks actually have to pay to

get liquidity. Indeed, according to the ECB Euro Money Market Survey, about two thirds of the transactions in the unsecured interbank market are overnight while almost the whole remaining portion has a maturity of maximum 1 month. Although the average duration is somewhat longer for the secured market, it also rarely extends to 3 months or more as about 15 p.c. of transactions in this segment are overnight and 80 p.c. have a maturity spreading from tom/next to 1 month.

## 2. Insurance sector

The profitability of the Belgian insurance sector improved significantly in 2007, compared to 2006, bolstered by a strong rise in the income from investments recorded in the non-technical result (Chart 15). While some of this high investment income in the non-technical result was related to one-off capital gains on investments in associated companies, it also reflected a growth in underlying investment income. The insurance companies thus appear to have consolidated their profit recovery, which set in after 2002, when the adverse stock market climate and high insurance and operating costs expressed as a percentage of premium income were reflected in a loss of 0.8 billion euro for the sector as a whole.

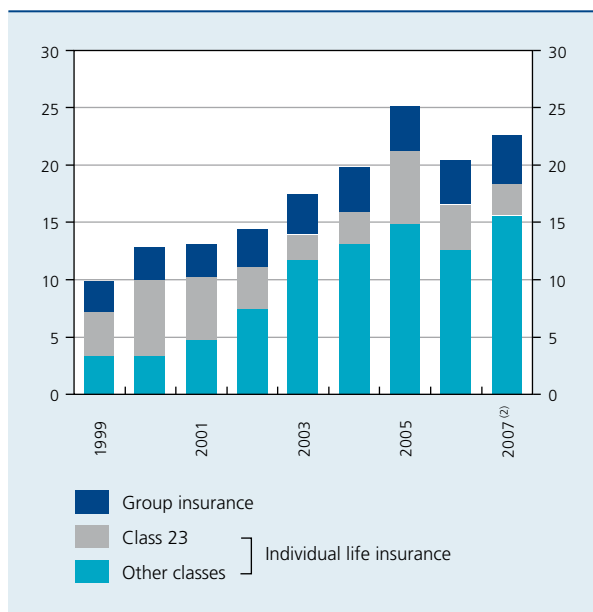
**CHART 15** MAIN COMPONENTS OF THE PROFIT AND LOSS ACCOUNT OF BELGIAN INSURANCE COMPANIES  
(unconsolidated data, billion euro)



Sources : CBFA, NBB.

(1) Estimates on the basis of the quarterly reports, which are not entirely comparable with the annual figures shown in the left-hand panel of the chart.

**CHART 16** LIFE INSURANCE PREMIUMS <sup>(1)</sup>  
(unconsolidated data, billion euro)



Sources : Assuralia, CBFA, NBB.

(1) Premiums collected on direct insurance operations in Belgium.

(2) The 2007 figures are based on estimates by Assuralia.

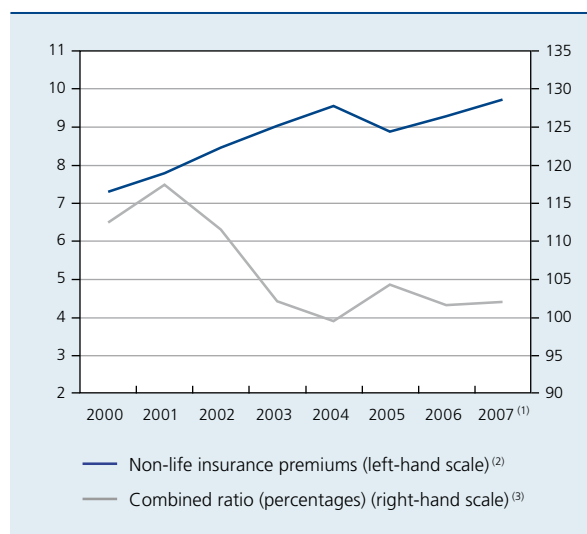
In 2007, the technical result of life insurance remained close to around 1.0 billion euro, as higher insurance and operational costs largely offset a stronger investment result and a further increase in the volume of new premiums. Tight control of operational costs and a rise in investment income lifted the technical result in non-life insurance 11 p.c. higher to 1.3 billion euro.

The strong growth of life insurance premiums in 2007 (11 p.c.) needs to be qualified somewhat, as life insurance premiums had dropped to a low level in 2006, following an exceptionally high level of collected premiums in 2005 (Chart 16). These developments were related to shifts in premiums between 2005 and 2006, as a result of the introduction on 1 January 2006 of a tax of 1.1 p.c. on premiums paid for individual life insurance contracts. Since households had anticipated this tax by paying additional premiums in the final months of 2005, and then reduced their payments in 2006, the net results for 2005 and 2006 were first artificially driven up and then depressed, compared to the picture which would have been expected in the absence of the new tax measure. Compared to the average annual level of premiums collected in the period 2004-2006 (of 21.8 billion euro), the growth rate in 2007 nevertheless still amounted to 3.7 p.c.

Taking account of the further reduction in premiums for unit-linked products (class 23) – which in 2007 amounted to only two thirds of the average level recorded in the period 2004-2006 –, this growth was due to the rise in premiums collected on policies relating to other types of contract, by far the most important being class 21, in both the individual and the group life insurance segment. These class 21 contracts are contracts with a minimum guaranteed rate of return.

The profitability of class 21 insurance contracts had been impaired some years ago by the marked fall in the yield which insurance companies obtained on their investment portfolio, whereas those companies guaranteed policyholders a minimum yield which – owing to pressure of competition – was generally fixed at the legal maximum of 4.75 p.c. In 2002, the margin between the yield the companies obtained and that guaranteed to policyholders actually became negative, as a result of the adverse movement in global stock market prices and a decline in long-term interest rates to levels below that 4.75 p.c. mark. Since then, the sector has gradually improved its life insurance result, forming reserves for planned payments on the old insurance contracts offering high guaranteed yields, and offering new insurance contracts with policy clauses and yields better suited to current and expected financial market conditions. Combined with the positive impact on investment income of higher stock prices, these

**CHART 17** NON-LIFE INSURANCE PREMIUMS AND COMBINED RATIO  
(unconsolidated data, billion euro, unless otherwise stated)



Sources : Assuralia, CBFA, NBB.

(1) The 2007 figure for non-life premiums is based on an estimate by Assuralia.

(2) Premiums collected on direct insurance operations in Belgium.

(3) The combined ratio expresses the sum of insurance and operating costs as a ratio of net premium income.

developments have helped to restore the life insurance result since 2002.

Non-life insurance premiums grew in line with nominal GDP in 2007 and exceeded 9.7 billion euro last year (Chart 17). The combined ratio – expressing insurance and operating costs as a percentage of premium income – remained stable at 102 p.c. This reverse measure of the profitability of insurance activities proper (excluding investment income) has been close to this level over the period 2003-2007, after having exceeded 110 p.c. during the period 2000-2002. The significant improvement in the combined ratio from 2003 onwards is due to higher premiums, better cost control and more rigorous management of the risks covered in insurance branches recording a deficit.

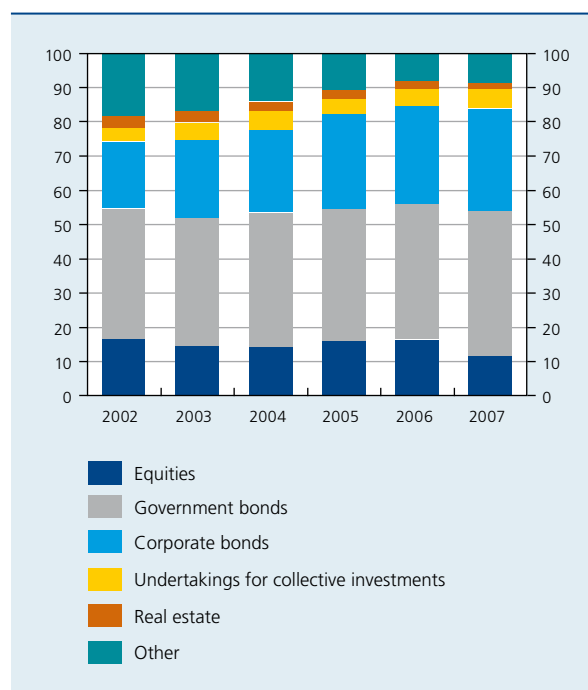
Despite the recent improvement in life and non-life insurance results, the sector remains sensitive to financial market developments, and particularly interest rate movements. That applies principally in the life segment, where contracts and liabilities have relatively long maturities compared to the non-life segment, reflected in a higher volume of provisions and portfolio investments. For the same reasons, financial income expressed as a percentage of premiums received is also higher in life insurance than in non-life insurance.

Belgian insurance companies active in both the life and non-life branches traditionally invest a significant part of their portfolio in bonds (Chart 18). At the end of 2007, these represented 72.4 p.c. of the total portfolio, with equities and undertakings for collective investments (UCIs) respectively accounting for only 11.5 and 5.6 p.c.

In recent years, in order to increase the return on their investments, insurance companies have boosted the share of corporate bonds, so that they represented 41.5 p.c. of the total bond portfolio at the end of last year, compared to 34 p.c. in 2002. Since the bonds selected generally have very high ratings, this diversification does not appear to have caused a significant decline in the overall credit quality of the investment portfolio of insurance companies. Companies however also invest in structured products, such as asset-backed securities or collateralised debt obligations. For the insurance activities undertaken through institutions incorporated under Belgian law, a stock-taking by the CBFA among the four large *bancassurance* groups found that the share of these structured securities in the overall debt portfolio was not higher than 7.5 p.c. of the total investment portfolio, with negligible exposures to subprime-related assets. This largely echoes the finding of a recent survey by Standard & Poor's for the European insurance sector. This study observes that

**CHART 18** INVESTMENT PORTFOLIO OF BELGIAN INSURANCE COMPANIES <sup>(1)</sup>

(unconsolidated data, percentages of total)



Sources: CBFA, NBB.

(1) Excluding investments linked to class 23 contracts.

European insurers have generally been conservative investors (partly because of regulatory constraints), incurring moderate credit risks, with the vast majority of their investments deployed in government and highly-rated corporate debt, bank deposits and equities.

In addition to the said investments related to traditional insurance activities undertaken through institutions incorporated under Belgian law, some of the major *bancassurance* groups also undertake more specialised bond insurance activities, through their foreign subsidiaries. These activities are not included in the standardised unconsolidated reporting schemes which are used as a basis for the analysis in this section. However, they may entail substantial exposures to structured finance instruments. A subsidiary of one of the major *bancassurance* groups is one of the world's top five global bond insurers. Box 4 provides some more background information on this sector.

In general, exposure to interest rate fluctuations is one of the main risks facing insurance companies in the management of their investments, since the average duration of the sector's financial assets does not match that of the liabilities. The scale and even the direction of this

## Box 4 – Recent developments in the monoline bond insurance sector

The core business of financial guarantors or monoline bond insurance companies is to protect bond investors against the default risk associated with a particular bond, by providing credit insurance on the coupon and principal payments. If the original debtor of the bond defaults on its payments, the financial guarantor or monoline bond insurer that “wrapped” this security is committed to ensure the continuity of interest and principal payments to the bondholders, in line with the original payment schedule specified in the contractual clauses of the insured bond. This feature distinguishes monoline bond insurance (including in the form of a credit default swap) from the credit protection provided through non-monoline credit derivatives, as the compensation of bondholders in the event of default in the latter case usually takes the form of a one-off (“accelerated”) settlement. Another distinguishing feature relates to the general absence of an obligation imposed on monolines to collateralise contingent obligations to protection sellers, based on the marked-to-market value of the credit insurance contract.

Monoline bond insurance started in 1971 in the municipal bond market, when the company Ambac wrote its first policies on US municipal bonds, before the sector gradually extended its activities – starting in the middle of the 1980s in the US – to the provision of credit insurance on securitised and structured finance assets, such as (tranches of) MBS, other ABS and, more recently CDOs. According to data from the Association of Financial Guaranty Insurers, public finance securities insured by monoline bond insurers represented a net par value of 1348 billion US dollar at the end of 2006. It is estimated that about 50 p.c. of all US municipal bonds outstanding currently benefit from monoline credit insurance. In addition to this more traditional public finance debt insurance, an additional net par value insured of 824 billion US dollar was accounted for by structured finance instruments at the end of 2006, with “wraps” of US MBS (19 p.c.) and ABS (46 p.c.) taking the lion's share of the total outstanding. Non-US ABS (19 p.c.) and MBS (6 p.c.) accounted for an additional quarter of the total.

The business model of monoline bond insurers requires a high rating, as the value of credit insurance bought from bond insurers depends not only on the credit quality of the insured security, but also on the credit standing of the insurer itself (so as to minimise the risk of double default). Up until the third quarter of 2007, all but one of the monoline bond insurers of municipal and asset-backed securities carried a AAA-rating. Through credit insurance, this AAA-rating was thus also extended to large amounts of municipal or asset-backed bonds that did not necessarily carry a similar high credit rating on a stand-alone (“unwrapped”) basis.

Credit insurance provided to subprime RMBS and to ABS CDOs backed by tranches of subprime RMBS has since then exposed a number of financial guarantors to significant financial and rating pressures, as expected losses on these instruments rose to levels projected to affect the generally senior (and mostly super senior) tranches insured by them. In spite of several recapitalisation efforts, the ratings of a number of financial guarantors have been downgraded since the start of the subprime credit crisis, while a number of others have seen their AAA-rating placed on negative credit watch or negative outlook.

While the perceived deterioration in the creditworthiness of certain monoline bond insurers has already led to provisions and impairments at institutions with potential credit insurance claims on the financial guarantors, the implications of new downgrades in the financial guaranty sector would, however, not be limited to a reduction in the value of their credit protection for the protection buyers. They would also affect the ratings of the more than 2 trillion US dollar of securities and structured products supported by their guarantees, to the extent that the stand-alone ratings of the wrapped securities would not be higher than the new rating of the downgraded financial guarantor. In this connection, the heightened concerns over monoline bond insurers in the first quarter of 2008 were associated with a significant spillover in the municipal bond market, contributing to higher spreads and failed secondary market auctions.

gap differ between the life and non-life segments, as is evident from the stress tests conducted in 2007 by the main companies in the sector, at the request of the NBB and the CBFA (Table 6). On the one hand, the average maturity difference between the investment portfolios and the technical provisions is generally smaller for non-life than for life insurance, so that the former has a lower exposure to interest rate risk. On the other hand, the average duration of the investment portfolios generally exceeds the duration of the corresponding contracts in the case of non-life insurance, while the opposite is true in life insurance. Moreover, there is a much greater symmetry in the respectively negative and positive effects of an upward and downward shift in interest rates for non-life than for life insurance. The convexity observed in life insurance results from the fact that, in the case of guaranteed-return life insurance contracts, insurance companies have to share part of the positive impact of an increase in interest rates with their policyholders, whereas the risk associated with a decrease in interest rates is fully borne by these companies.

The risks associated with the financial investments of insurance companies will be more explicitly taken into account in the forthcoming Solvency II Directive, which is due to enter into force in 2012. As in the case of the new Basel II rules applicable to banks, this Directive also provides for a three-pillar system. This combines quantitative rules for calculating capital requirements, more qualitative requirements concerning risk control – the prudential authorities having the option of imposing supplementary capital requirements – and finally, obligations regarding the disclosure of information, designed to strengthen market discipline. The quantitative rules under the first pillar take account of a much wider range of risks, enabling companies to use their own risk management models to calculate the capital required. They also

**TABLE 6** IMPACT OF AN INTEREST RATE SHOCK ON THE NET ASSET VALUE OF BELGIAN INSURANCE COMPANIES <sup>(1)</sup>

(data as at the end of June 2007, percentage of the available regulatory capital)

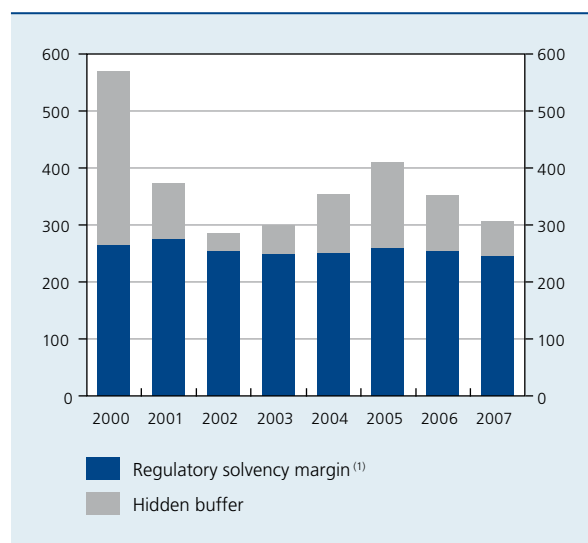
	Total	Life insurance	Non-life insurance
Upward shift .....	0.1	6.6	-3.9
Downward shift .....	-6.7	-19.3	3.7

Sources: CBFA, NBB, insurance company calculations.

(1) Impact of a parallel shift in the yield curve of 200 basis points, calculated on the basis of internal models and the assumptions of the main institutions of the sector.

**CHART 19** AVAILABLE SOLVENCY MARGIN OF BELGIAN INSURANCE COMPANIES

(unconsolidated data, percentages of the minimum required margin)



Sources: CBFA, NBB.

(1) This margin is composed of an explicit margin – including the own funds, subordinated debts and certain other balance sheet items – and an implicit margin which, subject to the approval of the CBFA, comprises certain other specific elements, the principal one being a part of the unrealised gains on investment portfolios.

incorporate the impact on solvency of market-consistent valuation principles in the case of both the financial investments, on the assets' side, and the technical provisions, on the liabilities' side.

This last clause will correct a serious distortion in the current model of calculating regulatory capital, namely the absence of any adjustment to the rate for discounting the technical provisions in the event of market interest rate fluctuations. According to the system currently in force, which is still based on a fixed discount rate, the Belgian insurance sector far exceeded the regulatory solvency requirements at the end of 2007 (Chart 19). Since 2000, the sum of the explicit and implicit solvency margins has in fact exceeded the minimum margin by 150 p.c. or more.

The explicit component includes the own funds, subordinated debts and certain other balance sheet items, such as the fund for future allocations, which corresponds to the positive balance of the technical life insurance result for which, on the closing date for the financial year, the decision on the allocation between shareholders and policyholders is still pending. Apart from these explicit components, the insurance companies may also, subject to CBFA approval, include other specific elements in their regulatory solvency margin, the principal one comprising part of the unrealised gains on investment portfolios. This last

possibility is linked to the current method of valuing insurance company assets. In fact, according to the accounting rules currently in force, most of the unrealised gains are not incorporated in the book value of the investment portfolios of insurance companies, and therefore do not cause any change in the capital. However, with the approval of the CBFA, part of these unrealised gains may be included in the implicit solvency margin. The fraction not included can be regarded as a hidden buffer; it diminished slightly between the end of 2006 and 2007, in line with the increase in long-term interest rates during this period.

# Statistical annex



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**TABLE 1** NUMBER OF CREDIT INSTITUTIONS

	2001	2002	2003	2004	2005	2006	2007
Credit institutions governed by Belgian law with Belgian majority shareholding .....	38	36	34	33	26	26	25
Credit institutions governed by Belgian law with foreign majority shareholding .....	29	29	27	26	28	25	27
EU Member States .....	22	21	21	20	23	20	21
Other States .....	7	8	6	6	5	5	6
Belgian branches of foreign credit institutions .....	46	46	48	45	50	54	58
EU Member States .....	35	36	38	36	41	46	49
Other States .....	11	10	10	9	9	8	9
<b>Total</b> .....	<b>113</b>	<b>111</b>	<b>109</b>	<b>104</b>	<b>104</b>	<b>105</b>	<b>110</b>

Source: CBFA.

**TABLE 2****KEY FIGURES**

(data on a consolidated basis)

	2001	2002	2003	2004	2005	2006 <sup>(1)</sup>	2007 <sup>(1)</sup>
<b>A. Large banking groups</b>							
Balance sheet total (billion euro) .....	940.7	907.5	913.2	1,010.7	1,229.2	1,348.0	1,488.8
Customers' holdings (billion euro) .....	477.0	465.4	453.9	482.1	532.0	667.4	700.9
Loans and advances to customers (billion euro) .....	374.8	381.2	384.9	433.2	535.1	553.8	619.0
Risk asset ratio (p.c.) .....	12.7	12.8	12.4	12.6	11.1	11.2	10.8
Net after tax results (billion euro) .....	3.4	2.9	3.6	4.6	5.7	9.2	6.2
Return on average assets (p.c.) .....	0.4	0.4	0.4	0.5	0.5	0.7	0.4
Return on average equity (p.c.) .....	15.0	12.6	14.2	17.3	19.9	23.1	13.7
Cost-income ratio (p.c.) .....	72.9	73.2	72.8	70.6	72.3	55.5	60.6
Average yield on assets (p.c.) .....	5.8	5.0	4.0	4.0	4.2	4.6	5.4
Average cost of funding (p.c.) .....	4.5	3.5	2.6	2.6	3.0	3.6	4.3
Interest margin (p.c.) .....	1.4	1.5	1.4	1.3	1.2	1.0	1.1
<b>B. Total of Belgian credit institutions</b>							
Balance sheet total (billion euro) .....	1,063.7	1,024.6	1,033.0	1,143.2	1,369.3	1,422.0	1,578.4
Customers' holdings (billion euro) .....	545.0	535.3	531.9	570.1	622.1	715.7	761.6
Loans and advances to customers (billion euro) .....	416.3	421.3	428.8	482.9	591.3	591.0	666.2
Risk asset ratio (p.c.) <sup>(2)</sup> .....	12.9	13.1	12.8	13.0	11.5	11.9	11.2
Net after tax results (billion euro) .....	3.8	3.2	4.0	5.2	6.6	9.7	6.7
Return on average assets (p.c.) .....	0.4	0.4	0.4	0.5	0.5	0.7	0.4
Return on average equity (p.c.) <sup>(2)</sup> .....	13.7	11.8	13.6	15.8	18.5	22.4	13.2
Cost-income ratio (p.c.) .....	74.1	74.7	73.9	72.0	72.6	55.7	61.1
Average yield on assets (p.c.) .....	5.8	4.9	4.0	3.9	4.1	4.6	5.3
Average cost of funding (p.c.) .....	4.4	3.4	2.6	2.6	2.9	3.6	4.2
Interest margin (p.c.) .....	1.4	1.5	1.4	1.3	1.2	1.0	1.1

Source: CBFA.

(1) Since 2006, the data are based on the new IAS/IFRS prudential reporting scheme. This has led to a methodological break in the time series shown in this table, affecting in particular the level of the cost-income ratio (due to a reclassification of commission expenses), the average yield on assets, the average cost of funding and the interest margin.

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

**TABLE 3** MAIN BALANCE SHEET ITEMS BY ACCOUNTING CATEGORY/PORTFOLIO  
(data on a consolidated basis, billion euro)

	2006	2007
<b>Assets</b>		
Financial assets held for trading .....	211.8	254.2
Financial assets designated at fair value through profit and loss .....	39.9	46.7
Available-for-sale financial assets .....	238.8	215.8
Loans and receivables (including finance leases) .....	806.3	925.3
Held-to-maturity investments .....	14.8	14.5
Derivatives used for hedging .....	2.3	5.6
Tangible assets .....	7.0	8.1
Goodwill and other intangible assets .....	2.2	3.9
Investments in associates, subsidiaries and joint ventures .....	3.5	29.8
Miscellaneous .....	95.2	74.5
<b>Liabilities</b>		
Financial liabilities held for trading .....	125.3	193.7
Financial liabilities designated at fair value through profit and loss .....	61.9	61.5
Financial liabilities measured at amortised cost .....	1,094.2	1,183.2
Financial liabilities associated to transferred assets .....	15.8	21.6
Derivatives used for hedging .....	1.7	4.1
Provisions .....	2.6	2.5
Miscellaneous .....	73.2	44.5
Total equity and minority interest .....	47.3	67.3
<b>Balance sheet total .....</b>	<b>1,422.0</b>	<b>1,578.4</b>

Source: CBFA.

**TABLE 4** MAIN BALANCE SHEET ITEMS BY PRODUCT  
(data on a consolidated basis, billion euro)

	2006	2007
<b>Assets</b>		
Loans to credit institutions .....	285.7	320.8
Loans and advances to other than credit institutions .....	591.0	666.2
Debt instruments .....	319.3	296.2
Equity instruments .....	51.8	52.8
Derivatives <sup>(1)</sup> .....	64.4	120.5
Other assets .....	109.7	122.0
<b>Liabilities</b>		
Debts to credit institutions .....	415.3	431.7
Customers' holdings .....	715.7	761.6
Deposits .....	556.4	582.4
Bank bonds and other debt securities .....	159.3	179.1
Derivatives and short positions .....	119.4	186.3
Subordinated liabilities .....	25.7	36.0
Other liabilities .....	98.6	95.5
Total equity and minority interest .....	47.3	67.3
<b>Balance sheet total</b> .....	<b>1,422.0</b>	<b>1,578.4</b>

Source: CBFA.

(1) As from 2007 the figure includes the accrued income attributable to derivative transactions.

**TABLE 5** LOANS AND ADVANCES TO CUSTOMERS<sup>(1)</sup>  
 (data on a consolidated basis, billion euro)

	2006	2007
Term loans .....	272.2	266.7
Mortgage loans .....	189.7	208.3
Current accounts .....	34.4	28.8
Consumer credit .....	15.4	17.1
Finance leases .....	18.2	21.4
Bills & own acceptances .....	2.2	2.9
Securitised loans (for capital and not accounting purposes) .....	8.0	4.0
Other .....	17.9	88.2
<b>Total</b> .....	<b>558.0</b>	<b>637.3</b>

Source: CBFA.

(1) Loans included in the accounting portfolio "Loans and receivables" only.

**TABLE 6** SECURITIES BY TYPE AND PORTFOLIO  
(data on a consolidated basis, billion euro)

	2006	2007
<b>Total long positions</b> .....	<b>374.6</b>	<b>378.7</b>
<b>Debt instruments</b> .....	<b>319.3</b>	<b>296.2</b>
Held for trading .....	53.1	57.6
Designated at fair value through profit and loss .....	21.5	15.5
Available-for-sale .....	231.7	206.9
Loans & receivables .....	0.0	1.9
Held-to-maturity .....	13.0	14.2
<i>p.m. Debt instruments involved in repo transactions excluding re-used debt instruments</i> ..	139.5	146.5
<b>Equity instruments</b> .....	<b>51.8</b>	<b>52.8</b>
<b>Quoted equity</b> .....	<b>36.1</b>	<b>36.5</b>
Held for trading .....	31.2	28.9
Designated at fair value through profit and loss .....	0.3	2.6
Available-for-sale .....	4.6	4.9
<b>Unquoted equity</b> .....	<b>15.7</b>	<b>16.3</b>
Held for trading .....	12.8	12.9
Designated at fair value through profit and loss .....	0.7	0.9
Available-for-sale .....	2.1	2.5
<i>p.m. Equity involved in repo transactions excluding re-used equity</i> .....	0.0	0.2
<b>Investments in associates, subsidiaries and joint ventures (non-consolidated entities)</b> ..	<b>3.5</b>	<b>29.8</b>
<b>Total short positions</b> .....	<b>47.3</b>	<b>64.1</b>
<b>Debt instruments</b> .....	<b>15.5</b>	<b>14.1</b>
<b>Equity instruments</b> .....	<b>31.9</b>	<b>50.0</b>

Source : CBFA.

**TABLE 7** LIABILITIES TOWARDS CUSTOMERS  
 (data on a consolidated basis, billion euro)

	2006	2007
Retail deposits .....	289.9	280.9
of which:		
Sight deposits <sup>(1)</sup> .....	54.9	62.1
Savings deposits <sup>(1)</sup> .....	142.7	131.1
Term deposits <sup>(1)</sup> .....	61.5	64.1
Customer savings certificates .....	27.1	27.2
Deposits of corporates .....	223.7	257.7
Deposits of non-credit institutions .....	29.7	32.1
Other customer deposits .....	13.2	11.8
Certificates of deposits .....	78.1	81.2
Bonds and other debt certificates .....	54.1	70.7
<b>Total</b> .....	<b>715.7</b>	<b>761.6</b>

Source: CBFA.

(1) Deposits booked at amortised cost only.



**TABLE 8** DERIVATIVES AND OFF-BALANCE-SHEET COMMITMENTS

(data on a consolidated basis, billion euro)

	Assets and liabilities	
	2006	2007
<b>Derivatives (notional amounts)</b>		
Held for trading .....	9,789.0	8,763.9
Interest rate derivatives .....	8,153.4	6,749.7
Equity derivatives .....	285.6	340.8
Currency derivatives .....	1,038.9	1,265.5
Credit derivatives .....	217.6	365.7
Commodity derivatives .....	26.5	40.6
Other derivatives .....	67.1	1.6
Hedging derivatives .....	519.1	375.1
Micro-hedging .....	245.3	116.4
Portfolio-hedging .....	273.8	258.6
<b>Total derivatives .....</b>	<b>10,308.2</b>	<b>9,138.9</b>
<b>Off-balance-sheet commitments</b>		
Given		
Loan commitments .....	352.4	451.7
Guarantees .....	282.4	265.8
Other commitments .....	303.5	311.2
Received		
Loan commitments .....	22.8	23.8
Guarantees .....	760.9	1,107.3
Other commitments .....	338.0	313.4

Source: CBFA.

**TABLE 9** OWN FUNDS COMPONENTS OF CREDIT INSTITUTIONS GOVERNED BY BELGIAN LAW  
(data on a consolidated basis, billion euro unless otherwise stated)

	2001	2002	2003	2004	2005	2006	2007
Own funds sensu stricto ("tier 1 capital") <sup>(1)</sup> .....	33.2	34.2	34.3	37.9	39.2	45.9	68.1
of which hybrid instruments .....	2.8	2.7	2.4	3.1	3.6	0.0	0.0
Additional items of own funds for credit and market risks ("tier 2 capital") .....	22.3	20.5	18.4	17.5	17.9	19.7	23.2
of which upper tier 2 <sup>(2)</sup> .....	7.2	5.9	5.4	5.0	4.6	5.8	6.2
of which lower tier 2 <sup>(3)</sup> .....	15.1	14.6	12.9	12.5	13.3	13.9	16.9
Deduction of participations .....	-3.9	-3.7	-3.9	-4.2	-4.8	-3.3	-27.7
<b>Total</b> .....	<b>51.6</b>	<b>50.9</b>	<b>48.8</b>	<b>51.2</b>	<b>52.3</b>	<b>62.3</b>	<b>63.6</b>
Additional items of own funds for market risks only ("tier 3 capital") <sup>(4)</sup> .....	2.6	1.9	2.1	2.1	1.3	0.1	0.0
<b>Risk asset ratio (p.c.)</b> .....	<b>12.9</b>	<b>13.1</b>	<b>12.8</b>	<b>13.0</b>	<b>11.5</b>	<b>11.9</b>	<b>11.2</b>

Source: CBFA.

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

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

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

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

**TABLE 10** INCOME AND EXPENSES  
(data on a consolidated basis, billion euro)

	2006	2007
Interest income .....	148.1	202.2
Interest expenses .....	-135.4	-188.9
Net interest income .....	12.8	13.3
Dividend income .....	0.4	0.3
Net fee income .....	6.7	7.3
<i>Fees received</i> .....	9.1	10.2
<i>Fees paid</i> (excluding the commissions paid to bank agents) .....	-2.4	-2.8
Realised capital gains or losses (on financial assets and liabilities other than measured at fair value through profit and loss) .....	1.4	1.2
Trading income (gains or losses on financial assets held for trading) .....	2.2	2.1
Other fair value accounting gains and losses .....	0.3	0.5
<i>Gains and losses on financial assets and liabilities designated at fair value through profit and loss</i> .....	0.0	0.2
<i>Fair value adjustments in hedge accounting</i> .....	0.3	0.2
Other net operating income .....	2.9	1.6
Non-interest income .....	13.9	13.0
Gross operating income (banking product) .....	26.6	26.3
Staff expenses .....	-8.1	-8.5
Commissions paid to bank agents .....	-0.9	-0.6
General and administrative expenses .....	-5.0	-6.1
Depreciation .....	-0.8	-0.9
Operating expenses (excluding impairment losses and provisions) .....	-14.8	-16.1
Impairment losses on financial assets .....	-0.4	-2.9
Impairment on property, investment properties, intangible assets, investments and associates and joint ventures accounted for using the equity method .....	0.0	0.0
Provisions .....	-0.1	-0.3
Impairment losses and provisions .....	-0.4	-3.2
Share of the profit or loss of associates, and joint ventures accounted for using the equity method .....	0.5	0.6
<b>Net operating income</b> .....	<b>11.8</b>	<b>7.7</b>
Negative goodwill immediately recognised in profit and loss .....	0.0	0.0
Total profit or loss from non-current assets and disposal groups classified as held for sale not qualifying as discontinued operations .....	0.0	0.0
Total profit or loss after tax from discontinued operations .....	0.0	0.0
<b>Total profit or loss before tax and minority interest</b> .....	<b>11.9</b>	<b>7.7</b>
Tax expenses related to profit or loss from continuing operations .....	-1.9	-0.8
<b>Total profit or loss after tax and before minority interest</b> .....	<b>10.0</b>	<b>6.9</b>
Minority interest .....	-0.3	-0.3
<b>Net profit or loss</b> .....	<b>9.7</b>	<b>6.7</b>

Source: CBFA.

TABLE 11 NUMBER OF INSURANCE COMPANIES

	2001	2002	2003	2004	2005	2006	2007
<b>A. By the location of their registered office</b>							
Belgium <sup>(1)</sup> .....	125	123	118	118	110	107	106
European Economic Area <sup>(2)</sup> .....	71	73	66	60	58	54	50
Rest of the world <sup>(3)</sup> .....	6	6	5	3	3	0	0
<b>Total</b> .....	<b>202</b>	<b>202</b>	<b>189</b>	<b>181</b>	<b>171</b>	<b>161</b>	<b>156</b>
Free service provision <sup>(4)</sup> .....	613	629	670	681	740	762	791
<b>B. By specialisation<sup>(5)</sup></b>							
Life insurance .....	28	30	31	31	30	29	30
Non-life insurance .....	140	140	127	122	116	109	103
Life and non-life insurance .....	34	32	31	28	25	23	23
<b>Total</b> .....	<b>202</b>	<b>202</b>	<b>189</b>	<b>181</b>	<b>171</b>	<b>161</b>	<b>156</b>

Source: CBFA.

(1) Companies with their registered office in Belgium comprise the Belgian subsidiaries of foreign companies.

(2) Belgian branches of companies with their registered office in another E.E.A. country.

(3) Belgian branches of companies with their registered office outside the E.E.A.

(4) Provision of insurance services without an establishment in Belgium.

(5) Including the Belgian branches of foreign insurance companies.

**TABLE 12** MAIN COMPONENTS OF INSURANCE COMPANIES' ASSETS<sup>(1)</sup>  
(data on a company basis, billion euro)

	2001	2002	2003	2004	2005	2006
Investments .....	104.1	110.3	125.2	143.3	166.5	183.7
All activities with the exception of class 23 .....	87.6	94.6	107.9	124.4	141.7	158.3
Shares <sup>(2)</sup> .....	18.1	15.8	13.8	15.1	17.9	18.8
Debt securities .....	53.9	58.9	72.2	88.2	101.2	115.2
Land and buildings .....	2.0	2.4	2.4	2.6	2.6	2.5
Mortgage loans .....	5.3	5.9	5.7	5.7	5.5	5.5
Investments in affiliated undertakings .....	5.1	7.4	8.0	8.2	9.2	11.0
Others .....	3.2	4.2	5.8	4.6	5.3	5.2
Class 23 .....	16.4	15.8	17.3	18.9	24.8	25.5
Shares <sup>(2)</sup> .....	14.5	13.1	13.4	13.7	19.5	21.2
Debt securities .....	1.5	2.1	2.6	3.2	4.1	3.8
Others .....	0.4	0.6	1.3	2.0	1.3	0.4
Reinsured part of technical provisions .....	5.7	6.0	6.2	6.6	5.2	4.9
Claims and other assets .....	9.0	9.8	11.0	13.8	13.3	13.2
<b>Total</b> .....	<b>118.7</b>	<b>126.1</b>	<b>142.4</b>	<b>163.7</b>	<b>185.0</b>	<b>201.9</b>

Source: CBFA.  
(1) Insurance companies supervised by the CBFA.  
(2) Including shares in UCITS.

**TABLE 13** MAIN COMPONENTS OF INSURANCE COMPANIES' LIABILITIES <sup>(1)</sup>  
(data on a company basis, billion euro)

	2001	2002	2003	2004	2005	2006
Own funds .....	8.6	7.9	8.8	9.4	10.2	10.7
Technical provisions .....	98.8	106.9	120.8	137.8	156.5	169.9
Life insurance (with the exception of class 23) .....	56.1	63.8	76.2	88.9	103.7	115.2
Class 23 .....	16.6	16.0	17.5	19.2	25.0	25.7
Non-life insurance .....	21.7	22.4	23.1	24.2	22.7	23.3
Others .....	4.4	4.6	5.0	5.5	5.1	5.7
Reinsurance companies' deposits .....	2.3	2.3	2.4	2.5	2.7	2.6
Creditors' claims .....	6.7	6.9	8.2	11.8	13.5	16.5
Other liabilities .....	2.3	2.1	2.2	2.2	2.0	2.2
<b>Total</b> .....	<b>118.7</b>	<b>126.1</b>	<b>142.4</b>	<b>163.7</b>	<b>185.0</b>	<b>201.9</b>

Source: CBFA.

(1) Insurance companies supervised by the CBFA.

**TABLE 14** COMPONENTS OF THE INCOME STATEMENT OF INSURANCE COMPANIES <sup>(1)</sup>  
(data on a company basis, billion euro unless otherwise stated)

	2001	2002	2003	2004	2005	2006
<b>A. Technical account in life insurance</b>						
Net premiums written	13.1	14.4	17.7	20.0	25.2	20.4
Claims paid (-)	5.4	6.9	7.9	8.5	10.2	13.0
Change in the provisions for claims (-)	7.8	6.4	12.9	15.2	20.5	12.4
<b>Premiums after insurance costs</b>	<b>-0.1</b>	<b>1.2</b>	<b>-3.1</b>	<b>-3.7</b>	<b>-5.4</b>	<b>-5.0</b>
Net operating expenses (-)	1.1	1.1	1.2	1.2	1.3	1.4
<b>Result before investment income</b>	<b>-1.2</b>	<b>0.0</b>	<b>-4.3</b>	<b>-4.9</b>	<b>-6.8</b>	<b>-6.4</b>
Net investment income	2.0	-0.3	4.8	5.7	8.0	7.4
<b>Technical result life insurance</b>	<b>0.8</b>	<b>-0.2</b>	<b>0.5</b>	<b>0.8</b>	<b>1.2</b>	<b>1.0</b>
<b>B. Technical account in non-life insurance</b>						
Net premiums written	7.8	8.5	9.1	9.6	8.9	9.3
Claims paid (-)	5.8	5.9	5.7	5.7	5.6	5.9
Change in the provisions for claims (-)	0.9	0.9	0.8	1.0	1.1	0.8
<b>Premiums after insurance costs</b>	<b>1.2</b>	<b>1.7</b>	<b>2.6</b>	<b>2.9</b>	<b>2.3</b>	<b>2.6</b>
Net operating expenses (-)	2.5	2.7	2.8	2.9	2.7	2.8
<b>Result before investment income</b>	<b>-1.4</b>	<b>-1.0</b>	<b>-0.2</b>	<b>0.0</b>	<b>-0.4</b>	<b>-0.2</b>
Net investment income	1.4	0.7	1.0	1.2	1.5	1.3
<b>Technical result non-life insurance</b>	<b>0.0</b>	<b>-0.3</b>	<b>0.8</b>	<b>1.2</b>	<b>1.1</b>	<b>1.2</b>
<b>C. Non-technical account</b>						
Total technical result life and non-life insurance	0.8	-0.5	1.3	2.0	2.3	2.2
Residual net investment income	0.6	0.1	-0.2	0.3	0.7	0.5
Other and exceptional results and taxes	-0.4	-0.4	-0.4	-0.6	-0.6	-0.5
<b>Net result</b>	<b>1.0</b>	<b>-0.8</b>	<b>0.6</b>	<b>1.7</b>	<b>2.4</b>	<b>2.2</b>
<i>p.m. Return on equity (p.c.)</i>	12.1	-10.4	7.3	18.0	23.3	20.8

Source: CBFA.

(1) Insurance companies supervised by the CBFA.

**TABLE 15** LEVEL AND COMPOSITION OF INSURANCE COMPANIES' AVAILABLE SOLVENCY MARGIN<sup>(1)</sup>  
(data on a company basis, million euro unless otherwise stated)

	2001	2002	2003	2004	2005	2006
Explicit margin .....	8,555	8,238	9,467	10,706	11,726	12,767
<i>Percentages of required margin</i> .....	197	173	179	181	180	179
Implicit margin .....	3,454	3,853	3,634	4,092	5,148	5,279
Future profits of life insurance activities .....	1,968	1,855	1,874	755	749	655
Unrealised capital gains .....	1,486	1,998	1,761	3,337	4,399	4,624
<i>Percentages of required margin</i> .....	79	81	69	70	79	74
<b>Total margin</b> .....	<b>12,008</b>	<b>12,091</b>	<b>13,101</b>	<b>14,799</b>	<b>16,874</b>	<b>18,046</b>
<i>Percentages of required margin</i> .....	<b>276</b>	<b>254</b>	<b>248</b>	<b>251</b>	<b>259</b>	<b>253</b>

Source: CBFA.

(1) Insurance companies supervised by the CBFA.



**TABLE 16** COMPOSITION OF INSURANCE COMPANIES' COVERING ASSETS FOR ALL TYPES OF ACTIVITIES <sup>(1)/(2)</sup>

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

	2001	2002	2003	2004	2005	2006	2007
Bonds .....	48.1	50.0	52.7	55.8	57.4	59.5	64.1
Equities .....	24.1	14.6	12.9	12.7	13.9	14.1	10.1
Real estate .....	2.8	3.1	2.8	2.4	2.2	2.1	1.4
Loans .....	5.6	5.6	4.7	3.6	2.7	2.3	2.3
UCITS .....	10.2	15.6	15.6	15.1	16.2	16.5	16.1
Others .....	9.3	11.1	11.3	10.3	7.6	5.5	5.9
<b>Total (billion euro) .....</b>	<b>98.0</b>	<b>110.5</b>	<b>127.6</b>	<b>147.3</b>	<b>168.8</b>	<b>182.7</b>	<b>193.1</b>

Source: CBFA.

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

(2) Insurance companies supervised by the CBFA.

**TABLE 17** KEY FIGURES OF STOCKBROKING FIRMS  
(data on a company basis)

	2001	2002	2003	2004	2005	2006	2007
Number of companies	43	40	37	36	31	27	26
of which with a majority of institutional shareholders	11	12	10	10	8	6	8
Securities portfolio for own account (billion euro) <sup>(1)(3)</sup>	10.95	12.00	18.60	1.89	0.25	0.14	0.23
Equity	1.96	1.67	3.42	0.13	0.11	0.12	0.15
Debt securities	1.55	1.80	1.79	0.38	0.10	0.02	0.05
Other financial instruments <sup>(2)</sup>	7.44	8.53	13.39	1.38	0.04	0.00	0.03
Balance sheet total (billion euro) <sup>(3)</sup>	9.71	9.88	15.48	3.11	2.37	2.30	3.06
Deposits in trust (billion euro) <sup>(4)</sup>	1.17	0.90	0.71	0.94	1.14	1.03	1.54
Securities in trust (billion euro)	20.7	19.7	32.8	28.4	41.1	46.6	73.2
Regulatory own funds (billion euro)	0.38	0.33	0.23	0.26	0.29	0.22	0.43
Risk asset ratio (p.c.)	22.0	17.7	16.2	36.0	58.2	46.5	35.9
Income (billion euro) <sup>(3)</sup>	0.28	0.34	0.31	0.19	0.27	0.32	0.36
Fees and commissions	0.12	0.10	0.09	0.12	0.17	0.18	0.21
On trading for own account	0.11	0.19	0.15	-0.01	0.02	0.17	0.02
Operating expenses (billion euro) <sup>(3)</sup>	0.29	0.35	0.32	0.18	0.18	0.21	0.25
Net after tax results (billion euro) <sup>(3)</sup>	0.02	0.00	0.02	0.05	0.10	0.13	0.17
Return on average equity (p.c.) <sup>(5)</sup>	2.9	0.6	2.7	11.9	28.0	36.5	37.8

Source: CBFA.

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

(2) Mainly composed of options.

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

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

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

**TABLE 18** KEY FIGURES OF PORTFOLIO MANAGEMENT AND INVESTMENT ADVICE COMPANIES

(data on a company basis)

	2001	2002	2003	2004	2005	2006	2007
Number of companies .....	34	33	30	30	23	22	23
of which with a majority of institutional shareholders .....	17	16	15	14	8	8	8
Assets under management (billion euro) .....	144.2	135.6	183.3	191.7	32.4	46.7	49.1
Balance sheet total (billion euro) .....	0.67	0.77	1.08	1.21	0.08	0.10	0.09
Own funds (billion euro) .....	0.42	0.43	0.65	0.70	0.05	0.05	0.05
Income (billion euro) .....	0.55	0.58	0.77	0.88	0.07	0.08	0.10
Operating expenses (billion euro) .....	0.37	0.27	0.48	0.54	0.04	0.05	0.06
Net after tax results (billion euro) .....	0.13	0.22	0.21	0.26	0.02	0.03	0.03
Return on average equity (p.c.) .....	31.5	50.2	32.9	37.8	39.0	54.1	62.5

Source: CBFA.

**TABLE 19** KEY FIGURES OF MANAGEMENT COMPANIES OF UNDERTAKINGS FOR COLLECTIVE INVESTMENT  
(data on a company basis)

	2001	2002	2003	2004	2005	2006	2007
Number of companies .....	-	-	-	-	5	6	7
Assets under management (billion euro) .....	-	-	-	-	211.4	256.4	251.9
Balance sheet total (billion euro) .....	-	-	-	-	1.4	0.9	1.0
Own funds (billion euro) .....	-	-	-	-	0.7	0.3	0.3
Income (billion euro) .....	-	-	-	-	0.9	1.2	1.5
Operating expenses (billion euro) .....	-	-	-	-	0.6	0.9	1.1
Net after tax results (billion euro) .....	-	-	-	-	0.3	0.3	0.3
Return on average equity (p.c.) .....	-	-	-	-	40.6	87.9	115.9

Source: CBFA.

**TABLE 20** BELGIAN UNDERTAKINGS FOR COLLECTIVE INVESTMENT

	2001	2002	2003	2004	2005	2006	2007 <sup>(1)</sup>
<b>A. Number per legal form (end of period)</b>							
Investment companies	108	108	105	108	108	108	105
Number of compartments	1,951	1,987	1,252 <sup>(6)</sup>	1,365	1,477	1,649	1,756
Investment funds	16	16	16	18	17	40	37
Pension-savings funds <sup>(2)</sup>	10	10	11	12	12	14	14
Real estate UCITS <sup>(3)</sup>	12	11	11	11	12	14	14
Undertakings for investment in receivables <sup>(4)</sup>	9	10	10	9	7	7	6
Venture capital UCITS <sup>(5)</sup>	2	2	2	2	2	2	2
<b>Total</b>	<b>157</b>	<b>157</b>	<b>155</b>	<b>160</b>	<b>158</b>	<b>185</b>	<b>178</b>
<b>B. Assets (billion euro)</b>							
1. Net asset value end of preceding year	83.51	88.32	78.26	85.05	95.34	112.14	124.27
2. Subscriptions	26.43	18.31	20.32	23.15	37.60	39.99	24.87
3. Redemptions	14.53	14.87	16.86	17.58	22.26	29.58	20.99
<b>4. Net amounts invested (4 = 2 - 3)</b>	<b>11.90</b>	<b>3.44</b>	<b>3.47</b>	<b>5.57</b>	<b>15.34</b>	<b>10.41</b>	<b>3.88</b>
5. Costs	1.06	0.99	0.99	1.14	1.18	1.41	0.71
6. Capital gains or losses	-6.03	-12.51	4.31	5.86	2.64	3.12	-1.34
<b>7. Net asset value end of period (7 = 1 + 4 - 5 + 6)</b>	<b>88.32</b>	<b>78.26</b>	<b>85.05</b>	<b>95.34</b>	<b>112.14</b>	<b>124.27</b>	<b>126.10</b>

Source: CBFA.

(1) Figures relative to the situation end June 2007.

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

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

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

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

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

**TABLE 21** NUMBER OF FOREIGN UNDERTAKINGS FOR COLLECTIVE INVESTMENT DISTRIBUTED IN BELGIUM  
(end of period)

	2001	2002	2003	2004	2005	2006	2007 <sup>(1)</sup>
<b>Per legal form</b>							
Investment companies .....	198	194	197	184	170	173	174
Number of compartments .....	2,029	2,036	2,067	2,030	2,122	2,172	2,266
Investment funds .....	76	70	70	61	46	53	54
<b>Total</b> .....	<b>274</b>	<b>264</b>	<b>267</b>	<b>245</b>	<b>216</b>	<b>226</b>	<b>228</b>
<b>Per category</b>							
Undertakings with UCITS-passport .....	239	230	218	206	198	209	213
Number of compartments .....	1,880	1,891	1,925	1,918	2,023	2,068	2,162
Undertakings without UCITS-passport .....	35	34	49	39	18	17	15
Number of compartments .....	149	145	142	112	99	104	104
<b>Total</b> .....	<b>274</b>	<b>264</b>	<b>267</b>	<b>245</b>	<b>216</b>	<b>226</b>	<b>228</b>

Source: CBFA.

(1) Figures relative to the situation end June 2007.

**TABLE 22** BREAKDOWN OF UNDERTAKINGS FOR COLLECTIVE INVESTMENT DISTRIBUTED IN BELGIUM ACCORDING TO INVESTMENT STRATEGY  
(billion euro)

	2001	2002	2003	2004	2005	2006	2007
Bond funds .....	32.83	31.22	31.73	35.33	52.92	56.18	45.85
Medium-term funds .....	1.44	1.75	1.89	1.83	1.47	0.95	0.78
Money market funds .....	5.03	6.29	5.71	6.16	5.92	5.30	7.01
Equity funds .....	37.36	24.71	26.72	27.86	39.71	43.40	42.42
Funds with capital protection .....	29.20	31.77	35.90	41.40	41.70	42.62	42.01
Balanced funds .....	27.00	21.95	22.85	23.42	25.57	29.85	31.98
Pension-savings funds .....	7.41	6.40	7.42	8.69	10.32	11.44	11.78
Real estate funds .....	3.27	3.39	3.85	4.42	5.59	7.27	6.12
Private equity funds .....	0.13	0.07	0.08	0.09	0.14	0.15	0.12
Miscellaneous .....	0.03	0.02	0.02	0.10	0.47	0.80	0.34
<b>Total .....</b>	<b>143.70</b>	<b>127.57</b>	<b>136.17</b>	<b>149.28</b>	<b>183.81</b>	<b>197.96</b>	<b>188.42</b>

Source: BEAMA.

**TABLE 23** GROSS PUBLIC ISSUES OF SECURITIES IN BELGIUM  
(billion euro)

	2001	2002	2003	2004	2005	2006	2007
<b>1. Shares</b>							
Belgian companies	0.19	0.35	0.35	3.56	1.83	1.33	17.69
Foreign companies	0.06	0.12	0.03	0.09	0.02	0.00	0.00
Total	0.25	0.47	0.38	3.65	1.84	1.33	17.69
<b>2. Fixed income securities</b>							
<b>2.1 Bonds</b>							
Belgian companies	0.06	0.38	1.23	5.52	4.97	5.54	5.29
Foreign companies	0.00	0.01	0.05	0.23	0.38	0.24	0.21
Total	0.06	0.37	1.18	5.29	4.59	5.31	5.08
<b>2.2 Fixed income securities with capital at risk<sup>(1)</sup></b>	1.34	1.50	0.34	0.27	0.55	1.11	0.77
Belgian companies	0.11	0.00	0.00	0.00	0.00	0.02	0.00
Foreign companies	1.23	1.50	0.34	0.27	0.55	1.09	0.77
<b>2.3 Total</b>	1.40	1.88	1.57	5.78	5.52	6.65	6.06
<b>3. Subordinated debt issued by credit institutions</b>	1.16	0.05	0.66	0.96	1.05	1.44	1.54
<b>4. Government debt</b>							
<b>4.1 Linear bonds (OLOs)</b>	26.0	26.1	23.3	22.4	23.3	23.7	25.6
<b>4.2 Other bonds and notes</b>	1.0	1.3	1.3	0.9	0.6	0.7	0.5
<b>4.3 Treasury certificates<sup>(2)</sup></b>	1.4	0.1	-0.8	-0.1	0.8	0.1	3.4

Sources: Belgian Debt Agency, CBFA, NBB.

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

(2) Net issues.



# Resilience of Financial Infrastructure

# Overview of the NBB's oversight activities

## Introduction

The NBB oversees a wide variety of payment systems, card schemes, securities settlement systems and message providers, in accordance with various arrangements.

For payment systems and for card schemes, the NBB performs its oversight activities within the framework of the Eurosystem's oversight responsibilities, under the arrangements agreed within the Eurosystem. The first two chapters of this article describe the allocation of tasks between the NCBs and the ECB, and the specific role of the NBB for payment systems and card schemes established in Belgium.

For securities settlement systems, the NBB is the overseer of systems established in Belgium. In the case of private sector systems, it acts in close cooperation with the CBFA, which is responsible for prudential supervision over the operators of those systems. Moreover, for systems with an international dimension and structure, international cooperative arrangements have also been set up. Chapter 3 focuses on the oversight of Euroclear, the main securities settlement system established in Belgium.

In the case of the message provider SWIFT, the NBB acts as lead overseer in cooperation with the central banks of the G10. The recent developments in the oversight of SWIFT are described in chapter 4.

## 1. TARGET2 Oversight

### 1.1 Introduction of TARGET2

TARGET, the original European payment system for cross-border payments in euro, had a decentralised structure consisting of fifteen different national real-time gross settlement (RTGS) systems and the ECB Payment Mechanism (EPM). These sixteen systems were interlinked. While a minimum level of harmonisation was achieved, each national RTGS system kept its own rules, procedures and settlement algorithms for the execution of payment instructions.

This interlinked structure of sixteen different payment systems did not permit full exploitation of the potential benefits of the growing integration of financial markets. The Eurosystem therefore decided to develop TARGET2 to establish closer connections between the various national payment systems. Although these systems will remain legally separate, TARGET2 aims at maximum harmonisation, limiting national divergences to the absolute minimum. All twenty-one systems which have joined TARGET2 operate on the same IT platform (which is run by the Banque de France, the Bundesbank and the Banca d'Italia) and use the same rules, procedures and settlement algorithms. It comprises mandatory and optional modules. The mandatory modules are:

- the Payments Module (PM) which processes the payment instructions;
- the Contingency Module (CM) which allows central banks to execute a limited number of payment instructions in contingency situations;
- the Static Data Management Module (SD) which manages the basic data, such as the TARGET2 directory;

- the CROSS module responsible for providing data for archiving and for calculating invoices and which is only accessible for central banks;
- the Information and Control Module (ICM) which enables participants to consult on-line their payment instructions, reserves, account balances, etc. Furthermore, this module permits interaction with optional modules such as the Home Accounting Module, the Reserve Management Module and the Standing Facilities Module.

## 1.2 TARGET2 oversight arrangements

In TARGET, each NCB assessed its local TARGET component against the Core Principles for Systemically Important Payment Systems. The resulting assessment reports were presented to the Payment and Settlement Systems Committee (PSSC), where they were submitted to a peer review, in order to ensure a level playing field – in regard to oversight – among the countries of the European System of Central Banks (ESCB).

The replacement of TARGET by the more integrated structure of TARGET2 entails a new oversight structure. First, it was necessary to redefine the scope of the oversight, as TARGET2 is adding new modules to TARGET. Next, the practical organisation of the work had to be reconsidered. Due to the maximum harmonisation and the use of a common IT platform, if existing TARGET oversight procedures had been applied to TARGET2, that would have led to a duplication of work and, hence, an inefficient use of resources for the ESCB. A new organisational structure has therefore been developed, combining a cooperative oversight framework and the more traditional national oversight approach which had been adopted for TARGET.

The cooperative oversight framework is defined in line with the recommendation made by the Committee on Payment and Settlement Systems (CPSS) in its 2005 report *“Central Bank Oversight of Payment and Settlement Systems”*. It draws a distinction between responsibility for the results of the oversight assessment and responsibility for the conduct of this assessment. Whereas the Governing Council is responsible for the former, the European Central Bank acts as the overseer with primary responsibility for the conduct of the oversight assessment of TARGET2. All NCBs of the Eurosystem are invited to join the ECB in the conduct of this oversight assessment.

For the national modules, the “old” oversight organisational structure is used. This means that local NCBs are responsible for the oversight assessment (e.g. conduct and results) of their local operations. The resulting assessment reports are subjected to a peer review at the level

of the PSSC in order to maintain a level playing field with similar modules offered in other countries, but also with the common modules offered by TARGET2.

## 1.3 Implementation of TARGET2 oversight

Practical organisation of the work had already started in 2005 with the definition of the scope and the new organisational procedures. Under the primary responsibility of the ECB, a group of NCBs and the ECB conducted the assessment of the common modules, whereas NCBs of those countries opting for national modules conducted the assessment of these local modules. In this context, the NBB was involved in the oversight of TARGET2 and conducted an oversight assessment of its Proprietary Home Accounting RECOUR.

## 2. Oversight of Card Payment Schemes

### 2.1 Motivation

As explained in the ECB’s policy statement of 2000, promoting efficient and smoothly operating payment systems also means ensuring the security of payment instruments. In the light of that, the Eurosystem has developed a common oversight policy for card payment schemes (CPS) to maintain public confidence in those CPSs. The need for such a common policy will be all the more pressing with the creation of the Single Euro Payments Area, which calls for the establishment of a level playing field between the national CPSs from the point of view of oversight.

### 2.2 Standards for card schemes

Before drafting the standards, the Eurosystem conducted a thorough analysis of the CPS market, in cooperation with the industry. Most CPSs active in the euro area were covered by this analysis, which provided valuable information on the functioning of the various systems and was the basis for the identification of the various actual or potential risks confronting CPSs. Five different areas were defined according to the risks identified:

- legal risk;
- financial risk;
- overall management risk;
- operational risk;
- reputational risk.

## Box 1 – Oversight Standards for Card Payment Schemes (CPS)

The Eurosystem has formulated five standards that should enhance the reliability of CPS. These standards cover legal issues, transparency, operational reliability, good governance and sound clearing and settlement processes. They read as follows:

1. each CPS should have a sound legal basis under all relevant jurisdictions;
2. each CPS should ensure that comprehensive information, including appropriate information on financial risks, is available to all actors;
3. each CPS should ensure an adequate degree of security, operational reliability and business continuity;
4. each CPS should implement effective, accountable and transparent governance arrangements;
5. each CPS should manage and contain financial risks in relation to the clearing and settlement process.

The addressee of these standards is in principle the Governance Authority of the CPS. However, in agreement with the overseer, the Governance Authority may delegate the responsibility for compliance to other entities active within the CPS. In such cases, the boundaries for responsibility of these actors must be clearly defined, transparent and documented.

These risk areas served as the reference for the formulation of standards by the Eurosystem. Before their final approval, those standards were submitted to a public consultation that started on 3 May 2007 and continued until 2 August 2007. Based on the comments received during this consultation, a final version of the standards was published on 11 January 2008 on the ECB website. Box 1 details these standards.

### 2.3 Organisation of CPS oversight

The standards are applicable to all CPSs that operate in euro and are active within the euro zone. Only CPSs satisfying one of the following criteria within the euro area may be exempted from the application of the oversight standards:

- over the past three years, the sum of cards in issue is on average less than one million per year;
- over the past three years, the CPS has an annual average value of transactions of less than € one billion.

All CPSs that do not qualify for exemption must comply with the standards, irrespective of their geographical area of activity within the eurozone. For a CPS active in only one country, the local NCB is responsible for the assessment. For those CPSs active in more than one country, a “cooperative oversight” structure has been put in place. As in the case of TARGET2, this cooperative oversight structure is set up in line with the 2000 ECB statement on the “*Role of the Eurosystem in the field of payment systems oversight*” that specifies the Eurosystem’s framework

for the oversight of systems for which a common policy is pursued. This statement explains that:

*The Governing Council formulates the common policy stance; the enforcement of the policy stance is as a rule entrusted to the NCB of the country where the system is legally incorporated. The Eurosystem favours a cooperative approach towards the enforcement of the oversight policy stance, with the local NCB acting as lead overseer, and being responsible for liaising with other relevant NCBs, whenever this is required. For systems which have no clear domestic anchorage, lead overseer is the NCB where the system is legally incorporated unless the Governing Council decides otherwise on the basis of the features of the system and entrusts oversight responsibilities to the ECB.*

The oversight assessments against the recently adopted standards for card payment schemes are scheduled to start during the first half of 2008, with final assessments ready by 2009. For Belgium, this means that MasterCard Europe, the Brand and Licence Company (as the owner of the Bancontact/Mister Cash brand) and Atos Worldline (as the major operator for Bancontact/MisterCash, Visa and MasterCard products) will be assessed against these standards.<sup>(1)</sup>

(1) For a detailed overview of the Belgian card payments landscape, see “Impact of recent developments in Belgian card payment schemes”, NBB’s 2007 FSR, pp. 113-119

### 3. Securities Settlement Systems

#### 3.1 Overall range of activities

The NBB has been involved in the oversight of Clearing and Securities Settlement Systems at various levels:

- through the oversight of its own in-house securities settlement system (SSS), with a focus on the overall risk management and the legal soundness of the system. No major changes have recently occurred regarding the functioning of the NBB-SSS;
- through its participation in the cooperative oversight of the Paris-based central counterparty LCH Clearnet. As Euronext Brussels trades are cleared via LCH Clearnet,

the NBB and the CBFA are involved in its oversight and supervision, in accordance with Belgian law and with the memoranda of understanding concluded by the relevant overseers and supervisors. In coordination with the CBFA and with the French, Dutch and Portuguese regulators, the NBB continues to advise the Minister of Finance on system rule changes that require his approval.

- through the oversight of the Euroclear group. Due to the importance, the international dimension and the complex structure of this group, which is incorporated in Belgium, the NBB is closely involved in the oversight of Euroclear which accounts for the major part of its monitoring activity in the field of SSS.

#### Box 2 – Cooperation within the CPSS

The CPSS of the Group of Ten countries published in 2007 two reports to which the NBB has contributed.<sup>(1)</sup>

**The report entitled “New developments in clearing and settlement arrangements for OTC derivatives”** (March 2007) looks at risk management practices in the OTC derivatives market and evaluates the potential for risks to be mitigated by greater use of market infrastructure. The report focuses on the following issues: (1) the risks created by delays in documenting and confirming transactions; (2) the implications of the rapidly expanding use of collateral to mitigate counterparty credit risks; (3) the potential for expanding the use of central counterparty (CCP) clearing to reduce counterparty risks; (4) the implications of OTC derivatives prime brokerage; (5) the risks associated with unauthorised novations of contracts; and (6) the potential for significant market disruptions from the close out of OTC derivatives transactions following the default of a large market participant.

**The report “Progress in reducing foreign exchange settlement risk”** (May 2008). The NBB is involved in the cooperative oversight arrangements relating to the Continuous Linked Settlement (CLS) system. This system was established by the private sector in September 2002, in response to the central bank strategy aiming to reduce the systemic risk arising from the settlement of foreign exchange transactions. It is operated by CLS bank, an institution based in New York and supervised by the Federal Reserve, which also acts as lead overseer. At present, fifteen currencies are settled in this system.

In May 2008 the CPSS issued a report based on a global survey of over one hundred institutions active in the FX market. The main objective of this survey was to assess how far the strategy endorsed in 1996 by the G10 Governors to reduce the FX settlement risk has been successful. The overall conclusion of this survey, in which two major Belgian banks were involved, is that significant progress has been made in terms of risk reduction, most visibly by the increasing use of CLS. For the Belgian institutions, which together account for FX settlement obligations representing around 1 p.c. of the total amount of the survey, the use of CLS represents on average 60 p.c. of the FX settlement flows (55 p.c. on average for all institutions covered by the survey).

Considering that a notable share of FX settlement obligations is still settled in ways that generate significant risks across the global financial system, the report recommends several actions by individual institutions, industry groups and central banks to see that this concern is properly addressed. One part of the new strategy would be for the

(1) The full text of the reports are available on the BIS website [www.bis.org](http://www.bis.org).



institutions to ensure that they have in place a coherent set of risk controls and incentives across their respective units, so that their FX settlement exposures are properly controlled. It is the objective of central banks, including the NBB, to work with the supervisors to encourage continued progress by the financial industry.

The rest of this chapter concentrates on Euroclear and reviews recent developments in the oversight of this major infrastructure by drawing a distinction between:

- the international cooperative arrangement set up for Euroclear SA/NV (ESA). ESA is the parent company of the ICSD Euroclear Bank (EB) and the CSDs Euroclear UK & Ireland<sup>(1)</sup>, Euroclear France, Euroclear Netherlands and Euroclear Belgium (EBE), so that its oversight is of direct common interest to the overseers of each (I)CSD belonging to the Euroclear group;
- the oversight performed by the NBB, as the national authority, over the SSS operated by Euroclear Belgium and the Euroclear ICSD operated by Euroclear Bank incorporated in Belgium. Those systems and the other national CSDs belonging to the Euroclear group remain separate legal entities, subject to their existing regulatory environment.

central banks (of countries whose CSD is owned by ESA: Belgium, the UK, France, the Netherlands and Ireland).<sup>(2)</sup>

The NBB and the CBFA act as the central entry point for the collection and distribution of the relevant information and coordinate the assessment of the common services provided by ESA. A formal arrangement was agreed in the 2005 “Memorandum of Understanding on the framework for the oversight and supervision of ESA”, establishing two committees that are in charge of implementation of this framework. A High Level Committee sets the policies and priorities arising from the coordinated assessment, and discusses with ESA’s board and management the outcome of the coordinated assessment, as well as the ESA strategy concerning its common services. A Technical Committee assists the implementation of the agreed policies regarding the coordinated assessment of ESA’s common services (see FSR 2005 – Cooperative oversight of Euroclear and SWIFT).

### 3.2 Cooperative oversight of Euroclear SA/NV

ESA owns the group’s shared securities processing platform and delivers a broad range of services to the Euroclear group SSSs. Those common ESA services and other issues of common interest are monitored, via a cooperative framework, by the relevant securities commissions and

(1) The former CRESTCo.

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

## Box 3 – Developments in the cooperation between the NBB and the CBFA

In Belgium, the NBB is in charge of overseeing securities clearing and settlement systems. The NBB oversight powers are laid down by law<sup>(1)</sup> and are in line with the CPSS-IOSCO recommendations for securities settlement systems and other best practices. The CBFA is responsible for prudential supervision of the entities operating these systems, which are required to have the status of a credit institution (such as EB) or, in compliance with the Belgian legal framework, of a settlement institution (such as EBE) or of an assimilated institution (such as the holding company Euroclear SA/NV). This ensures that the prudential requirements are equivalent to the ones for credit institutions. Furthermore, the involvement of the CBFA is also justified by its supervisory responsibilities with regard to the Belgian regulated markets, as every Belgian regulated market is required by law to use clearing and

(1) Article 8 of the Law of 22 February 1998 establishing the Organic Statute of the National Bank of Belgium and Article 23 of the Law of 2 August 2002 on the supervision of the financial sector and on financial services



settlement systems providing sufficient guarantees for the protection of the interests of participants and investors, as well as for the smooth functioning of the market.

A specific cooperative framework was installed between the NBB and the CBFA by Article 5 of the Belgian Royal Decree implementing Article 118 of the Law of 2 August 2002 on the supervision of the financial sector and on financial services. As a result, the two institutions exchange their respective analyses and use one another's assessments in conducting their own assessment, taking into account the differences of scope, methodologies and responsibilities. Specific dossiers exchanged in 2007 included the Euroclear group governance, the EB liquidity policy and the EB-Clearstream Banking Luxembourg Bridge settlement. The CBFA and the NBB also organise ad hoc meetings of a special committee to discuss relevant topics, to evaluate the progress made in their cooperation and to decide its future direction. Specific attention points include coordination in the drawing up of annual control plans, harmonisation of incident reporting, contact with and assessment of the internal and external audit, and coordination of contact with foreign authorities.

In 2007, the cooperation between the CBFA and the NBB concerning oversight and supervision was further enhanced, with the ultimate aim of evolving towards a more integrated oversight and supervision approach. To that end, the NBB and the CBFA have held detailed discussions on each other's risk assessment and risk-based priorities, and have coordinated their respective oversight and prudential supervision planning for 2008. Also, high-level meetings with Euroclear on supervisory and/or oversight recommendations are, as a rule, jointly organised by the NBB and the CBFA. These arrangements should make both supervision and oversight more efficient as well as more effective.

The implementation of the new common settlement platform is closely monitored by this group of overseers and supervisors. For the period under review, the milestones of this consolidation programme included the launch of new core settlement functionalities for EB, similar to those already implemented in 2006 for Euroclear France and Euroclear UK and Ireland, the further deployment of the new data centre infrastructure and the implementation of the new platform (ESES) for Euroclear France in November.

This latter project, which will be extended to Euroclear Netherlands and EBE during the last quarter of 2008, will create an integrated settlement platform for trades in securities listed on the Euronext cash markets. The system functionalities and market rules and practices for the three markets will be largely harmonised, and settlement will be possible using a single central bank account. The relevant French, Dutch and Belgian authorities coordinated the monitoring of this project's compliance with the relevant CPSS-IOSCO Recommendations for SSS. Specific attention was given to the harmonisation of the legal framework, the impact on system participants' liquidity resulting from the switch from a net to a gross settlement system, and the impact of the system design on the business continuity plan.

The new IT infrastructure of the Euroclear Group, which is owned and managed by Euroclear SA/NV was also assessed in a coordinated way by the regulators of the Euroclear Group countries. In the framework of its consolidation, Euroclear has put in place a new data centre infrastructure at group level, thus improving its disaster recovery and business continuity capacities. In particular, it will enable Euroclear entities to better cope with serious incidents with a regional or metropolitan impact. A dual-office model in which the companies' staff is divided between two distant locations in such a way that if one of the two office facilities should become unavailable, the operation of the Euroclear system could continue from the other one, has also been implemented.

The coordinating national authorities have paid special attention to stability in the production of the settlement services provided by ESA, specifically after some incidents resulted in system outages and settlement deadlines extensions in the Euroclear UK and Ireland systems. The group of regulators is following up the implementation of the action plan established by ESA to address those concerns.

The ESA regulators, supervisors and overseers developed a dedicated crisis coordination procedure designed for operational crises occurring within the Euroclear group which could have a significant cross-border impact on the group systems. The procedure aims to provide timely communication of information between national authorities and with the Euroclear group, via the use of a harmonised set of information that permits a prompt analysis of the situation and its impact on the various Euroclear entities. This cross-border crisis arrangement complements the national arrangements which already exist between each CSD of the Euroclear group and its domestic authorities. It also coexists with the current operational procedures for those CSDs settling in central bank money.

### 3.3 Oversight of Euroclear Bank and Euroclear Belgium

The oversight of EB has centred on several topics. One of the priorities was the review of the EB's liquidity policy, both under normal and extreme circumstances. Attention was focused on the operator's ability to cope with stress situations along the lines of CPSS-IOSCO Recommendation 9, which requests the CSD to ensure, as a minimum, timely settlement in the event that the participant with the largest obligation is unable to settle. This requirement also requests CSDs to assess the probability and potential impact of multiple settlement failures, relative to the costs of ensuring settlement in such an event. The EB's policy specifies that, under exceptional circumstances, an adequate liquidity contingency plan should be in place to ensure business continuity. The objective for EB is to be able to withstand an event where the participant with the largest payment obligation (this position being calculated at consolidated group level) is unable to make the payment when it falls due. Euroclear Bank has planned further improvements, particularly with respect to the stress-testing methodology as well as to the composition of the contingency liquidity sources. These new developments will continue to be closely monitored by the NBB.

The specific interest for the resilience issues has also led the NBB to ask EB to initiate a series of desk-top exercises over the last few years in which the impact of extreme shocks has been simulated and in which EB's contingency measures for such situations were presented. This so-called crisis master plan was aimed to enhance the ability to analyse the impact of extreme events (not only liquidity shocks but also of operational and credit events) on the smooth functioning of the system. This valuable tool is also allowing EB to further test and improve existing contingency plans via innovative scenarios.

In relation to the network of EB market links, the NBB monitored the compliance of the updated internal EB procedures with the risk analysis framework specifically designed for cross-border links. This framework involves an overall assessment of the design of each link and of its financial and operational integrity and provides guidance for interpretation of CPSS-IOSCO Recommendation 19<sup>(1)</sup>. The NBB paid specific attention to the compliance of the Bridge, i.e. the link between Euroclear Bank and Clearstream Banking Luxembourg, with the credit risk mitigation measures recommended in the CPSS-IOSCO report (which stipulates that any credit extensions between CSDs should be fully secured and subject to limits). Although a number of measures have been taken by Euroclear in order to comply with this requirement, the NBB still expects the current credit securitisation mechanisms that Euroclear has in place to evolve further. The NBB's oversight activities also included a review of the links for which provisional transfers were received from some local markets<sup>(2)</sup> (e.g. securities received before finality in that local market) without Euroclear intervening to prevent the provisionally-booked securities from being retransferred in its books. Progress has been made in that respect but some structural solutions are still awaited for the links with Spain and Germany on which some provisional transfers remain.

Finally, due attention was paid to the impact of implementation of Euroclear's new business model. Work continued on the settlement platform consolidation programme, especially with the successful migration of EB to the Single Settlement Engine. These developments are expected to have a positive impact on the overall operational reliability of the systems.

As for EBE, the NBB's assessment of the system on the basis of the CPSS-IOSCO Recommendations for SSS, was formally updated. The outcome of this update can be found in this FSR "Assessment of Euroclear Belgium against the CPSS-IOSCO Recommendations". During the year under review, in its oversight of EBE, the NBB has also examined the ongoing integration of EBE in the Euroclear group and the ensuing implementation of the Euroclear group risk management framework. Attention was given to the outsourcing arrangements with the IT provider used by EBE, and to the impact for EBE of the dematerialisation of securities in Belgium, implemented as from January 2008. The specific aspects of the ESES project were followed up at local level when relevant.

(1) See in this respect, the article "Cross-border securities settlement and risk analysis for cross border links", providing guidance on the interpretation of the CPSS-IOSCO recommendation 19 (Risks in cross-border links) as published in the NBB's 2006 FSR, pp. 123-140.

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



## 4. SWIFT

The NBB is the lead overseer of SWIFT, and performs its oversight in cooperation with the G10 central banks. SWIFT is not a payment system but a key messaging provider for payment and securities settlement infrastructures throughout the world. Central banks conduct oversight of SWIFT in view of its crucial importance for the safety and efficiency of payment and securities settlement systems. The practical arrangements for the oversight of SWIFT were described in the NBB's 2005 FSR issue. Another article in the 2007 FSR presented the framework developed for SWIFT oversight activities, e.g. the High Level Expectations for the oversight of SWIFT.

The three sections of this chapter successively provide an update on the introduction of the High Level Expectations for the oversight of SWIFT, review recent developments at SWIFT of relevance for overseers' activities, and examine how the strong interdependence between the various infrastructures using SWIFT for their messaging affects the design of SWIFT resilience requirements.

### 4.1 High Level Expectations for the oversight of SWIFT

The main focus of the SWIFT oversight is on operational risk, as this is believed to be the primary area where SWIFT could pose a risk to the global financial system. The five High Level Expectations (HLEs) for the oversight of SWIFT go into more detail on the various dimensions of those operational risks (see Box 4).

One of the reasons for issuing these HLEs, rather than more detailed, prescriptive standards, was to leave SWIFT the maximum flexibility to demonstrate its compliance with the expectations, without too much interference in SWIFT's existing risk management processes and reporting frameworks.

Over the last year, overseers and SWIFT have been discussing SWIFT's demonstration of compliance with the HLEs. This is documented by SWIFT in a self-assessment report to overseers. This report does not present the opinion of the overseers, but SWIFT's own assessment of how it lives up to the HLEs.

The HLEs are also used as the framework for organising oversight activities. This provides the structure for discussions on the risk-based oversight planning and the allocation of tasks between the technical and the senior level groups of SWIFT overseers. In accordance with standard SWIFT oversight methodology, specific oversight reviews

are always linked to one or more of the objectives formulated in a HLE, both for the oversight interactions with SWIFT and for the overseers' internal analyses. However, the HLE framework does not by any means restrict the topics that can be covered in the oversight of SWIFT. The overseers continue to have the opportunity to identify specific topics for review and discussion with SWIFT management and Internal Audit.

### 4.2 Developments at SWIFT

Overseers of SWIFT are reviewing the impact of several developments at SWIFT in 2007. Through discussions with Internal Audit, SWIFT management and Board representatives, they will gauge how these new policies could influence risk identification and assessment at SWIFT. These specific developments are being – and will continue to be – reviewed without, however, compromising on our primary focus on the availability, integrity and resilience of SWIFT's core services of FIN and SWIFTNet messaging.

The main development was SWIFT's decision to adapt its IT infrastructure. In September 2007, the SWIFT Board approved plans to move to a multi-zonal messaging architecture. SWIFT will locate a new operating centre in Switzerland and have a command and control capability in Hong Kong (in addition to similar, existing capabilities in Europe and the US). There will be two message processing zones, a transatlantic zone and a European zone, so that intra-European messages will remain in Europe. Over time, the design allows more traffic zones to be added if that is commercially warranted.

With this new architecture, SWIFT aims to increase its processing capacity, enhance its resilience, contain costs and address data protection issues. SWIFT overseers will focus their attention on this SWIFT system re-design, which comprises two major phases scheduled for completion by 2010 and 2013 respectively. They will review, within the framework of the HLEs, the design of the new concept, the management of the project and the combination of its implementation with ongoing day-to-day operations.

Besides, overseers will continue to focus on SWIFT's risk management policies related to cyberdefence, as these are a crucial component of SWIFT's security policy. In the oversight approach, specific attention is paid to the role, operation, organisation and governance of the IT audit function and the risk management function.

## Box 4 – High Level Expectations for (the Oversight of) SWIFT

### 1. RISK IDENTIFICATION AND MANAGEMENT

SWIFT is expected to identify and manage relevant operational and financial risks to its critical services and ensure that its risk management processes are effective.

### 2. INFORMATION SECURITY

SWIFT is expected to implement appropriate policies and procedures, and devote sufficient resources to ensure the confidentiality and integrity of information and the availability of its critical services.

### 3. RELIABILITY AND RESILIENCE

Commensurate with its role in the global financial system, SWIFT is expected to implement appropriate policies and procedures, and devote sufficient resources, to ensure that its critical services are available, reliable and resilient and that business continuity management and disaster recovery plans support the timely resumption of its critical services in the event of an outage.

### 4. TECHNOLOGY PLANNING

SWIFT is expected to have in place robust methods to plan for the entire lifecycle of the use of technologies and the selection of technological standards.

### 5. COMMUNICATION WITH USERS

SWIFT is expected to be transparent to its users and provide them information that is sufficient to enable users to understand well their role and responsibilities in managing risks related to their use of SWIFT.

### 4.3 System interdependence

A whole series of market infrastructures use SWIFT for their messaging. This implies that all these infrastructures and their participants are dependent on a single messaging operator. SWIFT's resilience is therefore crucial for global financial stability, justifying high oversight expectations vis-à-vis SWIFT. However, the individual infrastructures can also undertake action on their own. They need to gain familiarity with the contingency procedures put in place by SWIFT, and understand how these procedures operate, and how they would impact their own working methods and contingency arrangements. In order to increase crisis preparedness, these contingency procedures should be tested by SWIFT with the active involvement of major market infrastructures.

The messaging channels underlying correspondent banking activity can be accommodated in various ways, e.g. by in-house systems of major banks, bilateral relationships through leased lines, or via SWIFT. It is estimated that an important part of correspondent banking activity relies on SWIFT. Overseers aim to gain a better insight into the organisation and market practices of correspondent banking messaging, in order to ascertain whether SWIFT's contingencies for messaging – or, alternatively, correspondent banks' own contingency arrangements – are adequate. Specific industry-wide tests could be developed to increase preparedness under different scenarios.

# The assessment of Euroclear Belgium against the CPSS-IOSCO Recommendations

In November 2001, the Committee on Payment and Settlement Systems (CPSS) of the G-10 central banks and the Technical Committee of the International Organisation of Securities Commissions (IOSCO) published a set of standards in the form of Recommendations for Securities Settlement Systems.<sup>(1)</sup> The objective of the nineteen CPSS-IOSCO Recommendations is to contribute to financial stability by strengthening the securities settlement systems (SSS) that have become an increasingly important component of the global financial infrastructure. CPSS-IOSCO has also developed an Assessment Methodology which aims to provide a clear and comprehensive framework for assessments made on the basis of the Recommendations.<sup>(2)</sup> This methodology gives assessors four possible assessment categories (“Observed”, “Broadly observed”, “Partly observed” and “Non-observed”) defining to what extent the system complies with each Recommendation.

The Euroclear group encompasses four domestic Central Securities Depositories (CSD) and one International Central Securities Depository (ICSD). The CSDs of the group are Euroclear UK & Ireland, Euroclear France, Euroclear Nederland and Euroclear Belgium, and the ICSD is Euroclear Bank, a Belgian credit institution, which operates the securities settlement system known as the Euroclear System. These five entities are owned by Euroclear SA, which acts as service provider to the group (I)CSDs.

The NBB is responsible for the oversight of the securities settlement systems run by the Belgian members of the group, namely Euroclear Bank and Euroclear Belgium. In the framework of these responsibilities, the NBB updated in September 2007 its CPSS-IOSCO assessment of Euroclear Belgium, the outcome of which is revealed below.

Such disclosure is promoted by the CPSS-IOSCO methodology and should make the NBB’s regulatory role clearer for users of the systems. By disclosing this assessment, the NBB also intends to promote its accountability as overseer of payment and securities settlement systems.

The CIK (Caisse Interprofessionnelle de Dépôts et de Virements de Titres / Interprofessionele Effectendepositoen Girokas), is a Belgian limited liability company. At the beginning of 2006, CIK became part of the Euroclear group and is now a wholly-owned subsidiary of the Euroclear holding company, the Belgium-based Euroclear SA/NV. The new commercial name of CIK is Euroclear Belgium.

Euroclear Belgium is the Belgian central securities depository for mainly Belgian-issued equities. Securities held with Euroclear Belgium include Belgian and foreign shares, warrants, corporate bonds, rights and investment funds. Euroclear Belgium provides related securities safekeeping and corporate action services. It operates settlement systems for processing Euronext Brussels cash market transactions and over-the-counter (OTC) transactions.

(1) “Recommendations for Securities Settlement Systems”, CPSS-IOSCO, November 2001, (available on the website of the Bank for International Settlements: [www.bis.org](http://www.bis.org))

(2) “Assessment Methodology for the Recommendations for SSSs”, CPSS-IOSCO, November 2002, (available on the website of the Bank for International Settlements: [www.bis.org](http://www.bis.org))

## Box 1 – The CPSS-IOSCO Recommendations for SSSs

### I. Legal risk

The legal framework applicable to an SSS's operation is highly important for its reliability and predictability. Legal risks *may* cause one party to a trade to suffer losses because laws or regulations do not support the rules of the securities settlement system or the property rights and other interests held through the settlement system.

#### 1. LEGAL FRAMEWORK

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

### II. Pre-settlement risk

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

#### 2. TRADE CONFIRMATION

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

#### 3. SETTLEMENT CYCLES

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

#### 4. CENTRAL COUNTERPARTIES (CCPS)

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

#### 5. SECURITIES LENDING

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

### III. Settlement risk

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



#### 6. CENTRAL SECURITIES DEPOSITORIES (CSDS)

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

#### 7. DELIVERY VERSUS PAYMENT (DVP)

CSDs should eliminate principal risk by linking securities transfers to funds transfers in a way that achieves delivery versus payment.

#### 8. TIMING OF SETTLEMENT FINALITY

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

#### 9. CSD RISK CONTROLS TO ADDRESS PARTICIPANTS' FAILURES TO SETTLE

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

#### 10. CASH SETTLEMENT ASSETS

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

### IV. Operational risk

Operational risk is the risk of a human error, or of a breakdown or deficiency of the hardware, software or communications systems that are crucial to the settlement process. It covers both operational reliability and business continuity issues.

#### 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.

### V. Custody risk

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

#### 12. PROTECTION OF CUSTOMERS' SECURITIES

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



## VI. Other issues

### 13. GOVERNANCE

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

### 14. ACCESS

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

### 15. EFFICIENCY

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

### 16. COMMUNICATION PROCEDURES AND STANDARDS

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

### 17. TRANSPARENCY

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

### 18. REGULATION AND OVERSIGHT

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

### 19. RISKS IN CROSS-BORDER LINKS

CSDs that establish links to settle cross-border trades should design and operate such links to reduce effectively the risks associated with cross-border settlements.

The results of this assessment of Euroclear Belgium are summarised in Table 2. This assessment takes into account a series of mitigating actions that were taken by Euroclear Belgium after the preliminary assessment made by the NBB. As a result, Euroclear Belgium is now fully compliant with fifteen recommendations, whereas three recommendations (7, 12 and 19) are “broadly observed”. One recommendation (3) is considered irrelevant for Euroclear Belgium since it deals with aspects of the settlement cycle for which Euroclear Belgium cannot be held accountable.

## Legal risk

The settlement activities of the Euroclear Belgium systems are governed by consistent, clear and solid laws, rules, procedures and contractual provisions that are public and accessible to system participants.

The legal framework supports the enforceability of transactions and the protection of participants’ assets. It also provides an adequate legal basis for the holding of securities (immobilisation and dematerialisation), the transfer of securities by book entry, securities lending and delivery versus payment with finality. The system’s rules and contracts are considered enforceable between participants, notwithstanding the insolvency of a participant. Recommendation 1 (legal framework) is observed.

## Pre-settlement risk

Euroclear Belgium’s systems settle Euronext Brussels stock exchange transactions and over-the-counter trades. Rules and practices regarding trade confirmation and settlement cycles are set by the market itself. In practice, Euroclear Belgium cannot interfere with these rules and practices. Settlement instructions are matched prior to

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

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

settlement. Recommendation 2 (trade confirmation) is observed.

Recommendation 3 (settlement cycles) stipulates that settlement fails should not be a significant source of added risk but, if so, risks from fails should be effectively mitigated. For over-the-counter trades, the fails rate exceeds 5 p.c. of settlements and can thus be considered as a source of risk. No information is available regarding risk mitigation measures as these take place bilaterally between the transaction participants. The NBB acknowledges that the risk mitigation techniques for coping with fails are bilaterally agreed between the counterparties to the over-the-counter transaction. Recommendation 3 is thus not relevant for Euroclear Belgium.

Recommendation 4 (central counterparties) requires the evaluation of the costs and benefits of a central counterparty (CCP) or the introduction of a CCP mechanism. For Euronext Brussels trades, when the transaction is registered, the Paris-based clearing house LCH.Clearnet SA positions itself as a CCP between the clearing member of the buyer and the clearing member of the seller. The recommendation is being observed.

Recommendation 5 on securities lending stipulates that there should be no impediments to the development and functioning of securities lending. Securities lending helps to expedite settlement. Securities lending in Belgian stocks has recently become more efficient with a widening of the lending base. In July 2004, a law was passed allowing

Belgian funds to lend stocks, pending the implementing Royal Decree. In March 2006, this Royal Decree entered into force enabling Belgian funds to lend stocks to credit institutions, investment firms and clearing and settlement institutions. Recommendation 5 is observed.

### Settlement risk

CPSS-IOSCO Recommendation 6 (CSDs) requires the SSS to provide immobilisation or dematerialisation of securities and to process transfers by book entry. In Belgium, a dematerialisation conversion project is being implemented from 2008 onwards, discouraging investors from holding securities in paper form. Euroclear Belgium complies with this requirement.

Recommendation 7 requires a DVP mechanism so as to avoid principal risk when counterparties settle a trade. In principle, Euroclear Belgium provides proven DVP arrangements. However, the Euroclear Belgium technical and contractual framework does not always ensure DVP, as – under specific circumstances, e.g. in the unlikely event that the CCP LCH.Clearnet SA would default – the Euroclear Belgium participant selling securities on exchange does not always benefit from such a mechanism vis-à-vis LCH.Clearnet SA. Furthermore, the available data for over-the-counter transactions indicate that around 20 p.c. of over-the-counter trades might not be settled DVP. Therefore, Recommendation 7 is assessed as being broadly observed. The NBB recommends that within the relevant Euroclear Belgium settlement system, the CCP LCH.Clearnet SA is regarded as the same as any other participant in the sense that a DVP mechanism is always applied for trades settled between the CCP and all relevant Euroclear Belgium participants. The NBB acknowledges that the planned new settlement system (ESES), due to be implemented by Euroclear in Belgium in November 2008, will remedy this problem. Pending this solution, the NBB recommends that Euroclear Belgium amend its legal documentation so as to increase transparency on the potential risk a net seller incurs vis-à-vis the CCP in the event of a CCP default. It is furthermore recommended that the reasons for the assumed relatively high number of over-the-counter trades that are not settled DVP are determined and – where appropriate – the cause removed, except where it is the own free will of the parties to settle Free of Payment (FoP).

Regarding Recommendation 8 (timing of settlement finality), the moment of finality is stipulated in the Euroclear Belgium legal documentation. The system complies with this recommendation.

Euroclear Belgium does not offer cash accounts to its participants. The cash accounts of the systems operated by Euroclear Belgium are held at the NBB, which acts as the settlement agent for the Euroclear Belgium system participants. The cash leg of the transactions processed by Euroclear Belgium is thus settled in central bank money. Cash settlement is exclusively in euro. Overdrafts or debit balances in securities are not permitted in the system. Recommendation 9 (CSD risk controls to address participants' failures to settle) and Recommendation 10 (cash settlement assets) are therefore assessed as being observed.

### Operational risk

Euroclear Belgium has outsourced its IT operations to an external service provider, Atos Euronext Market Solutions (AEMS), under a framework agreement concluded via Euroclear SA/NV. In accordance with the Euroclear group outsourcing policy, Euroclear Belgium remains responsible as the operator of the custody and settlement system and exerts adequate control over the IT service provider. Recommendation 11 on operational reliability specifically requires all key systems to have appropriate contingency plans and backup facilities, and to be reviewed regularly. A Disaster Recovery Plan (DRP) covering IT infrastructure for key systems has been put in place and will run at another location sufficiently far away from the main site whenever needed. A business contingency plan has been drawn up. Recommendation 11 further requires a system operator, such as Euroclear Belgium, that outsources operations to a third party to make sure that those operations meet the same standards as if they were provided directly. The system operator and AEMS have identified the sources of operational risk and established related policies, so as to ensure that there are official and adequate management controls up to the level of the final provider of the outsourced service. Therefore, Recommendation 11 is being observed too.

### Custody risk

Recommendation 12 (protection of customers' securities) requires the use of adequate accounting practices and safekeeping procedures. The vast majority of the securities deposited and immobilised with Euroclear Belgium are physical securities that are kept in the vaults of Euroclear Belgium. Within Euroclear Belgium, risk controls are in place and procedures are subject to internal audit checks. Euroclear Belgium enables participants to distinguish between their own and their clients' securities, which protects customers' securities from a participant's insol-



veny. Euroclear Belgium has never experienced any case of insufficient securities to meet any customer claim. Also, participants – including foreign CSDs – receive account statements each time a securities transfer takes place, stating the transfer and the position of the securities involved. However, an account statement listing all the participant's securities positions is only sent once a year. Moreover, Euroclear Belgium can “print on demand” book-entry securities when an investor wants to hold this security in physical form, thanks to a Belgian law enabling this service which came into force in February 2006. When immobilised and held on account with CIK, these securities are represented by a specific global note form. The face value or capital share of this global note can be determined, as required by law, on the basis of the books and inventories held by Euroclear Belgium upon the instructions of its participants and the issuer. The Euroclear Belgium contractual framework has been adapted to specify all procedures involved regarding these “print-on-demand” securities. However, there is no reconciliation procedure for regularly confirming with the issuer the accuracy of the face value of this specific global note form.

Based on the above, Recommendation 12 (custody Risk) is assessed as being broadly observed. The NBB recommends that Euroclear Belgium regularly sends its participants an account statement listing all their securities positions and asking for any discrepancies to be reported. The NBB also recommends that Euroclear Belgium puts together a reconciliation procedure with the issuer so as to regularly check that the face value of the specific “printing-on-demand” global note form is correct.

## Other issues

### GOVERNANCE

In 2006, Euroclear Belgium became part of the Euroclear group and is now a wholly-owned subsidiary of the Euroclear holding company, called Euroclear SA/NV, established in Belgium. Euroclear SA/NV offers a broad range of services to Euroclear Belgium, as to the group's other SSSs. These include audit, financial and risk management, legal, human resources, product management, business model and harmonisation services. However, the group's (I)CSDs remain separate legal entities subject to their existing regulatory environment.

Both the Euroclear Belgium and the Euroclear SA/NV governance arrangements are clearly specified and information about them is publicly available. Established user committees do take users' interests into account. Consequently, Recommendation 13 (governance) is observed.

### ACCESS

Recommendation 14 (access) stipulates that access criteria must be objective, clearly stated and publicly disclosed. Criteria that limit access to the CSD on grounds other than risks should be avoided. Euroclear Belgium has drawn up objective and risk-based access criteria. It has stipulated them in its contractual framework that is published on its website. The recommendation is therefore observed.

### EFFICIENCY

Euroclear Belgium has put in place procedures to regularly review its pricing levels against its operational costs. User meetings are frequently held in order to improve services, whenever requested.

Users are systematically informed of all new planned products, the pricing structure and tariff changes. Regular and ad hoc user groups have been formed where users are involved in outlining the business cases for projects comprising a functional description and cost and price analysis. Recommendation 15 (efficiency) is observed.

### COMMUNICATION PROCEDURES AND STANDARDS

Euroclear Belgium uses international communication standards and procedures. Besides its own proprietary system, the CSD offers file transfer facilities and SWIFT ISO15022. Links with other CSDs are SWIFT-based. Users have different possibilities for connecting to the CSD and there is a wide range of possibilities as to the kind of reporting they want to receive, the frequency and the means of communication: SWIFT (ISO15022), Satelit (a proprietary system based on a specific software) or file transfer. Recommendation 16 (communication procedures and standards) is observed.

### TRANSPARENCY

Recommendation 17 on transparency requires market participants to be provided with a full and clear description of their rights and obligations, the cost of participating in the system, the rules, regulations and laws governing the system, its governance procedures, any risks arising either for participants or for the operator, and any steps taken to mitigate those risks. It further stipulates that the CPSS/IOSCO Disclosure Framework or the answers to the key questions of this assessment report should be completed and disclosed. Euroclear Belgium has coordinated all relevant contractual and technical documentation. It is available in French and Dutch and is published on the Euroclear Belgium website. Since October 2006, Euroclear Belgium has published on its website answers

to the ECSDA disclosure questionnaire which incorporates questions from the CPSS-IOSCO disclosure framework. Recommendation 17 is observed.

#### **REGULATION AND OVERSIGHT**

As a securities settlement system, Euroclear Belgium is overseen by the National Bank of Belgium. Euroclear Belgium has the status of settlement institution and, in this respect, is subject to prudential supervision by the CBFA. The roles and tasks of the CBFA and the NBB, and their cooperation, are clearly defined in the relevant laws and regulations on the supervision of the financial markets. Recommendation 18 (Regulation and oversight) is observed.

#### **RISKS IN CROSS-BORDER LINKS**

Recommendation 19 (risks in cross-border links) states that CSDs that establish links to settle cross-border trades should design and operate such links to effectively reduce the risks associated with cross-border settlements. It prescribes a risk assessment of the link. Euroclear Belgium has established a scheme for regular self-assessments of its link arrangements. However, it has not yet used this formal risk-assessment procedure for analysing the design of each link. Therefore, the recommendation is only broadly observed. The NBB recommends that Euroclear Belgium applies its risk analysis to the relevant legal, operational and financial aspects of each link.

# How Belgian payment and settlement infrastructure weathered the market turmoil in 2007 and the first quarter of 2008

## Introduction

Market infrastructures like large-value payment and securities settlement systems play a pivotal role in the functioning of global financial markets. As an outgrowth of the subprime crisis, the market turmoil that broke out in summer 2007 squeezed interbank credit markets as banks were unwilling to lend to each other, especially – but not exclusively – in the non-secured money market. Such disfunction in interbank markets could trigger different types of risks in payment and securities settlement infrastructure and potentially act as a vector to spread disruption further among other participants and other systems through various system interdependencies.

This article is built around three main sections. Section 1 presents an overview of the different sources of risk at stake in periods of market stress and resulting liquidity and collateral management challenges for market participants. Section 2 is devoted to the functioning, during the financial market turmoil, of ELLIPS, the large-value payment system in Belgium which migrated to the TARGET2 platform in February 2008.<sup>(1)</sup> The important role

of intraday credit will be addressed as a key factor for the smooth working of ELLIPS. Section 3 looks at how the securities settlement infrastructure established in Belgium, e.g. the NBB-SSS, Euroclear Bank and Euroclear Belgium, functioned during the turmoil.<sup>(2)</sup>

## 1. Overview of major risks faced and collateral used by payment and securities settlement systems

### 1.1 Potential risks for payment and securities settlement systems

An initial risk that has grown in importance for payment and securities settlement systems during the recent market turmoil has been operational risk.<sup>(3)</sup> Strong increases in trading might lead to peak settlement days and, if not well anticipated, result in processing capacity constraints. As laid down by international standards, payment and securities settlement system operators should ensure sufficient system capacity to maintain the required processing speed and to organise regular testing to determine whether stress volumes can be handled.<sup>(4)</sup>

The financial crisis has also heightened the possibility of a system participant becoming insolvent. Nowadays, the principal risks that could be faced, in such a case, by other participants tend to be mitigated by the fact that most securities settlement systems function on delivery versus payment (DvP) basis.<sup>(5)</sup> Moreover, payment and securities

(1) Stands for Electronic Large-Value Interbank Payment System, the Belgian component of TARGET (Trans-European Automated Real-time Gross settlement Express Transfer system) before February 2008.

(2) The NBB-SSS is the Securities settlement system operated by the NBB, in which the bulk of the Belgian public debt is issued and held on accounts.

(3) Operational risk is the risk of unexpected losses as a result of deficiencies in systems and checks, human error or management failure.

(4) CPSS-IOSCO Recommendation 11 for Securities Settlement Systems and Core Principle VII for Systemically Important Payment Systems.

(5) Principal risk is the risk that the seller of a security delivers a security but does not receive payment or that the buyer of a security makes payment but does not receive delivery.

settlement systems are bound to meet the requirements set out by CPSS-IOSCO and should be able to cope with the failure of the participant with the largest obligation to settle. Systems also need to evaluate the probability of multiple failures by simulation tests to assess whether the system is reliant in such cases.

Nevertheless, one consequence of the credit market squeeze could be that system participants fail to find the required liquidity via transactions in the money market or through their central banks to meet their obligations in payment and securities settlement systems in due time. The time criticality of payment transactions has increased with the move from deferred net systems to real-time gross settlement systems as well as the tight settlement time windows for other systems like CLS. Similarly, system participants may encounter difficulties in mobilising the required securities to carry out securities deliveries when large parts of their securities portfolio are used to generate liquidity. If a transaction is not settled, the counterparty will face a replacement cost risk.<sup>(1)</sup> Even if the required payment or delivery of securities is executed just with a small delay, system participants may incur liquidity risks.<sup>(2)</sup> This might also have an impact on the overall settlement efficiency of the system (e.g. queuing of payments, delays on the intended settlement day), although some components of the system may mitigate the potential impact (e.g. securities lending and borrowing programme).

These different types of risks could materialise not only as a result of events within a system. Systems could also be hit by external events if they fall within the range of risk contagion spread through various forms of system interdependencies. The settlement of securities against payment, for example, principally depends on the good functioning of the payment systems. Again, the failure of local market participants to meet settlement obligations may hamper the settlement of securities across links between (I)CSDs and, in a second round, impact on the internal settlement efficiency of the (I)CSD that has set up the link as onward transactions could not go through.<sup>(3)</sup>

Another important outcome of the market turmoil is the sharp decline in the market value of certain types of structured products (e.g. ABS, CDO). Such types of instruments are potentially used as collateral among payment and securities settlement systems. Although those systems should manage the variations in the value of collateral by applying haircuts, losses are possible when market events result in unexpected levels of volatility. Should markets turn illiquid for certain instruments, the collateral taker may not be able to realise the collateral assets at all. Such market risks are all the more relevant when the system participants hold large volumes of these kinds of

instruments in their collateral portfolio. In such a context, collateral management is a major challenge for market infrastructures and their participants.

## 1.2 Collateral management challenges

A bank's decision to get funding via the interbank money market or through central bank liquidity goes hand in hand with the allocation of different types of assets as collateral (e.g. "collateral arbitrage"). This process includes the analysis of possible opportunity costs in the selection of the type of assets as collateral, taking into account the eligibility of collateral in interbank markets and central bank operations, as well as the possibility of maximising returns in collateral management (e.g. collateral re-use facilities with triparty agents). On the other hand, cash lenders (or collateral takers) will analyse the potential market risks related to collateral to mitigate their counterparty risk (e.g. preferably by highly rated and liquid collateral) and set their pricing in that respect. As a result of the market turmoil, some assets previously considered as very liquid (such as certain structured credit products) were no longer accepted as collateral in the interbank market (repo-transactions).

The list of asset types eligible as collateral by the ECB allows banks in the euro area to make use of a wide range of collateral for the Eurosystem's open market operations as well as for intraday credit for payment systems. Although government bonds make up the majority of the total eligible asset pool for collateral in transactions with the Eurosystem, the share of such securities in the collateral actually used have been falling in recent years contrary to less liquid types of collateral.<sup>(4)</sup> ABS for example, account for a growing share of the collateral deposited with the Eurosystem. This trend has become more prominent since the market turmoil began including in Belgium. At the end of September 2007, ABS accounted for 17 p.c. of total collateral pledged with the Eurosystem.<sup>(5)</sup>

Banks make use of both domestic and cross-border collateral.<sup>(6)</sup> For cross-border collateral, several different possible arrangements can be used. Belgian banks rely on the

(1) Replacement cost risk is the risk of loss or unrealised gains on unsettled contracts with a defaulting participant.

(2) Liquidity risk includes the risk that the seller of a security does not receive payment from its counterparty in time and may have to find the funds elsewhere or liquidate assets to complete other payments.

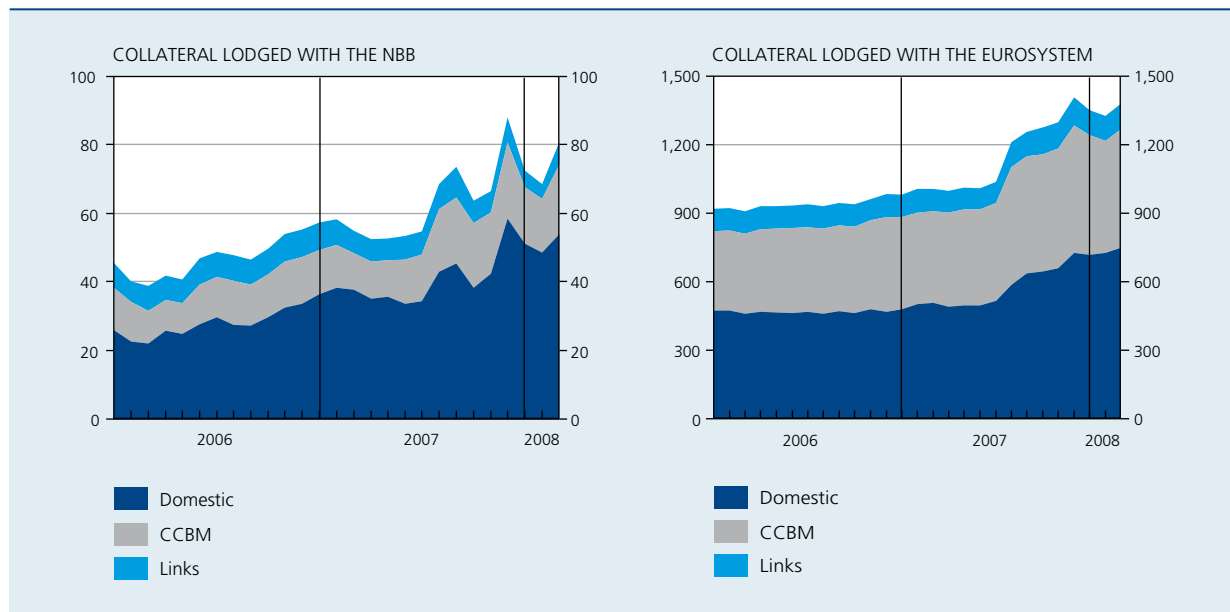
(3) A link between two SSSs consists of a set of procedures and arrangements for the cross-border transfer of securities through book-entry process. A direct link takes the form of an omnibus account opened by an SSS (the investor SSS) in another SSS (the issuer SSS).

(4) ECB, Euro Money Market Study 2007, December 2007.

(5) ECB, Monthly Bulletin, February 2008.

(6) Cross-border eligible collateral relates to securities originating from another country of the euro area.

**CHART 1** AMOUNT OF COLLATERAL POSTED BY BELGIAN BANKS FOR POTENTIAL USE FOR CENTRAL BANK LIQUIDITY  
(billions of euro on the last Friday of each month)



Source : NBB and ECB.

Correspondent Central Bank Model (CCBM) and Euroclear Bank links with local CSDs, eligible for Eurosystem credit and monetary policy operations, to mobilise collateral across national borders.<sup>(1) (2)</sup>

The left hand-panel of Chart 1 shows the amount of collateral lodged by Belgian banks with the NBB at the end of the month for potential use for central bank liquidity. The NBB directly transforms the collateral delivered to it, as collateral taker, into an available intraday credit, after covering the monetary policy operations. This does not mean that this facility is immediately used by the counterparties concerned but rather that it can be considered as a potential intraday credit usable at the discretion of its beneficiaries. While the market turmoil resulted in a sharp increase in the total amount of collateral lodged with the NBB, it did not change the relative proportion of domestic and cross-border collateral. Domestic collateral still accounts for the vast majority of collateral deposited by banks with the NBB. An important reason for this is that Eurobonds deposited with Euroclear Bank are considered as domestic collateral as Euroclear Bank is established in

Belgium. For the Eurosystem as a whole, as shown by the right-hand panel of Chart 1, about half of the total collateral provided by banks is cross-border.

With respect to cross-border collateral, the CCBM is more intensively used to mobilise cross-border collateral by Belgian banks than the eligible links of Euroclear Bank. The decision to make use of the CCBM or Euroclear Bank links primarily depends where the securities portfolio eligible for collateral is held (e.g. in the local market or in the books of the ICSD) rather than the procedures or functioning of these arrangements as such. Again, the location mainly depends on the bank's trading activity and may vary between different types of foreign securities. If securities are held by the bank in the local market, possibly via a local custodian, they will be mobilised via the CCBM. On the other hand, if other types of foreign securities are directly held in Euroclear Bank, the mobilisation of such securities as collateral only requires a book-entry transfer between two accounts in Euroclear Bank (e.g. between the Belgian bank and the NBB).

Foreign securities held in Euroclear Bank for which there is no eligible link need to be repatriated to the home market first before they can be pledged as collateral. Current Eurosystem rules for credit and monetary policy do not allow the home central bank to have an account with a foreign CSD. A longer settlement chain has a

(1) Within the Correspondent Central Banking Model (CCBM), counterparties may obtain credit from their "Home Central Bank" on the basis of collateral transferred to another NCB, the Correspondent Central Bank (CCB).  
(2) Euroclear Bank has 7 eligible links to NBB SSS (Belgium), Clearstream Banking S.A. (Luxembourg), Clearstream Banking Frankfurt (Germany), OeKB (Austria), Euroclear Nederland (the Netherlands), Euroclear France (France) and Monte Titoli (Italy).

direct impact on the processing speed of such collateral arrangements. However, banks often tend to pre-deposit collateral in order to anticipate future collateral requirements (e.g. Eurosystem tenders).

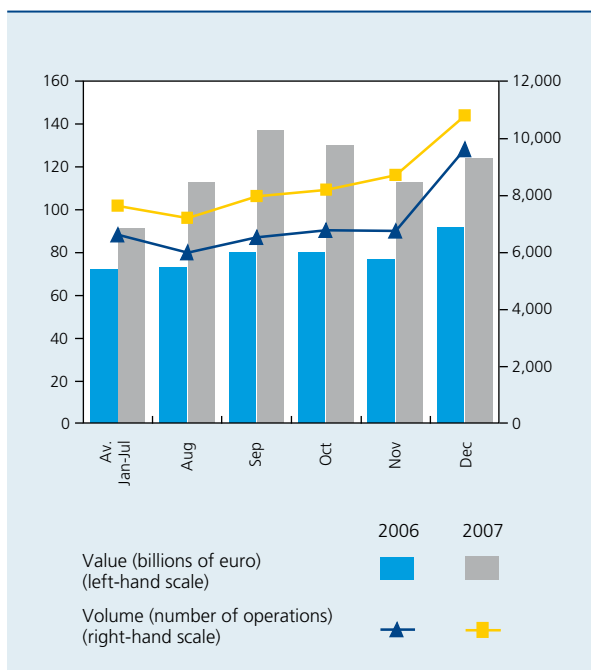
## 2. The functioning of ELLIPS during the market turmoil in 2007<sup>(1)</sup>

### 2.1 ELLIPS

The backbone for large-value payment flows initiated by the credit institutions established in Belgium is ELLIPS, which is the Belgian component of TARGET. In February 2008, ELLIPS migrated to the TARGET2 platform.

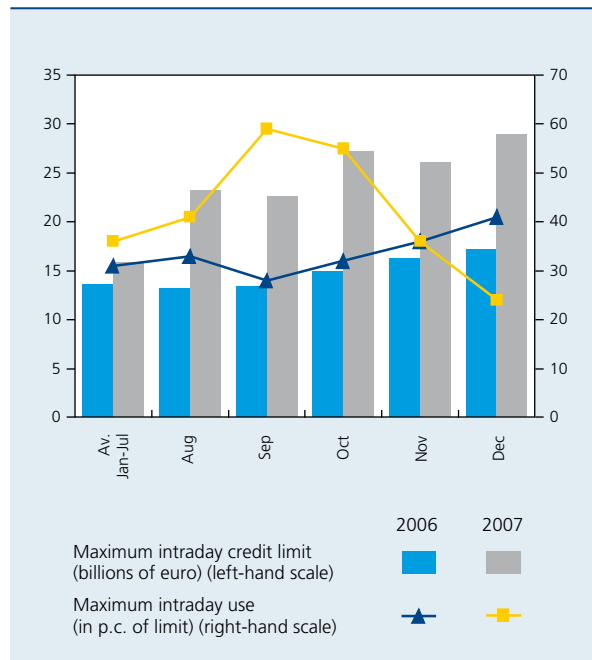
Chart 2 traces the turnover of ELLIPS during 2006 and 2007, expressed in both the number of average daily transactions and in value terms. During the first seven months of 2007, referred to as an indicator of the growth recorded during the period which preceded the market turmoil, the average daily value settled in ELLIPS increased by 26 p.c. compared to the corresponding period of 2006. In the following months, the yearly rate of growth accelerated markedly to reach a maximum of 71 p.c. in September and only gradually slowed down to

**CHART 2** TURNOVER IN ELLIPS IN VOLUME AND IN VALUE  
(monthly average of daily figures)



Source : NBB.

**CHART 3** LIMITS AND EFFECTIVE USE OF NBB INTRADAY CREDIT TO BELGIAN COUNTERPARTIES  
(monthly average of daily figures)



Source : NBB.

35 p.c. by December. A similar, although less pronounced pattern can be observed for the number of transactions. The yearly growth rate, limited to 15 p.c. during the first seven months of 2007, went up to as much as 29 p.c. in November, only to fall back to 12 p.c. in December. The differences in the evolution in value and in volume terms reveal that the individual transactions settled in 2007, and particularly in the last five months, were on average of a much higher value than those settled one year earlier.

To participate in ELLIPS, Belgian banks have to rely on the intraday credit they obtain against collateral from the NBB. After application of haircuts, the collateral received from the various banks determines their maximum intraday debit limit with the NBB, once adequate collateralisation of monetary policy operations has been taken into consideration.

Chart 3 shows that, as a consequence of the turbulence on the markets, Belgian banks have greatly widened their potential access to intraday liquidity with the NBB, by delivering additional collateral, which clearly suggests precautionary behaviour. While for the first seven

(1) As from mid February 2008, ELLIPS has ceased operation and the interbank payment activities have been transferred to the TARGET2 single shared platform. As a result, the data for 2008 are not more comparable with data for 2007.

months of 2007, the average increase in the intraday debit limits was only 16 p.c. compared to 2006, growth was much stronger in the following months, reaching a maximum of 83 p.c. in October and still as high as 68 p.c. in December.

In order to get a fuller picture of changes in the functioning of the system and in the behaviour of participating banks, the data on limits must be backed up by figures on the effective use by banks of their available intraday credit with the NBB. This rate of use is calculated by dividing the maximum intraday positions by the maximum intraday credit limit for each month.

During the first seven months of 2007, this rate reached 36 p.c. compared to 31 p.c. for the corresponding period of 2006. The use of intraday credit limit increased sharply during the months of September and October to reach, respectively, 59 and 55 p.c. Over this period, Belgian banks not only raised their limits but also made much wider use of those higher limits. As the liquidity available was squeezed by the gridlocked interbank market, it was crucial for participants to rely on a properly-functioning payment system backed up by continued adequate intraday credit provision by the central bank.

The situation returned to normal during the last two months of 2007 with the rate of use of intraday credit going down to 36 p.c. in November and 24 p.c. in December. However, as Belgian banks have maintained their intraday credit limits at a high level, the maximum intraday credits effectively used were still at a similar level in December 2007 (7.1 billion euro) as in December 2006 (6.9 billion euro), in absolute amounts.

It should be noted that this increase as well in the reservation of collateral by Belgian banks as in the effective use of intraday credit has taken place in an unchanged institutional and operational framework. There was, in particular, no change in the asset categories making up the single list of eligible collateral, no adaptation of the applicable risk management measures (haircuts and collateral valuation methods) and the standard operating hours were left unchanged.

The fact that ELLIPS worked well, even in months with the sharpest increase in activity (November 2007 for the number of instructions handled and September 2007 for the sums processed) may be corroborated by some more qualitative observations.

The payment management behaviour of ELLIPS participants has remained highly stable. They maintained their usual payment order sending pattern throughout the

whole year of 2007. There was neither a shift in payment order sending from the morning towards the afternoon, nor any disruption of the queuing mechanism applied. The framework in place for managing collateral movements has also proved to be adequate for coping with the large increase in delivered collateral during the final months of the year. The whole monitoring infrastructure in place at the NBB, in its capacity as operator of ELLIPS, was available, effectively used (as during other standard periods), and ran with no operational problems at all.

### 3. The functioning of SSS infrastructure in Belgium during the market turmoil in 2007 and the first quarter of 2008

#### 3.1 NBB-SSS

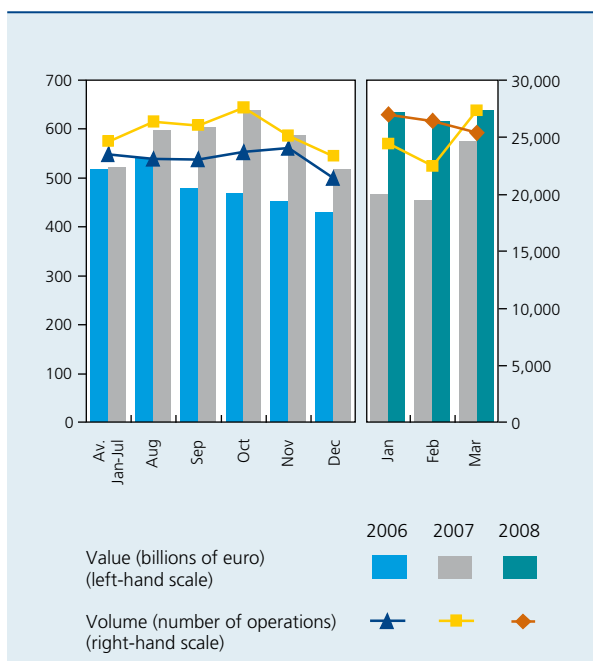
The NBB-SSS is the securities settlement system, which hosts the bulk of the Belgian public debt as well as the commercial papers and certificates of deposit issued under Belgian law.

During the first seven months of 2007, the growth in the activity of the NBB-SSS was quite moderate, in both volume and value terms (Chart 4). In the following months, the rate of increase in the value of transactions went up significantly, especially in October 2007 and in January and February 2008, reaching an average of 36 p.c. for these three months. On the whole, the variation in the number of transactions was much less pronounced. In March 2008, a net decrease was even observed compared to the number of transactions carried out in the corresponding month of the preceding year.

Some further indication of changes in the behaviour of participants can be inferred from the fees received by the NBB-SSS for organising the automatic securities lending and borrowing services, which increased significantly (+67 p.c. in 2007). These automatic securities lending and borrowing services are a settlement enhancing instrument for the direct participants and a risk management tool for the NBB-SSS. They give direct participants a chance (optional service) to borrow in an automated manner the securities which they lack on a temporary basis – e.g. because of a delivery problem higher up in the transaction chain – to settle successfully the sales transactions planned for that day. Each securities borrowing has to be adequately collateralised by the borrower concerned. Although strong growth in the use of those services had already been recorded at the beginning of the year, it suggests that the recent turmoil

**CHART 4** TURNOVER IN NBB SSS IN VOLUME AND IN VALUE

(monthly total of delivery instructions)



Source : NBB-SSS.

on the financial markets induced participants to resort to a much larger extent than previously to securities lending and borrowing services.

### 3.2 Euroclear Bank

Euroclear Bank is the operator of the Euroclear system which offers securities settlement and custody services in domestic and international securities (government and public sector bonds, corporate bonds, equities, warrants, etc.). It also acts as primary place of deposit (e.g. CSD) for international securities such as Eurobonds. Apart from settlement and custody, Euroclear Bank offers a wide range of other services including triparty collateral management services. It has a large and diverse customer base of financial institutions in more than eighty countries.

As shown in Chart 5, the market turmoil did not lead to any acceleration in the growth of Euroclear Bank's turnover. On the contrary, the rate of increase, which had been substantial during the first seven months of 2007

(+38 p.c. compared to 2006), tended to slow down in the following months.

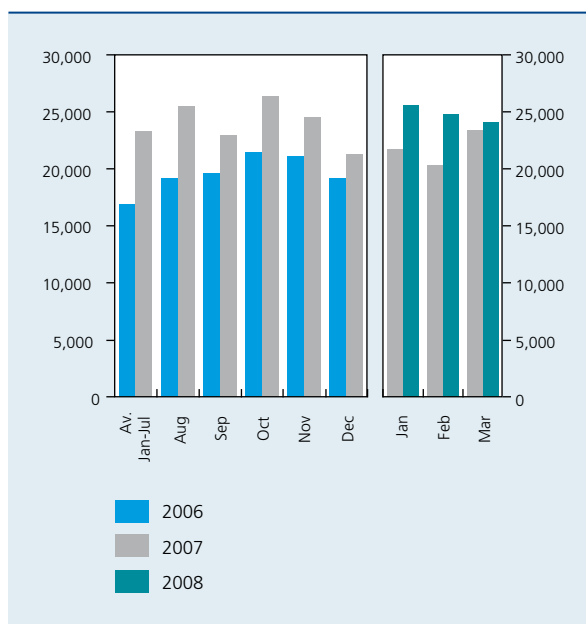
Settlement turnover in number is only available per quarter. The figures did not show any substantial change during the period under review.

The potential impact of the financial turmoil can be further examined by the trends in various services offered by Euroclear Bank. A first service is the provision of intraday credit, which is granted to participants to allow the settlement of securities purchases before funds are received to cover the payments. Such gaps may occur due to the sequence of settlement processing, differences in operating hours of various settlement systems or time-zone differences. The credit provided by Euroclear Bank is very short term, typically intraday, and is almost fully secured by collateral (on average about 99 p.c., a level that was sustained during the market turmoil).<sup>(1)</sup> The amount of secured intraday credit granted by Euroclear Bank represents only a minor share of settlement turnover.

Another service to support the settlement of transactions is the Euroclear Bank lending and borrowing programme. Fully integrated into the system's settlement processing windows, this programme aims to minimise potential

**CHART 5** TURNOVER IN EUROCLEAR BANK<sup>(1)</sup>

(billions of euro)



Source : Euroclear Bank.

(1) The figures include internal book-entry settlement between Euroclear Bank participants (only receipts are included) and external settlement such as transactions with parties outside Euroclear Bank (both receipts and deliveries). Securities borrowings and reimbursements, and special types of transactions as adjustments and withdrawals for redemptions are not included.

(1) Credit may be used for more than 24 hours but participants are strongly discouraged from doing so by the high debit interest rates charged to participants by Euroclear Bank.



settlement fails due to a shortage of securities. As intermediary between lenders and borrowers, Euroclear Bank guarantees the reimbursement of these short-term loans to the lenders in the programme (on behalf of the borrowers). In June 2007, before the start of the crisis, the list of eligible securities for the lending pool in Euroclear Bank was widened. The market turmoil proved to be a driver of lending and borrowing activity in Euroclear Bank as lenders were more reluctant to proceed on a bilateral basis and favoured the use of infrastructure like Euroclear Bank in which borrowing is fully secured and reimbursement is guaranteed by Euroclear Bank itself. For the borrowers, this activity helps in insuring settlement efficiency in periods of market turmoil.

A third important service offered is triparty collateral management. Euroclear Bank provides participants with a platform for settling different kinds of collateralized transactions, including repos. In a triparty arrangement, the collateralisation and administration of a financial transaction that requires one party (cash lender or, more generally, collateral taker) to receive and manage the collateral delivered by another party (a cash borrower or collateral giver) is organised by a neutral triparty agent e.g. Euroclear Bank. Prior to the intervention of Euroclear Bank, the collateral taker has to specify to its potential counterparties (i.e. collateral givers) the range of asset types acceptable for collateral to cover triparty transactions as well as, amongst other parameters, the applicable haircuts, reflecting its analysis of the quality of the counterparties and of the underlying collateral assets.<sup>(1)</sup> Euroclear Bank ensures that transactions executed under a triparty agreement are covered by collateral for the entire life of the transaction and takes charge of the valuation of the assets involved in the triparty transactions using its own collateral valuation process. Any shortfall automatically triggers an automatic margin call. More than half of the collateral provision outstanding is AAA or AA rated.

In spite of their secured nature, triparty collateral management deals were also affected by the market turmoil. In September, the average daily value of collateral under management in the Euroclear triparty platform dropped by 4 p.c. This might indicate that, even in secured triparty markets, with the involvement of a triparty agent, market participants were temporarily less willing to lend. Additionally, in the early stages of the crisis, collateral takers tightened controls on the assets allocated to them and tended to re-qualify the collateral they wanted to take from their counterparties as the crisis deepened further.

Triparty services, like the other services offered by Euroclear Bank, rely heavily on an adequate collateral valuation system. As a result of the market turmoil, the accurate valuation of certain securities, and in particular structured products like CDOs, became much more complicated. However, these products represent only a marginal share of the total collateral pool considered by Euroclear Bank to grant intraday credit and, if such asset classes are used, very conservative haircuts are applied. While it has not changed its valuation methodology as a consequence of the market turmoil, Euroclear Bank is paying more attention to the potential concentration of specific types of collateral in participants' portfolios.

### 3.3 Euroclear Belgium

Euroclear Belgium acts as a central depository for Belgian equities and private-sector fixed-income instruments. It settles both stock exchange transactions and over-the-counter (OTC) trades. After trading, trades on the Euronext Brussels platform are cleared by the Paris-based central counterparty LCH.Clearnet SA which places itself between the buyer and the seller. The resulting net balances of on-exchange transactions are then settled in Euroclear Belgium's forward market settlement (FMS) system. OTC transactions are settled directly through the electronic matching and securities settlement (EMSS) system.<sup>(2)</sup>

#### SETTLEMENT OF STOCK EXCHANGE TRANSACTIONS IN FMS

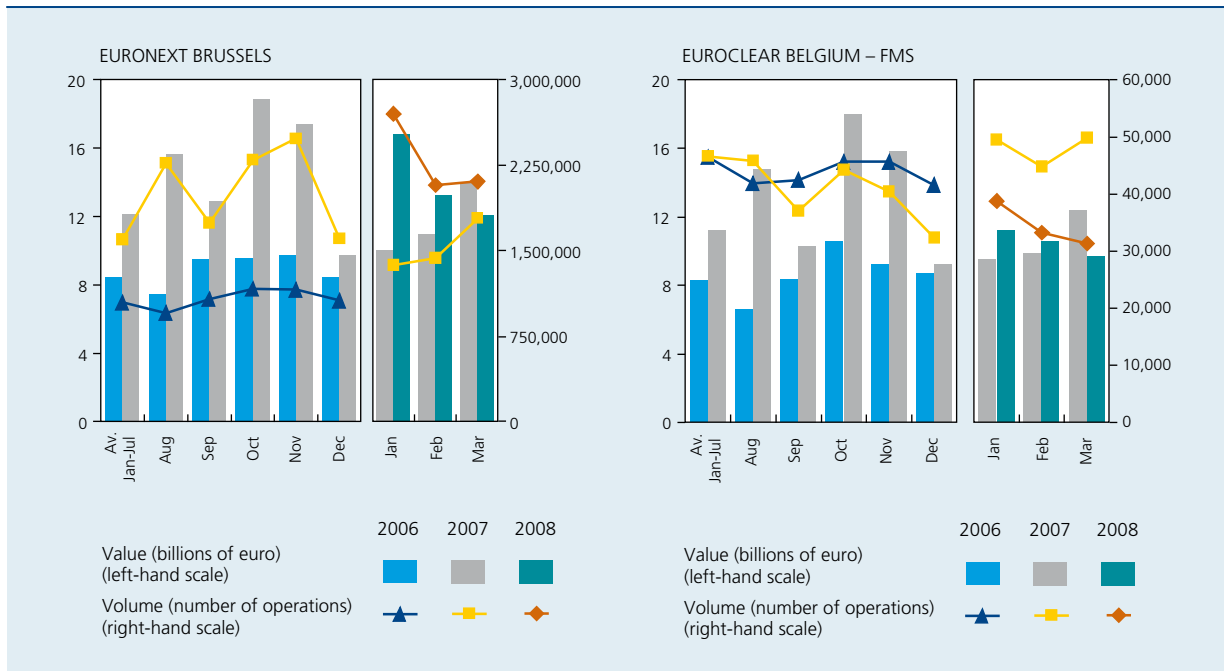
For 2007 as a whole, Euronext Brussels' turnover in value increased more than 50 p.c. compared to 2006 (left-hand panel of Chart 6). Apart from this strong growth in the value of trades, the impact of the market turbulence can also be seen from the sharp variation in the number of transactions, especially in the case of equities which make up the bulk of trading in Euronext Brussels. Among the most active domestic shares on the Brussels segment are traditionally those of the major Belgian banks (Fortis, KBC, Dexia). The market turmoil, as well as other events like the acquisition of ABN-AMRO by a banking triumvirate including Fortis, resulted in price fluctuations in Belgian banks' shares. As a result, the relative proportion of the major Belgian banks' shares in Euronext Brussels total turnover (in value) rose to 43 p.c. (or 12 p.c. of total number of trades) in October 2007.

(1) With structured securities, the cash lender has to get information about the underlying assets of structured securities that he would be ready to accept in his list of eligible assets.

(2) A third system operated by Euroclear Belgium, CDMS, processes unilateral FOP securities transfers. As the bulk of CDMS transfers consist of transfers between accounts of the same participant, they do not fall within the scope of this article.

**CHART 6**

**TURNOVER IN EURONEXT BRUSSELS AND EURCLEAR BELGIUM – FMS IN VOLUME AND IN VALUE <sup>(1)</sup>**



Source : Euronext and Euroclear Belgium.

(1) For Euronext Brussels, Electronic Order Book Turnover in value is single counted; number of trades is double counted.

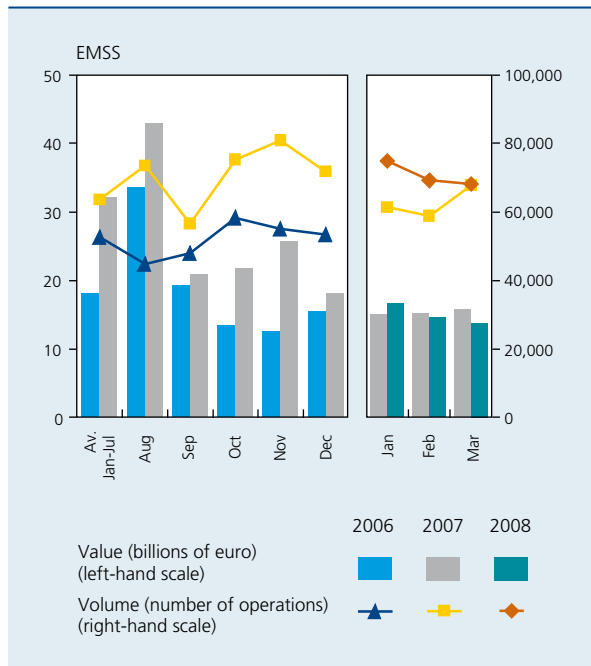
After the clearing stage performed by LCH.Clearnet SA, Euroclear Belgium settles stock exchange transactions in its FMS system in several batches on a DvP Model 2 basis; e.g. securities are settled on a gross basis, while cash is settled on a net basis. The netting effect of LCH.Clearnet SA would be expected to level out the impact of the variation in the stock exchange activities on the settlement turnover in the FMS system in Euroclear Belgium. This has effectively been the case for the number of transactions, but not in value terms. Indeed, surges in stock exchange trade activity in August, October and November 2007 were reflected in FMS turnover in value only. As a result, the average value of individual transactions settled in FMS increased significantly.

**SETTLEMENT OF OTC TRADES IN EMSS**

Settlement dates for over-the-counter (OTC) trades can be freely agreed between the traders involved. OTC transactions are pre-matched through Euroclear Belgium’s EMSS system between Belgian market participants who are members of the system. EMSS settles OTC transactions in real time according to DvP Model 1. The OTC market for Euroclear Belgium eligible securities is significant as EMSS settlement turnover outweighs the turnover in

**CHART 7**

**TURNOVER IN EUROCLEAR BELGIUM – EMSS IN VOLUME AND IN VALUE**



Source : Euroclear Belgium.

FMS. Peak settlement activity may be caused by specific events like an institution's capital increase (e.g. Fortis in August 2007), IPOs or corporate actions.

Business growth in terms of settlement turnover in value during the first few months of 2007 was already a healthy 77 p.c. This growth, still strong in August, October and November, levelled out since December.

#### SOME CONCLUDING REMARKS

During the period under review, the eight months from August 2007 until March 2008, the payment and settlement infrastructures in Belgium continued to function safely and efficiently notwithstanding the emergence and continuation of the crisis on the financial markets.

Overall, the actual impact of the market turmoil proved to be quite limited throughout the period covered. Payment and securities settlement systems did not have to cope with large enough peaks in the value or number of transactions to potentially threaten their operational capacity limits. The systems did not need to apply any exceptional contingency measures like an extension of opening hours, exclusion of participants failing to fulfil their settlement obligations, etc. The risk management procedure and the close monitoring of the market situation have enabled the various systems to cope with the challenges to which they were exposed.

Over the period from August 2007 to March 2008, international infrastructures such as Euroclear Bank had to face some major incidents with potential consequences on the functioning of payment and securities settlement systems, in particular the collapse of Bear Stearns and its rescue by J.P. Morgan. They were able to withstand such

shocks, but this should be no reason for complacency. A shock on a much larger scale and a much tougher test of the resilience of financial infrastructure would be the failure of a major participant to meet its obligations towards several payment and securities settlement infrastructures.

The market turmoil has nevertheless brought about some changes in the behaviour of participants, especially as regards to the mobilisation and use of collateral. Participants to ELLIPS have sharply increased the amount of collateral they are lodging with the NBB. This has resulted in a parallel raising of their credit limit with the central bank. After a sharp increase of the use of intraday credit limits in the initial phase of the crisis, the situation returned to normal levels at the end of 2007. At the same time, the type of collateral deposited with the NBB was significantly changed, including an increasing proportion of asset-backed securities.

During the period covered by this review, participants of securities settlement systems were also increasingly reliant on system lending and borrowing facilities. Such tools were important to sustain adequate levels of settlement efficiency.

Finally, a slight decline in the use of triparty arrangements in Euroclear Bank was observed. This seems to indicate that participants' reluctance to lend in the interbank market was not only limited to the unsecured segment but extended to secured borrowing too. However, decreases in the triparty outstanding amounts were limited in time and were followed by renewed growth, highlighting the benefits that the market participants can draw from the usage of a controlled triparty environment to process their collateralized business, and specifically in the context of a market turmoil.

# Assessment and lessons of the first Belgian financial crisis exercise

## Introduction

In an increasingly integrated financial system where many banking groups operate on a cross-border basis, the opportunities have increased, but so have the risks. As financial crises tend to erupt suddenly, develop quickly and differ from each other, the authorities in charge of financial stability need to develop very flexible crisis management procedures in order to deal with unexpected events and to mitigate as quickly as possible the consequences of a developing crisis in their jurisdiction.

Financial crisis simulation exercises are increasingly considered as an important instrument to test the adequacy and flexibility of these procedures. The NBB, together with the other central banks of the euro area, therefore played an active part in the two crisis simulation exercises organised by the Eurosystem in 2005 and 2006. The NBB, jointly with the prudential supervisor the Banking, Finance and Insurance Commission (CBFA) and the Ministry of Finance also took part in a similar exercise organised, at the EU level, by the Economic and Financial Committee (EFC) with the participation of central banks, supervisory authorities and Ministries of Finance of all member states.

This EFC exercise confirmed that the management of a financial crisis requires close coordination and cooperation between those three authorities, each acting in its specific sphere of competence and responsibility; in 2006 the EFC therefore recommended that, by January 2008 at the latest, each member state should organise a crisis simulation exercise at a national or regional level, or simply at a banking group level.<sup>(1)</sup>

(1) EFC, Next steps in developing the EU arrangements for financial stability (ECFIN / CEFCPE (2006) REP/55012 final), 9 September 2006.

In Belgium, this recommendation was endorsed by the Financial Stability Committee (FSC), which is a coordinating body chaired by the Governor of the NBB and composed of the members of the Board of Directors of the NBB, the Management Committee of the CBFA and a representative of the Ministry of Finance. The task of this committee, which was set up by law, is to strengthen and institutionalise the cooperation between the NBB and the CBFA by examining all questions of mutual interest to both institutions, primarily concerning the maintenance of financial stability.

On 14 February 2007, the FSC decided to organise a financial crisis management exercise before the end of 2007. It was agreed that the NBB, the CBFA and the Ministry of Finance would all take part in the exercise. The Belgian deposit guarantee scheme (Protection Fund for Deposits and Financial Instruments) would also be involved in the exercise, through its General Secretary.

The first section of this article presents the general framework and the main objectives of the simulation exercise. Section 2 describes the practical organisation and the main features of the exercise, while section 3 reviews the main lessons drawn from it. Section 4 concludes with the follow-up to the exercise.

## 1. General framework and objectives of the exercise

Each of the three authorities involved in the exercise has developed internally a comprehensive framework to deal in an appropriate manner with a financial crisis. So, timely alert mechanisms are in place and crisis manuals have been adopted. A crisis team – whose composition may

differ according to the nature of the crisis – can be called and contact lists have been set up. Assessment tools have been developed to facilitate an understanding of what is happening. Technical facilities and operational infrastructures are available (e.g. crisis rooms, telephones, computers, guaranteed access to offices, etc.). Communication plans have also been developed in order to be able to communicate within a very tight schedule.

To coordinate those actions, the three authorities have concluded national Memoranda of Understanding (MoU's) regulating their cooperation and the exchange of information during a crisis. In parallel, the NBB and the CBFA have deepened their dialogue with the systemic institutions, and have defined the critical information they would need from these institutions in the event of a crisis, to help them assess the extent of the crisis and propose measures.

The objective of the exercise was to test the functioning of those individual frameworks and the coordinating procedures established between the three authorities. In particular, the following elements had to be reviewed:

- the proper functioning of the three participating institutions' crisis management procedures;
- the relevance of the information notified to the participants and ease of interpretation;
- the quality of communication between the authorities and the various channels used;
- the speed of reaction of the authorities when faced with critical situations;
- the appropriateness of the existing decision-making processes for dealing with crisis situations;
- the communication with the press.

During the exercise, the participants therefore had to:

- assess the information that was sent to them;
- trigger their own institution's crisis management procedures and activate Memoranda of Understanding concluded by their institution at national level;
- activate communication channels between the NBB, the CBFA and the Ministry of Finance;
- test all available channels for gathering information internally or externally in a financial crisis situation;
- send or request information from external organisations or establishments (financial institutions, supervisory authorities, foreign central banks, etc.) whose role was played by the members of the organising committee;
- take or recommend measures in a very short timeframe.

## 2. Practical organisation and main features of the exercise

The exercise was prepared by an organising team made up of NBB and CBFA representatives. During the exercise, the role of this team was twofold: on the one hand, to manage the exercise in logistical terms and, on the other, to simulate the role of third-party organisations and institutions involved in the scenario. The team conducted a pre-test with the aim of checking the technical facilities and the sequential rhythm of the scenario.

The actual date of the exercise was not announced in advance to the participants, who were required to make themselves available for a full day, since the information that would normally have been spread over several days during a real crisis was released in just one day. The exercise was organised in a decentralised setting in the three institutions. Each one was free to make the practical arrangements for its participation in the exercise (activation of its internal crisis management procedure, meeting of a crisis unit, etc.), while keeping as close as possible to a real-life situation in logistical terms.

The participating institutions were allowed to contact each other either bilaterally or multilaterally during the exercise whenever they felt it was necessary. In order to facilitate the debriefing of the exercise, they were asked to give preference to using e-mails for their communication. Participants were also allowed to question and exchange information with other third-party organisations or institutions (simulated during the exercise by members of the organising team) such as foreign supervisory authorities, central banks from other countries, private banks and financial institutions, the ECB, press agencies and journalists as well as credit-rating agencies.

At the end of the exercise, each institution was asked to draw up a summary on the situation (extent of the crisis, risks, possible solutions, justification for the decisions made and the factors taken into account, etc.) which was meant to serve as a basis for decision-making by leaders of the three institutions. In addition, the participants were asked to complete a questionnaire giving their assessment of the exercise.

The exercise itself took place on 30 November 2007. It simulated a financial crisis triggered by a fraud in a fictitious banking group. For maximum realism, the organisers decided to design the scenario with reference to a banking group operating in Belgium. The overall structure of the banking group (governance, number and location of subsidiaries, etc.), its starting balance sheet position and the pattern of profitability over the previous quarters and

years were therefore assumed to be identical to those of the banking group which served as a model. All the information available on this group in each institution (statistical information on the balance sheet, crisis file, etc.) could then serve as a reference during the exercise.

It had also been agreed from the outset to restrict the exercise scenario to problems concentrated exclusively in the Belgian entity of the banking group in difficulty, without generating any major cross-border effects. An extension of the financial crisis to the whole banking group was ruled out, so that the management of the crisis could be restricted to Belgian authorities.

### 3. Main lessons drawn from the exercise

By its very nature, a crisis exercise has a number of limitations compared with a real-life situation in terms of the sequence of events, the identity of the people involved, the nature of contacts with other institutions, including the distressed bank, the interaction between participants, etc. Despite these natural limitations inherent in simulation exercises, the authorities were able to draw the following lessons from their participation in the exercise.

#### 3.1 Importance of a comprehensive crisis management framework

The exercise confirmed the importance for each participating authority of having a *comprehensive and well-structured crisis management framework*. The existing structures worked well during the exercise. To enable people to act without delay during a crisis, it is advisable to organise regular training sessions and reminders of basic procedures for staff concerned.

Another lesson is that the composition of the crisis team has to be sufficiently diversified to represent the different departments who have a role to play, but the team must not be too large in order to guarantee a smooth decision-making process. The exercise pointed up the importance of a clear definition of responsibilities within the crisis committees.

The exercise also reminded the authorities of the necessity to have regularly updated contact lists and to keep infrastructures available and technical facilities working at all times during weekdays and week-ends.

(1) The content of the two national MoU's is detailed in the special box on MoU's.

#### 3.2 Stress-testing of national MoUs

The exercise allowed the *stress-testing of the national MoU's*.<sup>(1)</sup> As MoU's mainly contain high-level principles on the exchange of information and cooperation, and are not detailed agreements, it was judged useful to test them in a crisis simulation to assess how they work in practice, and how they could be efficiently activated for the benefit of all authorities involved. In this respect, the exercise led to a better understanding of the other authorities' information needs in a crisis context, e.g. the exercise helped determine for each authority what information is needed and at what stage. The exercise also afforded a better view of the respective role of each authority in a crisis context.

#### 3.3 Information issues

*Information issues* are a central feature of crisis exercises, as information is a key component of crisis management. It is important for authorities to have quick access to topical information about the distressed bank and its creditors, as well as about the impact of the crisis on clearing, payment and settlement systems, other financial institutions and the financial markets in general. The exercise made it possible to assess the quality of the information already available within each authority (crisis file, statistical information, position in the payment and settlement systems), and to specify the type of information that must be rapidly available in a crisis. The exercise also confirmed the importance for the authorities of maintaining a dialogue with individual banks so as to be able to obtain relevant data (e.g. the latest liquidity position) at very short notice and to interpret that information very quickly.

#### 3.4 External communication policy

The exercise confirmed the importance for the authorities to develop a common approach in terms of the *external communication strategy* in the event of a financial crisis. Authorities must avoid issuing conflicting messages to the public, and co-ordination must therefore take place at each stage of a developing crisis.

#### 3.5 International cooperation

Nowadays, most systemic institutions operate on a cross-border basis, which explains why existing national frameworks are *complemented by equivalent frameworks developed at international level*. Although cross-border contagion had been ruled out by the design of the

exercise, the simulation involved the communication of information to foreign authorities.

During the exercise, the Belgian authorities communicated with their counterparts in silos, in accordance with the principles set out in the European MoU of 2005 (e.g. supervisors with supervisors, central banks with central banks, Ministries of Finance with Ministries of Finance).

#### 4. Follow-up to the exercise

Further to the exercise and to the lessons drawn from it, practical recommendations to strengthen the Belgian financial crisis management framework have been

approved by the FSC and addressed to each participating institution. Each authority has been asked to implement these recommendations internally.

However, the enhancement of the crisis management framework must be pursued on a continuous basis. The three participating authorities will have to draw the lessons from their experience in managing the consequences for the Belgian financial system of the turmoil affecting the international financial markets since August 2007. They will also further test their crisis frameworks in the coming months, as new large-scale financial crisis simulation exercises have already been announced at various European levels.

### Box – Cooperation agreements involving Belgian authorities

The increased complexity and internationalisation of large financial institutions call for close cooperation not only between national authorities but also, on a cross-border basis, with foreign authorities, both in normal times and during a crisis. This box reviews the main arrangements which have been agreed upon to that end.

At national level, the authorities have formalised their cooperation through the conclusion of two “practical arrangements” (referred to hereinafter as “MoU’s”). These Memoranda of Understanding (MoU’s) are the local and operational implementation of EU recommendations and/or MoU’s concluded at the European level.

#### **National MoU between the NBB and the CBFA**

In 2004, the NBB and the CBFA agreed within the Financial Stability Committee (FSC) an MoU on cooperation and exchange of information in the event of a financial crisis. This MoU covers the financial institutions and systems subject to the prudential supervision of the CBFA, and the institutions and systems which the NBB manages and/or “oversees”. The MoU allows for “sensitive” and “confidential” information to be shared between the two institutions at an early stage of the crisis whenever an institution is informed of any fact, decision or development which may have a significant impact on the situation of a financial institution which falls within the scope of the MoU. The MoU also contains provisions for preliminary consultations on how decisions made by one of the authorities, acting on the basis of its powers, is likely to affect the exercise of the other authority’s powers. In practical terms, contact persons have been nominated within the two institutions to act as channels for these exchanges of information and consultations.

This MoU was signed within the framework of a MoU agreed in March 2003 at ECB Banking Supervision Committee level. The signatories of this latter MoU are the central banks and the prudential authorities of the European Union.

#### **National MoU between the NBB, the CBFA and the Ministry of Finance**

In 2005, the FSC has also set out arrangements specifying the practical cooperative working arrangements between the NBB, the CBFA and the Ministry of Finance in the event of an emerging financial crisis. This MoU is based on the exchange between the parties, at an early stage, of the information which they have on an emerging



financial crisis. That information may relate to incidents actually or potentially affecting the Belgian financial sector. The MoU will be activated in the event of incidents impacting on the stability of the Belgian financial system, which in most cases will entail an international dimension.

The information exchanged under the MoU includes, for instance, information on the possible systemic impacts of the incident on the Belgian financial system, the contagion channels vis-à-vis other financial institutions, markets or financial infrastructures, and the consequences of the crisis for the Belgian economy. The MoU also contains provisions for preliminary consultations on how decisions made by one of the authorities acting on the basis of its powers are likely to affect the exercise of the other authority's powers. The parties are also committed to coordinating their communication with the public as far as possible. The MoU also provides for the parties to exchange information on general financial stability issues at regular round-table discussions at the meetings of the Financial Stability Committee. Here too, contact persons have been nominated by each authority.

This MoU was concluded in 2005 further to the adoption of the MoU relating to cooperation in the event of a crisis at European Union level which was agreed in 2005 by the central banks, the banking supervisors and the EU Finance Ministers under the aegis of the EFC. This MoU has recently been complemented and extended by a new European MoU concluded in 2008.

#### **European MoU of 2008 on cooperation on cross-border financial crisis situations**

In September 2007, following the endorsement of the *EFC Report on developing EU Arrangements for Financial Stability* by the informal ECOFIN of 15 September 2007, the EFC was invited to prepare a proposal to complement and to extend the MoU on cooperation concluded between the Banking Supervisors, Central Banks and Finance Ministries of the EU in Financial Crisis situations which entered into effect on 1 July 2005.

The EFC gave a mandate to an Ad Hoc Working Group on EU Financial Stability Arrangements to carry out this work. This Working Group, comprising representatives from EFC, BSC, FSC, CEBS, CESR and CEIOPS, agreed in March 2008 on a new draft MoU which was then approved during the informal ECOFIN meeting of 4-5 April 2008.

This new MoU aims at updating the principles contained in the MoU of 2005 and replacing this MoU as from 1 July 2008.

The MoU includes a set of common principles for cross-border financial crisis management agreed by the parties (e.g. the primacy of private sector solutions).

The MoU deals with cooperation arrangements between the parties. It first points out that Domestic Standing Groups (DGS) are responsible for facilitating the operation of the MoU at national level (e.g. determining which authority must coordinate crisis management, developing tools for crisis management, etc.). In Belgium, it has been decided that the FSC would play the role of DGS.

The MoU then encourages the parties with common financial stability concerns stemming from the presence of at least one financial group to conclude a Voluntary Specific Cooperation Agreement (VSCA), which provides for more specific and detailed crisis management procedures taking into account the peculiarities of each cross-border financial group. To facilitate the conclusion of such agreements, an example of such a VSCA is attached to the Practical Guidelines.

The MoU also encourages the parties to set up Cross-Border Stability Groups, which are aimed at enhancing preparedness in normal times and which may facilitate the management and resolution of a cross-border financial crisis.





The MoU also specifies which authority should be responsible for co-ordinating a cross-border crisis according to the nature of the crisis, and deals with information exchange and the coordination of external communication. Annex 1 to the MoU provides the parties with guidance, describing what processes should be activated for strengthening crisis preparedness in normal times, crisis alert, crisis assessment, crisis management network, crisis management and external communication. A template for a systemic assessment framework which the parties are encouraged to use in the event of a crisis is attached to the MoU as annex 2.

#### **Regional MoU between NBB, CBFA and De Nederlandsche Bank (DNB)**

Among the noteworthy features of the Belgian financial sector are its high level of concentration and the presence of a number of large international banking groups. Two of these groups have a strong presence in both Belgium and the Netherlands. The FSC therefore considered that an ad hoc MoU (which can obviously be compared with the VSCA) was needed to cover cooperation between the NBB, CBFA and DNB, which acts as both central bank and prudential authority, in the event of one of these groups experiencing a financial crisis.

This MoU came into effect on 1 June 2006. It governs mutual cooperation between the three institutions, should a financial institution with a presence in both countries be affected by a crisis. To this end, the MoU provides for a joint crisis management committee for the three institutions to be convened in the event of an emergency. This committee is entrusted with the task of ensuring mutual consultation and coordination between the institutions, collecting information, preparing decisions to be taken, and maintaining contacts with the institution experiencing difficulties and with market participants.

Furthermore, the MoU helps to make information available in a crisis. The financial institutions concerned have to be in a position to make specific, predetermined information available in the shortest possible time. As a result, the MoU strengthens cross-border cooperation between the three authorities, something which numerous European directives (e.g. the EU Capital Requirements Directive) have been seeking to achieve.

The FSC is looking at the possibility of updating this MoU on the basis of the principles of the new 2008 MoU.

The FSC is also examining whether other MoUs could be agreed with other countries where large Belgian banking groups have a presence.

# Thematic Articles

# Burden-sharing agreements : the cart before the horse ?

Grégory Nguyen

## Introduction

Recent crisis episodes in the banking sector have emphasised both the importance of having sound crisis management policies in place and the role of authorities in developing and implementing these policies. However, since crises tend to be highly complex and uncertain events, developing a crisis management framework is by no means simple, even in a purely domestic context. Conceiving a framework in a cross-border environment, in which several authorities will have to coordinate their actions, may be even more complex.<sup>(1)</sup>

Faced with these challenges, authorities in charge of crisis management have been proactively adapting the European crisis management framework. For instance, very recently, the EU authorities – namely finance ministers, central bank governors and heads of supervisory authorities – have agreed on a Memorandum of Understanding on cooperation on cross-border financial stability. This Memorandum of Understanding contains inter alia nine high-level principles for the management of a crisis involving at least one cross-border banking group at risk of being declared insolvent and with the potential to trigger a systemic crisis in another EU country (Council of the European Union (2007) and Council of the European Union (2008)).

These principles concern each of the different stages of crisis management. These stages are likely to vary with the crisis situation but, as shown in Chart 1, they usually

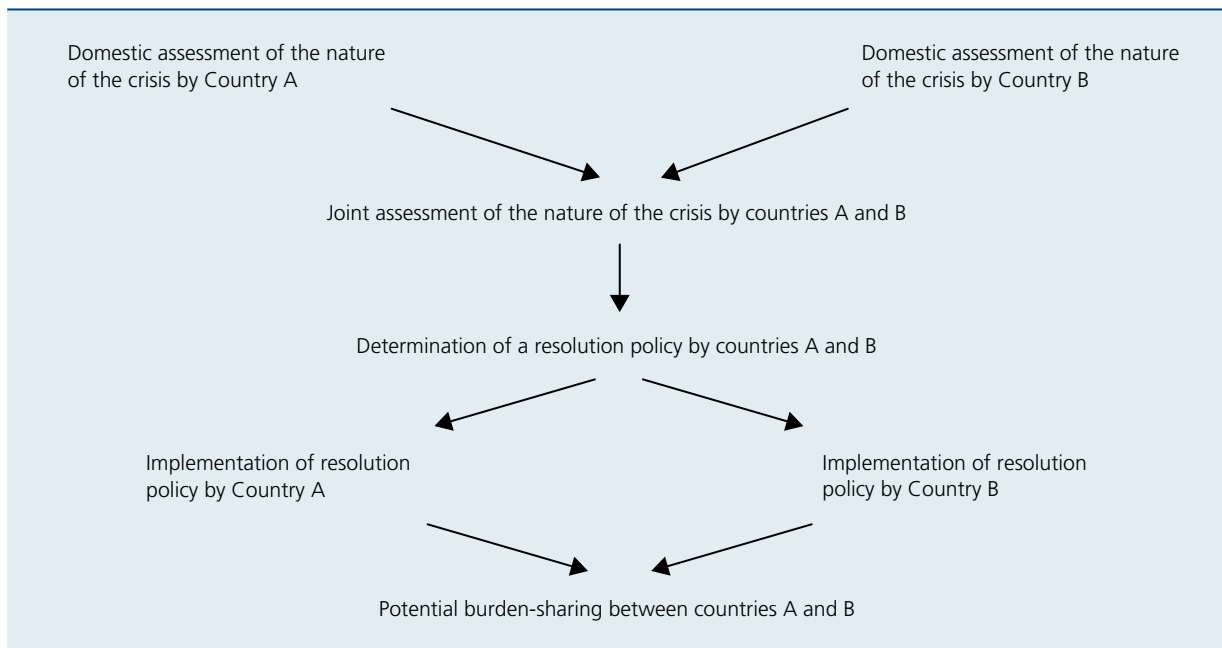
comprise an assessment of the systemic nature of the crisis, determination of a crisis resolution policy and implementation of the latter by domestic authorities. The assessment of the systemic nature of the crisis should be carried out promptly by the competent authorities and according to a common analytical framework (Principle 5). An optimal crisis resolution policy should be chosen so as to minimise any potential harmful economic impact at the lowest overall cost (Principle 1) and its implementation should be coordinated between authorities (Principles 5 and 7).

Chart 1 also raises the possibility of recourse to a potential sharing of the costs, or the burden, of the crisis. The resolution of a crisis can take several forms and, in principle, private-sector solutions – which do not rely on public funds – should have the primacy (Principle 2). However, the recent past has again demonstrated that recourse to taxpayers' money could not credibly be ruled out by authorities. For instance, the involvement of public funds in the rescue of IKB or Northern Rock was not only considered as a necessary step by authorities in charge of crisis management in Germany and the United Kingdom respectively, but also involved substantial resources. These crises were exclusively domestic. However, the steadily increasing presence in Europe of some very complex credit institutions which are integrated across national borders raises the likelihood of one day facing a crisis involving a cross-border bank. Therefore, Principles 3 and 4 relate to the sharing of the burden among different countries.

Potential burden-sharing is only one stage in the cross-border crisis management process and should therefore be clearly distinguished from the stages involving assessment of the crisis, determination of the crisis resolution

(1) See, for example, Nguyen and Praet (2006) who discuss the different solutions that can be used to solve a banking crisis and the complexity associated with their implementation in both a domestic and cross-border context.

**CHART 1** SUCCESSIVE STAGES IN CROSS-BORDER CRISIS MANAGEMENT



policy, and implementation of this policy. Although the successive stages of the crisis resolution process are conceptually distinct, the discussion of the burden-sharing should not be disconnected from the discussion on the crisis resolution policy, as they are intrinsically related. Indeed, the choice of the resolution policy determines the cost of the crisis and thus establishes the bases for the burden-sharing. Conversely, authorities' preferences for a crisis resolution policy will be influenced in the first instance by their expectations about the final cost allocation associated with it. These strong interlinkages between the burden-sharing mechanism on the one hand and the crisis resolution policy on the other hand illustrate how a potential burden-sharing agreement could affect the crisis management framework and suggest that such an agreement is not neutral for crisis management.

The burden-sharing theme has attracted a lot of attention from policy makers in recent times (see Fonteyne, 2007). However, there is still a wide divergence of views between the supporters of burden-sharing agreements and those who would be more hesitant or reluctant to accept to share the burden. The former argue that it is a necessary condition for authorities to internalise the cross-border consequences of their actions. The latter believe that agreeing on burden-sharing entails moral hazard or may be premature (this debate between authorities in favour of and against burden-sharing agreements is very clearly exposed in e.g. IMF, 2007).

Despite the fact that the debate in policy-making fora is lively and intense, the literature on burden-sharing remains relatively scarce and deals mainly with the different rationales behind an agreement on sharing the costs of a crisis or with the practical design of the burden-sharing scheme. The objective of this article is different as it does not discuss the desirability of such an agreement but rather aims at investigating the preconditions that need to be fulfilled before a burden-sharing agreement can be put into practice. These conditions relate (i) to the necessary trust between authorities, (ii) to the coordination of the stages that precede the burden-sharing and (iii) to the design of the burden-sharing scheme.

The remainder of this article is organised as follows. Section 1 clarifies some concepts relating to burden-sharing agreements. Section 2 discusses the conceptual conditions that need to be met before a burden-sharing agreement can be implemented. Section 3 goes deeper into one of these conditions, namely that the burden-sharing agreement should be compatible with the institutional environment. Finally, section 4 concludes.

## 1. Clarification of concepts

The concept of *burden-sharing agreement* entails different dimensions. Clarifying them is particularly important as, currently, the expression *burden-sharing agreement*

may be used to refer to various schemes with very different features.

First, some authors and policy makers use the concept of burden-sharing agreement to refer to an agreement between different countries or authorities to share the burden of a crisis on the basis of a scheme to be determined *ex post*, after a crisis has arisen. The expression burden-sharing agreement has also been used to refer to an agreement to share the burden of a crisis according to a rule defined *ex-ante*, before a crisis has occurred. The difference between the first and the second concept is that, in the first case, the cost allocation is not predetermined, as authorities have an agreement to determine the cost allocation during or after the crisis. There is only an agreement on the principle of sharing the burden, but how the burden will actually be shared is not specified and participants have the flexibility to adapt the burden-sharing to take account of crisis features that cannot be anticipated. In the second case, the authorities devise *ex-ante* a burden-sharing rule which predetermines the cost allocation. In the context of this article, we will use the term *agreement on a burden-sharing principle* to refer to the first kind of agreement, and the term *agreement on a burden-sharing rule* will refer to the second.<sup>(1)</sup>

The principles of the Council of the European Union (2007) are apparently based on a burden-sharing principle. Indeed, the fourth principle for cross-border financial crisis management establishes that, in resolving a crisis involving a cross-border bank, “if public resources are involved, direct budgetary net costs are shared among affected Member States on the basis of equitable and balanced criteria, which take into account the economic impact of the crisis in the countries affected and the framework of home and host countries’ supervisory powers”. Although the principle identifies relevant criteria to determine the final cost allocation, it does not impose any rigid rule that would apply to all Member States, or to all types of crisis.<sup>(2)</sup>

A burden-sharing rule is the type of agreement that underlies e.g. the contribution of Goodhart and Schoenmaker (2008), in which they discuss several methods first to finance a burden-sharing agreement and then to redistribute the costs according to a predetermined key

between participating Member States, either through a general fund or through specific agreements.

A second dimension that differentiates between the terms of a potential burden-sharing agreement refers to the definition of the actual burden, e.g. to the nature of what is being shared. A narrow definition of the burden is the net direct budgetary costs that a specific country or a group of countries will have to bear to solve a crisis. This definition focuses on the direct costs and includes, for instance, the costs of recapitalisation of the bank in difficulty or the costs associated with other forms of public interventions, such as costs associated with potential guarantees for which no flow of cash can be directly observed. The net budgetary costs also take into account the potential direct revenues that may result from the management of a banking crisis. They include, for instance, flows arising from the sale of (part of the) assets of the ailing bank or from the payments of dividends by the bank.

A broader definition of the burden also exists. This definition refers to the total welfare losses which a specific country or a group of countries affected by a crisis incurs. This definition differs in at least two ways from the first – narrower – definition:

- it includes the net direct budgetary costs associated with a crisis but also the economic impact of the crisis. Ideally, it should capture all the losses – present and future – resulting from the externalities associated with a banking crisis. These externalities concern the financial sector (e.g. through disruptions in payment systems, contagion on the interbank market or a general loss of confidence in the financial sector), as well as the non-financial system (e.g. through the loss of information on borrowers due to a bank failure or a potential rationing of credit that would follow a banking crisis). It could be broadly captured by the present and future GDP losses incurred as a result of the crisis.
- in the broad definition of costs, the total burden of the crisis results from a difference – that between the welfare of a country (or a subset of countries) in a normal situation and in a crisis situation – while the narrow definition of costs considers only cash flows that are directly or indirectly observable. The broad definition thus implies the need to calculate a hypothetical situation and to compare it with an actual one.

Given the difficulties associated with calculating the burden in the broad definition of costs, the word burden is commonly used to designate the direct net budgetary costs. For instance, the approach privileged by the Council of the European Union (2007), as illustrated by the fourth principle quoted above, rests on the narrow definition of the burden. In economic terms, however, there is

(1) In the context of this paper, the term burden-sharing agreement is used generically to designate all kinds of agreements on burden sharing, including agreements on a burden-sharing principle and agreements on a burden-sharing rule.

(2) The Council of the European Union (2007) also “encourages authorities (...) that share financial stability concerns to start developing, as soon as possible, voluntary cooperation agreements consistent with the extended EU wide MoU and building on cross-border supervisory arrangements for crisis prevention. These agreements would focus on the principles and procedures in detail – taking into account particular needs of crisis management in a specific cross-border context”.

no reason to separate the direct costs from the indirect welfare losses – especially as they may be, to a certain extent, substitutable.<sup>(1)</sup> Therefore, some authors, such as Freixas (2003), use the broader definition.<sup>(2)</sup> The practical implication of the choice between the two definitions will be discussed in Section 3 of this paper.

## 2. Conditions for the functioning of burden-sharing agreements

While considerable thought has been given to the potential need for crisis burden-sharing among countries and to the aim of burden-sharing agreements, to the best of our knowledge, almost no discussion has focused on the conditions that must be fulfilled in order for any such agreement – whether in the form of a principle or a rule – to succeed.<sup>(3)</sup> This section identifies a number of preconditions that supervisory and crisis-management frameworks must satisfy if a burden-sharing agreement is to be successfully implemented. These conditions fall into three categories: general conditions, conditions relating to crisis assessment and determination of the crisis resolution policy, and conditions relating directly to the burden-sharing agreement.

### 2.1 General conditions: mutual trust between authorities participating in the agreement

Trust is an important aspect that should not be underestimated in a burden-sharing process. Indeed, authorities will only be willing to cooperate in a burden-sharing agreement if they fully trust their counterparts in foreign countries. A lack of trust, on the other hand, may hinder the cooperation that is necessary to resolve a crisis and to implement a burden-sharing agreement.

For instance, because supervision and crisis management are closely interrelated, a lack of trust by one authority in the supervisory structure in some foreign countries may impede the signing of a burden-sharing agreement with these countries. Indeed, if an authority considers that some form of risk is not adequately monitored by one of its potential counterparties in a burden-sharing agreement and that the lack of monitoring is likely to increase

the probability of default of a given bank, this authority may be reluctant to commit ex-ante to sharing the burden of a crisis involving this bank. Similarly, an authority may be unwilling to share confidential information or to communicate crisis assessments if it believes that counterparties may use the information inappropriately or disclose it. Mutual trust is therefore necessary to ensure cooperation between authorities in case of crisis.

In this context, authorities that are willing to implement a burden-sharing agreement should examine current cooperative procedures – including, in Europe, the consolidating supervisor structure proposed in the Capital Requirements Directive and the colleges of supervisors, as well as cooperation procedures between central banks and ministries of finance – to make sure that the procedures used are sufficiently robust to guarantee the necessary trust among authorities.

### 2.2 Conditions relating to the assessment and determination of crisis resolution policy

#### 2.2.1 Agreement on the general objective of crisis management

Agreement on the objective of crisis management is necessary in order to agree on a crisis resolution policy and, therefore, on burden-sharing. In principle, the objective of an authority managing a purely domestic crisis is to minimise the domestic welfare losses. Similarly, in a cross-border setting, as recognised in the first principle of the Council of the European Union (2007), the objective of the authorities in charge of crisis management should be to minimise the global welfare losses.<sup>(4)</sup> The crisis resolution policy that keeps global welfare losses to a minimum will be referred to in the remainder of this article as the optimal (crisis) resolution policy.

While authorities in Europe seem to have an agreement to minimise global welfare losses, the practical scope of such a principle may actually be quite limited. Indeed, calculating welfare losses is a complex operation, especially when it has to be done for various hypothetical scenarios involving different resolution policies. In practice, it is doubtful whether anyone, in the current environment, could prove that the principle had not been respected, except possibly in situations where one or several authorities had blatantly acted at the expense of others. Therefore, authorities may not feel completely bound by an agreement to minimise global welfare losses.

(1) Note that they may not be perfectly substitutable in a cross-border environment. For instance, there may be situations in which welfare losses in one country will only be avoided through a direct budgetary intervention in another country.

(2) Freixas (2003), however, makes a distinction between the social benefit of a bailout and its direct costs.

(3) One exception is Fonteyne (2008).

(4) The first principle of the Council of the European Union (2007) states that “The objective of crisis management is to protect the stability of the financial system in all countries involved and in the EU as a whole and to minimise potential harmful economic impacts at the lowest overall collective cost. (...)”.

Despite the fact that such an agreement will never be perfect, it is necessary to have broad political consensus on the fact that crisis resolution has no other primary objective. Indeed, part of the legitimacy of a burden-sharing agreement will stem from the fact that it allows the implementation of a resolution policy that may be more costly for some authorities but that is the least costly for society as a whole. Note that a complete and precise calculation of welfare losses is not necessary to identify the optimal policy. Indeed, it is only necessary to be able to accurately rank the different potential policies. However, in situations where the burden-sharing scheme is based on welfare losses, a precise calculation of the welfare losses will be necessary.

Therefore, if authorities want to implement a burden-sharing agreement based on welfare losses, or if they want to improve the crisis management framework, they should strive to remove the imperfections associated with the principle of minimising global welfare losses. In other words, they should develop and agree on a common analytical framework<sup>(1)</sup>, on models and on a methodology to assess the global welfare losses associated with a crisis, on a structure to ensure that welfare losses are correctly and independently calculated and then truthfully reported, and they should also put in place mechanisms that allow verification of compliance by authorities with this principle. These measures would also render the principle more operational and thus more binding.

### 2.2.2 Common opinion on the optimal crisis resolution policy

Another condition, linked to the previous one, relates to the need for authorities to form a *common opinion on the crisis resolution policy*. Indeed, there is unlikely to be any burden-sharing if, at the beginning of the crisis, authorities disagree on the way it should be solved.

In order to reach a common opinion on crisis resolution policy, it appears essential to first proceed with a common assessment of the nature of the crisis. We refer to a common assessment as the process through which authorities jointly determine the nature of a cross-border crisis or through which they exchange their individual assessments. The common assessment should therefore reflect an appreciation of the consequences of the crisis in each of the countries involved. Similarly, the impact in each country of the different potential corrective measures should also be evaluated. This common assessment should warrant due recognition of cross-border externalities, and therefore may require information sharing between cross-border authorities, prior to and during the crisis. The expected result of the common assessment

would be a common understanding of the potential breadth and severity of the crisis, which could then serve as an input for the formulation of a coordinated communication plan and policy response.

The speed at which this assessment is delivered and the common understanding reached is crucial. Indeed, as crises tend to be races against the clock, the assessment must lead to a common opinion on the optimal crisis resolution policy in a very short space of time. At present, there is no such mechanism to ensure the formulation of a common opinion on the resolution of the crisis. This puts high uncertainty on the outcome of any burden-sharing agreement that may have previously been negotiated, since authorities are unlikely to share a burden if they disagree on the resolution policy that should be implemented. Therefore, authorities wishing to implement a burden-sharing agreement should first investigate whether it is possible and desirable to develop a framework for developing a common opinion on crisis resolution. If such a framework is desired, it should be made operational before the burden-sharing agreement is addressed and/or negotiated. If such a framework is not desirable or not possible, the consequences for the burden-sharing mechanism of potential disagreement on crisis resolution should be carefully reviewed.

## 2.3 Conditions relating to the burden-sharing agreement

### 2.3.1 Legality of a pre-commitment on burden-sharing.

When authorities in one country agree on burden-sharing, they pre-commit public funds, as they declare their willingness to share the cost of a crisis with some foreign authorities. Although this allocation of public funds remains uncertain and contingent on the occurrence of a crisis, authorities in some countries may have to adapt their domestic legal frameworks if they want to pre-commit to a burden-sharing mechanism. In addition, in order to be legal, a pre-commitment on burden-sharing may be subject to special procedures and may require domestic parliamentary approval. However, the publicity associated with such parliamentary approval could increase the extent to which moral hazard is present in the system.

(1) Note that the Council of the European Union (2007) specifies that authorities have already agreed on a "common analytical framework for the assessment of systemic implications of a potential crisis to ensure the use of common terminology in assessing the systemic implications of a cross-border financial crisis by all relevant authorities; and to enhance the availability of timely assessments among authorities that will facilitate the decision making in a crisis situation".

### 2.3.2 Binding burden-sharing transfers

For a burden-sharing mechanism to succeed, it must be both credible and enforceable. Otherwise, the mechanism may not be taken into account by the different authorities and may thus not fulfil its role. For instance, if burden transfers are not enforceable, some authorities may lack the incentives to cooperate in implementing the optimal crisis resolution policy. This would be the case, for example, if implementing this policy were to raise the costs borne by one authority relative to the costs in the absence of burden-sharing.

Yet, the mere fact that burden-sharing transfers must be preceded by a common assessment of the crisis and a common opinion on the optimal resolution policy, e.g. by a process that is uncertain (as authorities may act in bad faith), illustrates how difficult it may be to find a mechanism that would guarantee enforcement of burden-sharing transfers. Moreover, it may be challenging to simultaneously ensure effective enforcement of promised transfers and the confidentiality necessary to maintain some constructive ambiguity regarding the use of public funds. Potential enforcement mechanisms would include, for instance, mediation mechanisms, reputation risk or litigation, but most of these would imply disclosing the details of the burden-sharing agreement. Another possibility would be to make the implementation of the optimal resolution policy conditional on burden transfers which would have to take place simultaneously. However, this may be difficult in practice.

Despite the difficulties associated with enforcement of burden-sharing transfers, authorities wishing to implement such an agreement should be capable of ensuring that eventual burden transfers can be effectively enforced. Yet, the chosen enforcement mechanism is likely to have an impact on the general institutional framework. The optimal mechanism for enforcing burden transfers, its legal consequences and its effect on the institutional framework should therefore be further investigated and fully specified by authorities willing to enter into a burden-sharing agreement.

### 2.3.3 Compatibility between the objective of the burden-sharing agreement and the institutional environment

A burden-sharing agreement could have several objectives. First, it may serve as a coordination device that would facilitate implementation of the optimal crisis resolution policy. Since the behaviour of the different authorities is determined by the incentives they face, changing some of these incentives could modify their reactions to

the crisis and their willingness to adopt particular resolution policies. A well-conceived burden-sharing agreement could then serve to align the interests of the different authorities and to modify their behaviour in order to enhance their cooperation.

A second reason for modifying the distribution of the costs of a crisis relates to the allocation of powers between authorities and the realisation that a burden-sharing agreement can affect authorities' behaviour in normal, as well as crisis, times. Home countries have responsibility for the supervision of foreign branches (with the important exception of the supervision of liquidity, which is the responsibility of host authorities) and host authorities have responsibility for the supervision of the subsidiaries they host. Although cross-border crisis management responsibilities are not clearly defined, current perceptions of these responsibilities tend to follow from the supervisory duties (see, for example, Nguyen and Praet, 2006). Because of the relationship between the supervisory and the crisis-management frameworks, the final cost allocation in an eventual crisis will not only influence the way authorities behave in the crisis but will also indirectly affect the incentives they face in normal times.

A third potential objective of a burden-sharing agreement is to allocate crisis costs according to a principle of "fairness" or some other mutually-accepted criterion.

These three objectives may sometimes have conflicting implications and it may not always be possible to pursue them simultaneously. In particular, the type of burden-sharing agreement (principle- or rule-based) that can be successfully implemented and the ultimate objective of the agreement will depend crucially upon the institutional environment, namely whether the optimal resolution policy can be independently enforced or not.<sup>(1)</sup> The link between the institutional framework, the objective of the burden-sharing agreement and the type of agreement that should be chosen is analysed in section 3. As will be shown, incompatibility between the institutional environment and the type of burden-sharing agreement can render the agreement ineffective or could even distort the choice of crisis resolution policy.

(1) Note that, as will be explained in section 3, we establish a difference between the enforceability of the optimal resolution policy – e.g. the possibility to ensure that authorities in charge of crisis management implement the collectively optimal resolution policy – and the enforceability of the burden transfers – e.g. the possibility to force authorities that are part of a burden-sharing agreement to effectively transfer funds calculated in accordance with the terms of the agreement.



### 3. Burden-sharing and enforcement of the optimal resolution policy

As suggested above, the institutional framework plays a key role in burden-sharing and even determines the type of burden-sharing agreement (principle- or rule-based) which is feasible. Hence, the choice of the type of agreement will depend on the institutional set-up. Two cases need to be differentiated, relating to the extent to which it is possible to independently enforce the optimal crisis resolution policy.<sup>(1)</sup> The first case is one in which there is no institutional structure that would make it possible for authorities to enforce the optimal resolution policy. In this situation, authorities must voluntarily implement the policy themselves, and they will agree to participate in the solution that is collectively optimal only if it is not contrary to their domestic interests. The second case is one in which it is possible to enforce the optimal resolution policy.<sup>(2)</sup>

The objective of the burden-sharing agreement will be different in the two cases. When the optimal resolution policy cannot be independently enforced, the crisis resolution policy has to be self-enforcing. As will be explained in section 3.1, the design of the cost-sharing agreement may help to ensure this. Indeed, the burden-sharing scheme will influence the incentives of authorities to act, as these incentives are influenced by the final allocation of the costs of the crisis. The burden-sharing agreement needs to be used as a coordination device to ensure that authorities will implement the optimal resolution policy; therefore, an agreement on a burden-sharing principle must be used. In such a situation, it would not be possible to define an ex-ante burden-sharing rule that would be compatible with all possible crises and optimal policies. Burden transfers need to be determined jointly with the optimal resolution policy. While the rule governing the transfers cannot be determined ex-ante, authorities can

nevertheless commit ex-ante to the principle of initiating discussions on the burden-sharing once a crisis has erupted.<sup>(3)</sup>

Conversely, as will be discussed in section 3.2, when the optimal crisis resolution policy can be enforced externally, the burden-sharing agreement no longer needs to act as a coordination device and can play another role. Actually, the fact that the optimal resolution policy can be enforced without being affected by the final cost allocation disconnects the burden-sharing from the determination and implementation of the optimal resolution policy. Thanks to this disconnection, the cost allocation can be determined independently of the crisis resolution policy. It is then possible to define a cost-sharing rule before the determination of the optimal policy response.<sup>(4)</sup>

#### 3.1 Burden-sharing principle: when the optimal crisis resolution policy can not be externally enforced.

There are some situations where, in the absence of a burden-sharing mechanism, authorities cannot simultaneously maximise their own welfare and collectively minimise the global welfare losses. For instance, ring fencing by some domestic authorities in a banking crisis situation may constitute a guarantee against domestic welfare losses but may at the same time impede a solution that would be globally more favourable. When the optimal crisis resolution policy cannot be externally enforced – in the example, if no one can prevent ring fencing by domestic authorities – the burden-sharing agreement can be used as a coordination device to ensure that authorities naturally cooperate and apply the optimal crisis resolution policy. An appropriate sharing of the burden can indeed guarantee that authorities are better off if they cooperate.

In order to accomplish this, one condition needs to be satisfied, namely that parties will be willing to implement the collectively optimal resolution policy in situations where they cannot achieve a better outcome alone, or in any coalition with one or more other authorities. In such situations, authorities do not have any incentive to implement another crisis resolution policy, as no coalition could improve the welfare of all its members on its own. This property ensures that the optimal crisis resolution policy is self-enforcing.<sup>(5)</sup>

To satisfy this property, the burden-sharing mechanism can be used as a way of reallocating welfare losses between authorities to guarantee that no single authority is worse off if it implements the resolution policy that

(1) Note that, as discussed in Section 2, the enforcement of the optimal resolution policy also supposes that there is a mechanism that can determine what the optimal policy is, how it can be reached and can verify that authorities effectively implement this policy.

(2) It is beyond the scope of this article to investigate how the optimal resolution policy can be enforced. However, one could imagine several procedures or architectures that would help to enforce the optimal solution. These procedures and mechanisms may rely on very different structures that may be decentralised or centralised and that may involve, for instance, changing the mandate of domestic authorities, implementing mechanisms ensuring mandatory coordination, or establishing a coordinating authority in charge of crisis management. See also Fonteyne (2008).

(3) One may nevertheless wonder why an ex-ante agreement on a burden-sharing principle would be necessary if authorities can agree on this principle once a crisis situation arises. Two reasons may justify an ex-ante agreement. Such an agreement may be needed if it has some implications on how the cooperation is organised in normal times, or if authorities want to put in place an operational framework for organise the burden sharing, which would have to be improvised if there were no ex-ante agreement.

(4) Note that while the agreement on a burden-sharing rule and the agreement on a burden-sharing principle differ on the extent to which they can be applied in situations where the optimal crisis resolution policy can be enforced or not, they both rely on the assumption that transfers resulting from the burden sharing can be enforced.

(5) This solution concept is most often referred to as the “core” in cooperative game theory.

minimises the global welfare losses. The burden-sharing mechanism can be compared to a compensation mechanism: authorities that profit from the adoption of the optimal resolution policy compensate those who would be worse off after its implementation, implying some form of monetary transfers between countries.

Since, in theory, authorities have the choice between cooperating in the optimal resolution policy or not cooperating, they will compare their welfare losses in each situation. The welfare losses incurred if they do not cooperate will thus constitute a natural benchmark that will influence the final allocation of costs in the event of cooperation. This allocation (and the subsequent burden transfers) has to be determined jointly with the optimal resolution policy. The costs involved for an authority in the case of non-cooperation will establish a ceiling on the amount of costs that can be allocated to that authority via the burden-sharing mechanism.

When there is an agreement on a burden-sharing principle, a necessary – but not sufficient in itself – condition to make sure that no authority can improve its welfare, either alone or in a coalition, is that the crisis resolution

policy adopted by the players minimises the total welfare losses. Indeed, when authorities can freely transfer funds to compensate for welfare losses, any resolution policy that would not keep welfare losses to a minimum could be improved upon by one or more authorities without affecting the welfare of the others. This is because, by definition, the optimal resolution policy – compared to a policy that is not optimal – will be less costly, generating a global surplus.<sup>(1)</sup> All authorities can then be made better off if, starting from a cost allocation with a non-optimal policy, the surplus, or part of the surplus from the optimal policy, is reallocated to one or more of them. Therefore, a resolution policy that does not minimise global welfare losses resulting from the crisis can be improved upon for one or more authorities without being detrimental to the others.<sup>(2)</sup>

(1) The global surplus is defined as the difference between the welfare losses when authorities do not cooperate in implementing a resolution policy and the losses in the optimal solution e.g. in the solution minimising the losses.

(2) Note that this condition does not hold in absence of a burden-sharing mechanism. When there is no agreement to share the burden of the crisis, authorities are not necessarily better off if they minimise the global surplus. When the burden of the crisis can be fully shared, however, any solution that would not be based on the optimal resolution policy could be strictly improved. The presence of a sound burden-sharing mechanism determined jointly with the crisis resolution policy will thus constitute a natural incentive to adopt the optimal resolution policy.

## Box 1 – Burden-sharing: a numerical example

Table 1 presents a simplified numerical example of a situation in which burden-sharing can help reach a solution that minimises the global welfare losses. The table gives the total welfare losses that three countries (A, B and C) have to incur to solve a crisis, as well as the transfers that are necessary to ensure cooperation. The last column of the table gives the global welfare losses, which are defined as the sum of the individual welfare losses in country A, B and C. The parameters  $\alpha$ ,  $\beta$  and  $\gamma$  represent the shares of the surplus from cooperation that are allocated to countries A, B and C respectively. These values are determined via the burden-sharing scheme.

### EXAMPLE OF A BURDEN-SHARING SCHEME

Welfare losses in each equilibrium	A	B	C	Total
No cooperation . . . . .	10	15	1	26
Cooperation before burden transfers . . . . .	5	10	8	23
Cooperation after burden transfers . . . . .	$10 - \alpha (26 - 23)$	$15 - \beta (26 - 23)$	$1 - \gamma (26 - 23)$	23
Implied transfers . . . . .	$5 - \alpha (26 - 23)$	$5 - \beta (26 - 23)$	$- 7 - \gamma (26 - 23)$	$3 (1 - \alpha - \beta - \gamma)$

In the example, in the first outcome, “No cooperation”, in which authorities individually maximise their domestic welfare, the total welfare losses amount to 26. When authorities in the three countries cooperate, the total welfare losses fall, from 26 to 23. However, the allocation of the losses is also modified. The welfare losses in country A

and B are respectively reduced by 5 while losses in country C are raised significantly as they jump from 1 to 8. This reflects the fact that some positive externalities are created by the behaviour of C. Note that countries A and B cannot implement the cooperative solution on their own, as it also requires the active cooperation of country C. This situation could arise, for example, if country C does not suffer much from the crisis but is the only authority that can intervene to stop it. For instance, this would be the case if the ailing bank were incorporated in country C where it would not be systemic and operating in country A and B where it would be.

In the absence of an agreement on a burden-sharing principle, country C would not have any incentive to provide assistance to the ailing bank, as the cost it would have to bear would exceed the costs it faces in the non-cooperative outcome. However, if country C were internalising the cross-border consequences of its actions, it would intervene.

An appropriate burden-sharing agreement makes the cooperative solution profitable for the three countries, since the implementation of the crisis resolution policy that minimises global welfare losses generates a surplus of 3. As is shown in the last line of the table, starting from the allocation (10, 15, 1) of welfare costs in the non-cooperative solution and allocating proportions ( $\alpha$ ,  $\beta$  and  $\gamma$ ) of the surplus to the three authorities, respectively, could benefit each of the three countries.

The only conditions that apply to  $\alpha$ ,  $\beta$  and  $\gamma$ , in this case, are that their sum should be equal to 1, with  $\alpha$ ,  $\beta$  and  $\gamma$  positive.<sup>(1)</sup> The net welfare transfers between authorities that would be necessary to guarantee that their incentives are aligned when implementing the optimal crisis resolution policy would amount to  $(5 - \alpha (26-23))$  from country A to country C, to  $(5 - \beta (26-23))$  from country B to country C, and to  $(-7 - \gamma (26-23))$  for country C. Note that, since costs are transferred, an increase (decrease) in costs is equivalent to a decrease (increase) in welfare. Taking into account the fact that  $\alpha$ ,  $\beta$  and  $\gamma$  lie between 0 and 1, the transfers will lie in the following intervals: [2; 5] for country A, [2; 5] for country B and [-10; -7] for country C. Indeed, country C must receive monetary compensation of at least 7 if it is to be better off than in the non-cooperative solution. Country C can receive up to 10 if it captures the whole surplus. Countries A and B can transfer a maximum of 5 each, as otherwise they would prefer the non-cooperative solution. Given that C must receive at least 7, the minimum that either A or B could transfer is 2.

Within these intervals, many different solutions (e.g. many different values of  $\alpha$ ,  $\beta$  and  $\gamma$ ) are feasible. The values that will actually be chosen will depend on the nature of the negotiations between the three countries, which, as shown in the example above, can be conceptualised as a game. For instance, a fairly standard concept in the literature on cooperative games is the Shapley value. The Shapley value aims at determining a “fair” allocation of the gains from cooperation – in this case, the surplus generated as a result of implementing the optimal resolution policy – and assigns a single allocation of costs to a given cost-sharing game. The allocation is determined by the importance of the contributions to total costs of each player in the game and is a linear function of the marginal contribution of each player in all possible coalitions between the players.

The bargaining solution is another solution concept that could be applied to determine the final allocation of the surplus. The surplus from cooperation would be distributed in a manner reflecting the bargaining strength of the different authorities. This bargaining power will depend upon the characteristics of the negotiations, together with the knowledge that each authority has the possibility to stop bargaining, which would lead to the “disagreement outcome”.

Finally, players may also want to take account of external criteria to split the surplus. These criteria – specific to banking crisis management – may resemble those that could be used in an ex-ante rule and that are discussed in section 3.2. The difference with an ex-ante rule, however, derives from the fact that the cost allocation would be determined after the crisis has arisen, taking into account the incentives of the different authorities.

(1) Note that, as already explained, it appears difficult to determine  $\alpha$ ,  $\beta$  and  $\gamma$  – or more generally, the extent of transfers – before the crisis arises and as long as its features remain unknown.

Although the above discussion has assumed that the burden-sharing scheme will be based on welfare losses, the real world is more complex, and the implementation of the optimal crisis resolution policy may not be possible. Indeed, as was discussed in Section 2, it is very difficult to calculate the welfare losses associated with a crisis. Therefore, in the current context, countries are unlikely to transfer funds to compensate for these indirect costs. Moreover, even if authorities were capable of calculating their own domestic welfare losses and willing to share these costs, they may lack the incentives to report their welfare losses truthfully (see Freixas, 2003), especially if their report influences the ultimate burden transfers.

Since it is not currently possible to determine individual and global welfare losses with any certainty, authorities willing to engage in a burden-sharing agreement will most likely want to consider a proxy for total welfare losses. This proxy may be the net direct budgetary costs. However, these costs may diverge from the total welfare losses. In addition, as shown in Box 2, limiting the transfers to direct costs may imply that it is impossible to induce authorities to cooperate in implementing the optimal resolution policy; therefore, this policy may not be feasible.

## Box 2 – Discrepancies between welfare losses and direct budgetary costs: a numerical example

The fact that total welfare losses may not be perfectly transferable may render the implementation of the optimal crisis resolution policy impossible. Table 2 presents a simplified numerical example in which two countries (A and B) face a banking crisis. Country A hosts the subsidiary of a bank that is incorporated in country B. The subsidiary in A is in difficulty while the parent company could survive on its own if country B ringfences its assets. The ailing bank is systemic in country A but not in country B.

When the two countries do not cooperate, the global welfare losses amount to 110. These 110 are divided between country A and country B. Country A suffers the most from the crisis as its total welfare losses would amount to 100 following the default of the subsidiary. Country B's losses are limited to 10 as the bank could survive independently in country B if assets were ringfence.

If authorities cooperate, global welfare losses can be reduced to 61. Cooperation would imply that country B does not ringfence the assets of the bank incorporated in its country, to implement a solution that would be based on the group as a whole. The solution may for instance necessitate transfers of liquidity or capital from the bank in country B to its subsidiary in country A. However, this may subsequently raise the bank's default probability in country B. This higher default probability worsens the position of the bank's creditors in that country, together with the position of the deposit insurance scheme and consequently triggers a decrease in the general welfare of the country. Welfare costs thus increase from 10 to 11. Stopping to ringfence assets would thus exclusively benefit country A as it would allow it to reduce its welfare losses from 100 to 40. Let us assume that the optimal solution requires an additional budgetary intervention from country A amounting to 10.

While the cooperative crisis resolution policy minimises the sum of welfare and budgetary costs and is consequently optimal, this solution becomes impossible to implement if only the budgetary costs are shared. Indeed, in such a case, country B does not have to bear any budgetary costs but only welfare losses. In other words, even if country A supports the whole budgetary burden, country B will not agree to implement the cooperative solution as it would entail an increase in welfare losses. In such a situation, implementing the optimal crisis resolution policy is only possible if country A and country B accept to share welfare losses as well.

However, as argued above, the difficulty of identifying welfare losses and implementing mechanisms that ensure welfare losses are truthfully reported (for instance, country B could also claim to have incurred welfare losses in excess of 11 without country A being able to verify this assertion) may constitute a huge obstacle to the sharing of these losses.



## EXAMPLE OF A BURDEN-SHARING SCHEME BASED ON BUDGETARY COSTS

	A	B	Total
<b>No cooperation</b>			
Welfare losses (excluding budgetary costs) . . . . .	100	10	110
Budgetary costs . . . . .	0	0	0
<i>Total welfare losses</i> . . . . .	<i>100</i>	<i>10</i>	<i>110</i>
<b>Cooperation before burden transfers</b>			
Welfare losses (excluding budgetary costs) . . . . .	40	11	51
Budgetary costs . . . . .	10	0	10
<i>Total welfare losses</i> . . . . .	<i>50</i>	<i>11</i>	<i>61</i>

### 3.2 Burden-sharing rule: when the optimal crisis resolution policy can be externally enforced.

Unlike in the previous section, where the institutional structure is such that the optimal resolution policy can be externally enforced, the final cost allocation (and, therefore, the burden-sharing scheme) can be disconnected from the choice of the optimal crisis resolution policy. In this case, it is possible for authorities to sign an ex-ante agreement on a burden-sharing rule, and the authorities are free to determine a set of criteria, or a rule, that will guide the allocation of the total costs. For instance, the rule could allocate costs according to normative criteria, such as “fairness” or “solidarity”.

Entering a normative debate on the burden allocation may, however, prove to be difficult and even misleading. Indeed, “fairness” and “solidarity” are relative concepts that could be interpreted differently by different authorities. This is true in normal times but may become even more apparent in a period of crisis in which authorities would be tempted to defend their own domestic interests. Therefore, the “fairness” or “solidarity” concepts

should be clarified beforehand, and authorities should come to an agreement on their meaning and on the criteria which conform to the meaning.<sup>(1)</sup> The final burden-sharing rule could actually be based on a series of criteria reflecting different considerations. Criteria that have been suggested by policy makers or academics fall into three different categories: those linked to the allocation of responsibilities and powers between authorities; those reflecting countries’ general features; and those specifically linked to the ailing credit institution.

The Council of the European Union (2007) suggests that authorities may want to consider the respective responsibilities of the home and host authorities in the occurrence of the crisis.<sup>(2)</sup> To the extent that the supervisory framework may influence the circumstances of the crisis, it could be reflected in the rule too. There may also be another more fundamental reason to take account of the supervisory framework. Although it is true that the burden-sharing is disconnected from the management of the crisis in cases where the optimal crisis resolution policy can be enforced, the burden-sharing rule will nevertheless influence the behaviour of authorities in normal times. Therefore, the rule needs to be consistent with the incentives that one wants to give to authorities in charge of banking supervision in normal times.

The rule may also reflect some country-specific features such as, for instance, the capacity of the country to contribute to the burden-sharing or the importance of the financial system in the country. The GDP of the country could be used as a proxy for its financial capacity.<sup>(3)</sup> This is proposed by Goodhart and Schoenmaker (2008), who

(1) Besides choosing the variables of the rule, authorities will also have to decide whether a “fair” rule should be based on a general fund and apply to all countries participating in the burden-sharing agreement or on a specific fund and apply only to countries affected by the crisis. See Goodhart and Schoenmaker (2008) for an extensive discussion of these two different alternatives.

(2) See, for instance, the fourth principle of the Council of the European Union (2007) that says burden sharing should take account of home and host countries’ supervisory powers. However, the principle does not establish a rule but only lists some criteria that could be taken into account in a burden-sharing agreement.

(3) Schinasi (2007) uses the “economics of alliances” to assess the European architecture. He finds that in contexts where domestic authorities are individually responsible for financial stability, small countries may tend to free ride on the efforts of large countries to provide financial stability. Schinasi (2007) suggests therefore that using GDP in a burden-sharing formula would benefit large countries at the expense of smaller countries.

suggest applying a GDP-based key if the burden-sharing is structured as a general fund.

Specific features of the credit institution requiring assistance may also be integrated into the rule. Goodhart and Schoenmaker (2006) discuss for instance the possibility of including variables such as (risk-weighted) assets, deposits or even the income of the ailing institution in each of the countries in which it is present. The objective of these specific variables would be to capture the relative presence of the institution, its systemic nature and the risk associated with its presence in each of the countries in which it operates. The list of possible variables capturing these factors is long and could be subject to heavy debate.

Choosing the variables to incorporate into the burden-sharing rule is a key element of the process, since, as mentioned above, they can have an impact on the behaviour of authorities in normal times. Because the rule is determined ex-ante, participants in the burden-sharing agreement will know in advance which criteria will influence the final cost allocation. Although – by assumption – this will not affect the choice of the crisis resolution policy, it may well affect the way authorities behave in normal times. If participants know in advance the factors that will determine the final burden they will have to bear, they may, in non-crisis periods, try to take actions to minimise the influence of these factors. For instance, authorities in one country could encourage banks to reallocate some of their assets or liabilities to their entities in other countries in order to limit the potential burden the first country would have to bear in the event of a crisis. From an economic point of view, the efficiency of such reallocations may be questionable.

As has been noted above, a crucial assumption in this section is that the optimal crisis resolution policy can be enforced. The implementation of a burden-sharing rule in a situation where this condition is violated could have significant negative consequences in terms of incentives to act during the crisis, especially if there is a strong divergence between the burden allocation resulting from the rule and the burden allocation under the optimal resolution policy. In such cases, authorities may lack the incentives to cooperate, and the optimal resolution policy would not be implemented.

This problem may remain limited if the correlation between the part of the burden allocated and the potential total welfare loss is positive for each authority, e.g. if an authority contributes more when the impact in its own country is greater and less when the impact in its own country is limited. In this case, the burden-sharing rule is more likely to be acceptable for every authority. However,

some rules may have counter-productive effects if they do not guarantee this positive correlation; e.g. if one or several authorities, as in the example described above, have to bear a substantial burden, while in practice they are not affected by the crisis. In such a case, these countries may want to deviate from the optimal resolution policy, or may want to impede a solution that would be detrimental for them, e.g. by issuing an opinion on the crisis that would be radically different from the opinion of their peers. Therefore, using an ex-ante burden-sharing rule when the choice and implementation of the crisis resolution policy depends on the cost allocation can be counter-productive (see also Čihák and Decressin, 2007). In such a case, the respective objectives of the crisis-management framework – namely to minimise the global losses – and of the burden-sharing agreement – e.g. to reallocate the costs of the crisis according to pre-specified criteria – will differ. No one can guarantee in this case that the ultimate objective of the crisis-management framework will prevail, since the choice of the crisis resolution policy will be influenced by the final cost allocation that is imposed by the burden-sharing scheme.

## Conclusions and policy implications

The objective of this article is to define the various possible burden-sharing agreements and to investigate the conditions in which they could be applied. The article makes a distinction between the agreement on a burden-sharing principle, in which authorities commit themselves to sharing the burden of the crisis without specifying ex-ante a cost allocation, and the agreement on a burden-sharing rule, in which the future cost allocation is determined ex ante, on the basis of pre-specified criteria. The article shows that each of these two agreements has a different objective. It also demonstrates that they respond to different concerns, but also correspond to different institutional environment. Indeed, when the optimal crisis resolution policy cannot be enforced by an independent authority, agreement on a burden-sharing principle should be preferred, as it can serve as a device to align the interests of all authorities. On the other hand, when the burden-sharing is disconnected from the choice of the optimal crisis resolution policy, e.g. when the optimal resolution policy can be enforced, the final cost allocation, by assumption, does not influence the management of the crisis and can consequently be determined beforehand. Obviously, the outcome of each of these two types of burden-sharing schemes – e.g. the final cost allocation between different countries – will differ substantially.

In the present European environment, national authorities – which are in charge of the assessment of the crisis and of the choice and implementation of the resolution policy – are also footing the bill for the crisis. Therefore, the final allocation of the costs of the crisis is likely to affect the choice and implementation of the crisis resolution policy. Authorities in Europe wishing to implement a burden-sharing agreement thus have the choice between two alternatives, namely either concluding an agreement on a burden-sharing principle only or modifying the institutional structure to guarantee that the optimal crisis resolution policy can be identified and enforced and that the final cost allocation will not influence its choice. The choice of one of these two alternatives by authorities desiring to negotiate a burden-sharing agreement will depend on the objective they assign to it. If authorities need a coordination mechanism, they should acknowledge that an agreement on a burden-sharing rule will be incompatible with this objective and should not be pursued. If, on the other hand, they want to implement a burden-sharing agreement to modify the eventual cost allocation according to normative criteria, then they need to develop a framework that will guarantee that the optimal resolution policy can be enforced.

However, authorities wishing to implement a burden-sharing agreement will face another difficulty as the outcome of a burden-sharing agreement will remain subject to a series of uncertainties. First, there are some legal uncertainties. Authorities willing to agree on a burden-sharing mechanism ex-ante have to carefully review these legal uncertainties, which will depend on their domestic context. The procedure of committing public funds, even if this commitment concerns future resources and is contingent on the occurrence of a crisis, may require parliamentary approval or may be subject to another form of decision making. Legal uncertainties not only concern the ex-ante agreement but also its ex-post enforcement. The legal form that the agreement takes will also influence enforcement.

There will also be uncertainties surrounding the assessment of the nature of the crisis and especially its potential consequences in terms of welfare losses. Since potential

welfare losses are difficult to calculate, some uncertainties may remain on the crisis resolution policy to choose. The behaviour of authorities in a crisis context may also be difficult to anticipate as it will be influenced by both domestic and cross-border elements that may be difficult to apprehend beforehand.

Finally, even if the latter elements were perfectly predictable, a crisis context remains by definition uncertain. Authorities starting to cooperate with foreign counterparts do not know ex-ante what their final contribution will be as the crisis unfolds. A crisis may actually start with a fairly benign situation which then deteriorates. In that context, authorities starting to cooperate may fear that a binding burden-sharing rule would constrain their ability to manage the crisis or may involve far more resources than initially expected.

Considering all these uncertainties, any burden-sharing agreement should rest on robust foundations that are solidly anchored in the institutional framework. For instance, authorities wanting to adopt a burden-sharing agreement should make sure that the decision-making process during the crisis is clearly set out and that a common opinion on the policy response required to solve the crisis can be rapidly determined by the authorities in charge of crisis management. In the absence of a coordinated policy response, the successful application of a burden-sharing mechanism is very unlikely. However, currently, the European framework for crisis management is lacking a mechanism guaranteeing that authorities can reach a common opinion on a crisis resolution policy in a short space of time.

All preconditions for an efficient burden-sharing agreement are therefore currently not met. However, they serve as a good benchmark for future regulatory initiatives. To that extent, improving cooperation between authorities, and in particular investigating whether the framework for reaching a common opinion on crisis resolution can be implemented, seem to be the most important elements on which authorities should focus for the moment.

## References

- Čihák M. and J. Decessin (2007), "The Case for a European Banking Charter", IMF Working Paper, 07/173.
- Council of the European Union (2007), "Council Conclusions on Enhancing the Arrangements for Financial Stability in the EU – Press Release", 9 October.
- Council of the European Union (2008), "Memorandum of Understanding on Cooperation between the Financial Supervisory Authorities, Central Banks and Finance Ministries of the European Union on Cross-border Financial Stability – Press release", 4 April.
- Fonteyne W. (2007), "Options for Faster Financial Integration", IMF Survey, 36, 5, 76-77.
- Fonteyne W. (2008), "Crisis Resolution and Burden-sharing for Cross-border Systemic EU banks", IMF Working Paper (Forthcoming).
- Freixas X. (2003), "Crisis Management in Europe", in Financial Supervision in Europe, ed. by Kremers J., D. Schoenmaker and P. Wiert, Edward Elgar Publishing.
- Goodhart C. and D. Schoenmaker (2006), "Burden-sharing in a Banking Crisis in Europe", Sveriges Riksbank Economic Review, 2, 34-57.
- Goodhart C. and D. Schoenmaker (2008), "Fiscal Burden-sharing in Cross-border Banking Crises", Mimeo, London School of Economics.
- International Monetary Fund (2007), "Euro Area Policies: 2007 Article IV Consultation – Staff Report; Staff Supplement; Public Information Notice on the Executive Board Discussion; and Statement by the Executive Director for Member Countries", IMF Country Report N°07/260.
- Nieto M. and G. Schinasi (2008), "EU Framework for Safeguarding Financial Stability: Towards an Analytical Benchmark for Assessing its Effectiveness", Banco de Espana Working Paper, 0801.
- Nguyen G. and P. Praet (2006), "Cross-border Crisis Management: a race against the Clock or a Hurdle Race?", Financial Stability Review, 151-173.
- Schinasi G. (2007), "Resolving EU Financial-Stability Challenges: Is a Decentralized-Making Approach Efficient?", Mimeo, IMF.



# Transparency in banking

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## Introduction

Transparency in banking can be defined as “public disclosure of reliable and timely information that enables users of that information to make an accurate assessment of a bank’s financial condition and performance, business activities, risk profile and risk management practices” (Basel Committee, 1998).<sup>(1)</sup> In recent years, there has been greater emphasis on bank transparency through new capital regulation (e.g. Pillar 3 of the Basel II framework) and new accounting rules (e.g. the International Financial Reporting Standards). These regulatory initiatives have been motivated by the growing complexity of the financial system, which has led to an increase in banks’ opacity.

The theme of transparency in banking is hardly new. Ten years ago, the Asian financial crisis had already prompted calls for greater transparency among banks. More recently, the subprime mortgage crisis has led to renewed interest in this topic. Indeed, some banks were severely criticised for not being transparent enough about their subprime-related exposures and for the relatively slow speed at which they disclosed write-downs and losses following the outbreak of the crisis. To some extent, this lack of transparency may be due to the difficulty of valuing complex instruments in a volatile environment characterised by low levels of liquidity. However, it may also be due to insufficient disclosure by banks about their valuation techniques or their accounting practices, for instance. As a result, it may be necessary to strengthen bank disclosure requirements.

(1) According to the Basel Committee, there is thus a difference between the disclosure of information (“disclosure”) and the disclosure of reliable and timely information (“transparency”). In the remainder of this article, the terms “disclosure” and “transparency” are used interchangeably.

This article discusses various issues involved with the concept of bank transparency. It first reviews the benefits and costs associated with transparency before detailing the regulatory approach to it and illustrating its importance in the context of the recent turmoil in credit markets. Section 1 looks at the implications of bank transparency for financial stability and the incentives for banks to be more transparent. Section 2 details two important regulatory initiatives with respect to disclosure in banking: Pillar 3 of the Basel II framework and International Financial Reporting Standards. Section 3 looks at the role of banks’ disclosures during the subprime mortgage crisis and the impact that these disclosures have had on the crisis. It outlines some recent suggestions for improvements in regulation and market practices. The last section concludes.

## 1. Importance of transparency for financial stability and for banks

This section examines the importance of bank transparency from a financial stability viewpoint, as well as banks’ incentives to be more transparent. It shows that bank transparency can enhance financial stability, although “imperfections” in transparency can actually have the opposite effect. In addition, banks may not have sufficient incentives to be transparent; therefore regulation may be warranted.

### 1.1 Impact of bank transparency on financial stability

There is an extensive literature supporting the view that bank transparency has a beneficial impact on financial stability. The main effect of transparency seems to be to reduce problems of asymmetry of information between

banks on the one hand and depositors, market participants and supervisors on the other hand.<sup>(1)</sup> Lower asymmetry information problems may in turn enhance financial stability, both in normal times (ex ante) and during periods of stress (ex post).

Ex ante:

- Lower information asymmetries may increase market discipline on banks because depositors, market participants and supervisors may be better able to monitor banks and detect “bad” investment strategies or financial problems before they have a chance to do any harm (Basel Committee, 1998). As a result, banks’ risk-taking (moral hazard) may decline.

Ex post:

- Lower information asymmetries may reduce the probability of market panics. Indeed, market panics are usually the result of unexpected or unquantifiable bad news. As pointed out by Moody’s (1998a), “bad news is never welcomed, but if unexpected or unquantifiable, it is taken more seriously, and reacted to with greater panic, than bad news that an investor can anticipate and quantify as a result of previous disclosure”. A similar type of argument is formalised by Gorton and Huang (2006), who assume that banks may be hit by both a systemic shock and a bank-specific shock, with depositors only being able to observe the former. This implies that, in the event of a bad realisation of the common systemic shock, all banks will face a depositor run. If banks are transparent enough to allow depositors to also observe the idiosyncratic shock, only a fraction of the banks will be hit by a bank run.
- Lower information asymmetries may ensure that institutions which are certified to be sound in an accounting sense but which are in fact not healthy in an economic sense do not survive and do not contaminate the entire banking system, which would further aggravate a crisis and the costs of cleaning up the system. For instance, Moody’s (1998b) indicates that, during the Asian crisis, many banks booked additional loans to weak borrowers as current and performing. In a strict accounting sense, the loans were performing. Yet, because these loans had been made to borrowers who had already defaulted, and were therefore weak, in an economic sense, they should have been classified as being of doubtful quality.

- Lower information asymmetries may help public authorities to better assess the potential implications of the failure of an individual institution on other banks or the market as a whole (Schinasi, 2005).

Even though the above-mentioned papers clearly point up the benefits of bank transparency for financial stability, other contributions explain why transparency may affect it adversely. Most of these adverse effects stem from the fact that transparency may not always be “perfect”. For instance,

- If transparency is “noisy”, e.g. if banks disclose partial information about their losses (or write-downs) instead of comprehensive information, it may be difficult for investors to infer whether single-loss events signal a generally mispriced portfolio or just an extreme realisation in a correctly priced portfolio. Depending on how the event is interpreted, the assessment of the portfolio’s value will change and the information noise can cause the market to expect more volatility. As a result, banks may face an unduly high risk premium required by the market on their equity and debt (Lee, 1999).
- If transparency is not uniform, e.g. if some investors receive private signals about the banks’ financial condition while others do not, financial stability may be endangered. For instance, Chari and Jagannathan (1988) develop a model where bank runs reflect a signal extraction problem in which some individuals receive a noisy signal about the bank’s return, which may lead them to withdraw funds early. Other depositors must then infer from observed withdrawals whether a negative signal was received by informed depositors or whether liquidity needs happen to be high. In this set-up, bank runs occur because uninformed depositors misinterpret informed depositors’ liquidity shocks as bad news about the condition of bank assets. Similarly, if banks provide different levels of disclosure in a crisis situation, sound banks with poor disclosure levels may be wrongly perceived as being risky and may be thus adversely affected.
- If transparency is costly, e.g. if banks must support direct or indirect costs to comply with transparency requirements, this may undermine their charter value hence increase their incentives to take risks and worsen the moral hazard problem (Hyytinen and Takalo, 2002).
- If transparency is established too late, e.g. only after the occurrence of a crisis, market participants may interpret this increased disclosure as a sign that bigger problems are to come, which may lead them to overreact to information about the banks’ situation (Moody’s, 1998a).

(1) Problems of asymmetry of information are particularly important for banks given that they are more opaque than other firms. As explained in Morgan (2002), there are two reasons for this greater opacity. First, banks specialise in lending to borrowers on which they gather private information but whose credit quality is unknown to the public. Second, banks may invest in certain types of financial assets which allow quick and easy trading (e.g. liquid assets), and which are therefore hard for investors to monitor.

Finally, transparency may also reduce financial stability if banks are hit by shocks which are largely independent of their portfolios (e.g. macroeconomic shocks). This comes from the fact that investors will require higher deposit rates to be compensated for the shocks; however, banks may not necessarily be able to offset this increase in deposit rates by choosing a lower level of risk *ex ante*, which will compound their problems (Cordella and Yeyati, 1998).

There is, however, some empirical evidence suggesting that, on balance, transparency reduces the probability of a banking crisis and thus enhances overall financial stability. For instance, Nier (2005) analyses a sample of 550 listed banks from 32 countries between 1994 and 2000 and finds that banks that disclose more accounting information are less likely to suffer severe problems (as proxied by large jumps in their stock prices). Another study by Tadesse (2005), which uses yearly data for 49 countries with 21 crisis episodes between 1990 and 1997, finds that increased bank disclosure requirements and stronger auditing regulatory regimes reduce the likelihood of a systemic banking crisis.

## 1.2 Incentives for banks to be transparent

Obviously, some of banks' private incentives to disclose information are intertwined with the above-mentioned public benefits of transparency. One may nevertheless identify some additional private benefits of bank transparency. For

instance, banks may choose to disclose information because some market participants (e.g. investors and credit rating agencies) place a greater value on high-disclosure banks, as it gives them more confidence in their investment decision-making or in their risk assessment. As a result, banks which choose to disclose information may benefit from a lower risk premium on their debt or equity, or from higher credit ratings. Box 1 provides an illustration of the latter case.

At the same time, banks may also choose not to be transparent for several reasons. First, they may have little incentive to disclose proprietary information since this may reveal competitive strategies or weaknesses. Second, banks may be reluctant to disclose information which imposes additional compliance costs or administrative burdens on them. Third, banks which are suffering from temporary and recoverable weaknesses (e.g. a liquidity shock) may fear that additional disclosure will aggravate market responses, and they may therefore choose not to disclose information.

To sum up, this section shows that while transparency is socially desirable (in the sense that its likely impact on financial stability is positive), the interplay between the private benefits and costs of transparency may lead banks to under provide it. Hence, it may be necessary to impose disclosure requirements either through formal rules or guiding principles. The next section discusses the disclosure requirements brought about by two important regulatory initiatives: Pillar 3 of the Basel II framework and the International Financial Reporting Standards.

### Box 1 – An example of how information disclosure may benefit banks – the case of credit ratings

This box summarises the credit rating agencies' perspectives on bank transparency in the general rating process and also illustrates how transparency can actually have an impact on unsolicited bank credit ratings, which may in turn provide an incentive for banks to disclose information.

#### a) The credit rating agencies' perspective on bank transparency

Moody's asserts that transparency is an important consideration when rating a bank. A lack of disclosure is indeed likely to increase credit risk for two reasons. First, it allows the internal discipline of the company to deteriorate. Second, it encourages extreme behaviour, e.g. companies under less public scrutiny may be more aggressive because they can hide behind opaque accounts (Moody's, 1998a and 1999).



Moody's therefore looks at two aspects of disclosure when rating a bank: the extent of disclosure by the bank about its operations and the reliability of that disclosure.<sup>(1)</sup> Moody's has identified a list of 13 quantitative and qualitative disclosure failures which matter both in emerging and developed markets. These are: i) delays in financial reporting, ii) the absence of quarterly financial updates, iii) non-standard loss and impairment definitions for financial assets, iv) non-homogeneous accounting standards, v) non-consolidation of the results of related companies, vi) lack of separate corporate-entity financial statements, vii) misleading treatment of expenses, viii) the recognition as current income of future cash flows that have a great degree of uncertainty, ix) undisclosed derivatives that could "break" the bank, x) asset or liability exposures not reflected in periodic statements, xi) the lack of dissemination of information about material events when they occur, xii) the lack of independence of auditors, and xiii) the lack of freedom of expression for independent third parties.

Standard and Poor's (S&P) uses a framework for assessing firms' (i.e. not necessarily just banks') governance, which focuses on four major components, including "transparency and disclosure". As far as the latter component is concerned, S&P examines company annual reports to identify more than 100 disclosure items which are grouped into three categories: i) ownership structure and investor rights, ii) financial and operational disclosure, and iii) board and management structure and process (see S&P, 2004).

S&P states that the link between its corporate governance scores and credit ratings can be extensive, but is often indirect. While there is likely to be a positive correlation between the two measures, this correlation is not equal to one and may be stronger or weaker during certain time periods. It should be noted that S&P stopped assigning governance scores for US companies in 2004 but has continued to assign these scores for some non-US companies.

Although the third player in the credit rating industry, Fitch, does not have any publicly available documentation relating to the role of transparency in the bank rating process, a previous director of Fitch's BankWatch has asserted that information disclosure plays an important role when assigning a rating: "As a matter of practice, less disclosure tends to be associated with higher risk. In the context of risk assessment, disclosure is not only the means by which the assessment is performed, it is also a positive credit consideration in itself" (Golin, 2001, p. 535).

In addition, there is also anecdotal evidence supporting the fact that transparency has an impact on Fitch's bank credit ratings. For instance, Fitch recently claimed that the low rating of a Chinese bank partly reflected its "continued poor public transparency and disclosure" (Fitch, 2006).

#### **b) The empirical impact of bank transparency on credit ratings**

Even though the first part of this box clearly shows that rating agencies pay attention to the amount of information released by banks when assigning their credit ratings, there is no reason to expect information disclosure alone to have a systematic impact on ratings. Indeed, credit ratings are typically based on two types of information: public information (obtained from the issuer's annual report, from its website, etc.) and non-public or "private" information (acquired during meetings with the issuer). Therefore, disclosure of information may only have a significant impact on credit ratings for which rating agencies are constrained to rely exclusively on public information and are unable to gather private information from the issuer, e.g. unsolicited ratings. For those types of credit ratings, lower information disclosure may lead rating agencies to assign lower ratings due to a conservative bias.

(1) The first aspect (extent of disclosure) is similar to what the Basel Committee refers to as "disclosure", while the second aspect (reliability of disclosure) is close to the Basel Committee's definition of "transparency".



The above reasoning is investigated in Van Roy (2006). This paper looks at the impact of disclosure of accounting information on a sample of solicited and unsolicited bank ratings assigned by Fitch in Asia. Solicited ratings are credit ratings which are requested (and paid for) by issuers and which incorporate both public and private information. Unsolicited ratings are credit ratings which are not requested by issuers and which are mostly based on public information. Over recent years, several market participants have complained that unsolicited ratings seem to be lower than solicited ones, all else being equal.

Van Roy (2006) confirms that disclosure of information has a significant impact on credit ratings for which public information is the main source of information for rating agencies, e.g. the unsolicited ones. *Ceteris paribus*, the difference between the rating of high and low disclosure banks with unsolicited ratings is equal to 2.5 notches on average (on a 1 to 9 rating scale), while there is no difference between the rating of high and low disclosure banks with solicited ratings.<sup>(1)</sup> The study further highlights the role of disclosure in the bank credit rating process by showing that banks with unsolicited ratings and with high levels of disclosure receive ratings which are not significantly different from those of similar banks with solicited ratings. However, banks with low disclosure and unsolicited ratings have ratings which are significantly lower than those of similar banks with solicited ratings (3.4 notches on average). Thus, there are reasons to believe that disclosure of information may account for the difference between solicited and unsolicited ratings which has been noted by market participants.

Taken as a whole, these findings should provide an incentive for bank managers to disclose information, as they show that disclosure not only appears to have a positive effect on the credit rating of banks with unsolicited ratings, but that it also eliminates the alleged downward bias of unsolicited ratings. This result is particularly interesting in light of the fact that one of the main objectives of Pillar 3 of the Basel II framework is to encourage public disclosure by banks (see Section 2.1).

(1) The figures in this paragraph are taken from a revised version of the paper available from the author. This version provides evidence that the above-mentioned results hold in a more international sample, which contains S&P's credit ratings of banks located in Africa, Asia, Europe and Latin America.

## 2. Bank transparency and regulatory initiatives

Pillar 3 is one of the three pillars of the Basel II framework. Its purpose is to complement the other two pillars of the framework (minimum capital requirements and supervisory review process) by a set of consistent and comparable disclosure requirements which have the potential to increase market discipline on banks. These requirements mostly focus on capital and risk disclosures.

The International Financial Reporting Standards (IFRS) are a set of accounting standards and interpretations established by the International Accounting Standards Board (IASB). Their overall aim is to present a more accurate picture of companies' (i.e. not only financial institutions') financial positions at any given time. The requirements imposed by some of the IFRS go beyond risk

disclosures and include, e.g., the disclosure of measurement methods used to value financial assets and liabilities. Note also that contrary to the Generally Accepted Accounting Principles (GAAP), which are rules-based, IFRS are principles-based.<sup>(1)</sup>

To a certain extent, Pillar 3 and International Financial Reporting Standards have similar goals, as they both aim at enhancing the transparency of financial institutions in order to enable financial market participants and supervisors to acquire information and make decisions more easily. This in turn should enhance financial stability. It is therefore not surprising that Pillar 3 and some of the standards of the IFRS (most notably IFRS 7) share similar disclosure requirements for financial institutions. Sections 2.1 and 2.2 further detail regarding Pillar 3 and IFRS as well as their respective implementation.

(1) The advantage of principles-based over rules-based accounting standards is that they may allow for financial innovation more easily. Their disadvantage, however, is that they may leave room for interpretation and therefore be difficult to enforce.

## 2.1 Pillar 3 of the Basel II framework

As mentioned above, the aim of Pillar 3 is to enhance market discipline through greater disclosure. Table 1 (in the Annex) shows that the disclosure requirements under Pillar 3 consist of quantitative and qualitative information which falls under five areas: general disclosure principle, scope of application, capital structure, capital adequacy and risk exposure. The table also contains some examples of qualitative and quantitative disclosure requirements for each area.

More specifically, the general disclosure principles and the scope of application areas mostly deal with the existence of a formal disclosure policy and the level of the banking group at which it is applied; the capital structure area refers to a discussion of the main features of the capital instruments held by the bank, as well as how much capital is held; while the capital adequacy area corresponds to a discussion of the bank's approach to assessing its capital adequacy and to a quantitative disclosure of its capital requirements for different types of risk.

The last disclosure area (risk exposure) is the most important one. It consists of general disclosure requirements regarding the bank's risk management objective and policies for credit risk, market risk, operational risk, risk from equity positions and interest rate risk, and specific disclosure requirements for each of these five types of risk. It should be noted that for credit risk and market risk, the bank has a choice of method for computing required capital, and the disclosure requirements are specific to the method chosen. It is also important to mention that Pillar 3 does not include disclosure requirements for liquidity risk. This has led some observers to question whether such requirements could have helped restore market confidence earlier on in the subprime mortgage crisis

(Box 2 further discusses issues involved with the measurement of liquidity risk). Furthermore, Pillar 3 disclosure requirements with respect to securitisation exposures are quite limited, as they mostly focus on banks' total outstanding exposures that have been securitised, as well as on the corresponding capital charge. The Basel Committee will issue revised guidelines for the management and supervision of liquidity risk in July 2008 and will also promote enhanced disclosures relating to complex securitisation exposures.

As far as regulatory implementation is concerned, Pillar 3 has been implemented in many EU countries since 1 January 2008 via the Capital Requirements Directive (CRD). Although the CRD allows national authorities to use specific means of verification for the disclosures not covered by statutory audits, only a minority of countries apply stricter provisions either via internal or external auditors. Given that Pillar 3 is quite flexible in terms of medium and location of disclosure, it is also expected that a majority of banks will choose to make the disclosures in their annual and interim financial statements, apart from selected information (e.g. capital adequacy), which needs to be reported on a quarterly basis through other media.

Finally, the Committee of European Banking Supervisors (CEBS) recently published a report on the implementation of Pillar 3 (CEBS, 2007), with the overall message that Pillar 3 does not give rise to major concerns in Europe. The report nevertheless points to a small number of areas that need further attention and proposes follow-up work, in particular on the application of the disclosure requirements to (significant) subsidiaries and on investigating the potential for a solution where limited disclosure is being provided with a subsidiary's (individual) financial statements. An additional open issue is the relationship between Pillar 3 and accounting standards (see Section 2.2).

### Box 2 – Banks' disclosure on liquidity risk<sup>(1)</sup>

Discussions about the type and depth of banks' disclosure to markets typically focus on solvency risks. Liquidity risks feature less prominently. Yet, when there is uncertainty and imperfect information that afflict both lenders and borrowers, as during the 2007/2008 structured-finance-related stresses, disclosure on the degree of banks' liquidity risk might help restore market confidence. This box briefly sets out current practices before highlighting some of the contentious issues in this domain.

(1) This box was prepared by Valerie Herzberg.



As hinted in Section 2.1, in terms of international regulation, there are few concrete mandatory disclosure requirements on liquidity. Disclosure on the quantification of liquidity risk is limited to contractual liquidity schedules of assets and liabilities for different maturity buckets and does not explicitly reveal the size of liquidity buffers. However, banks report disaggregated assets, and databases such as Bankscope use this information and the maturity schedules to compute seemingly comparable narrow and broad liquidity measures. Also, many large banks disclose qualitative information about their liquidity practices. In the case of Belgium, while the details vary, banks describe in their annual reports the main pillars of liquidity risk policies: objectives of liquidity management, organisational structure, processes and metrics for managing liquidity risk, stress testing, limits and contingency funding plans. The content covers, e.g., diversification of funding sources, the role of liquidity buffers and stress tests, the allocation of responsibilities, how central and local liquidity processes complement each other, how limits are derived and what they refer to.

One question that arises is whether this level of transparency is enough for the various stakeholders to paint an accurate picture about liquidity risks in the banking sector. Firstly, starting off with quantitative information, there are two general shortcomings. The contractual maturity schedules divulge little about real expected liquidity gaps in normal times and/or under stress and the policies in place to manage these gaps; moreover, contingent claims and sources are excluded. And, in terms of funding risk, while there is information on the maturity of funding sources, this does not reveal much about the ease with which these sources could be renewed and how concentrated they are.

Comparability is also hampered by different liquidity management choices of banks. Some banks centralise certain aspects of liquidity management, which of course affects liquidity ratios of the individual entities and of the consolidating group. A measure at group level may be more appropriate if liquidity can easily circulate among all the entities of a group, if there are no legal obstacles to its transfer across national borders and if solidarity among all the group entities is ensured. In practice, liquidity of some subsidiaries would need to be considered stand-alone, while that of others ought to be integrated into the group. Outside analysts, of course, have insufficient information to gauge what degree of centralisation in measuring liquidity buffers is appropriate.

Turning to qualitative information, which is particularly important in light of the aforementioned data limitations, it seems even harder to reach relevant conclusions across banks. For example, taking public disclosure on stress-testing, it is difficult for external parties to assess whether a bank's stress test assumptions are internally consistent and appropriate and how the severity of assumed shocks compares across banks. The same holds for descriptions of banks' liquidity management principles more generally. These are difficult for an outside investor to interpret: one bank, for example, may say it sets limits on its unsecured funding gap without explaining how these are derived, while another may set limits on the basis of distressed liquidity scenarios without stipulating on what type of gaps.

Given that liquidity is volatile and fast-changing, the question relating to the frequency at which information should be provided is also an important one. Annual reports are of course backward looking and most banks only provide one-point-in-time year-end information on their maturity gaps.

But comprehensive, comparable and timely information is necessary to allow investors and depositors to gauge a bank's liquidity risk tolerance and to exert the relevant market discipline. In many countries, supervisors have access to such information. In Belgium, for example, the scope of regular liquidity reporting to supervisors has recently been enhanced, improving the monitoring of different banks' liquidity risks (Janssens et al., 2007).

However, precisely because of its volatile nature, high-frequency liquidity information can easily be misinterpreted and thus create destabilising "noise" in markets. According to a recent survey conducted by the Banking Supervision Committee among European banks, there is considerable reluctance to provide comprehensive disclosure on stress tests and contingency funding plans. None of the large Belgian banks provide quantitative



details on their stress tests. Besides, there is a risk that solvent institutions – but with a temporarily vulnerable liquidity position – could be subject to runs and predatory liquidity curtailment by cash-rich institutions if they had to disclose their positions.

More generally, the liquidity shortages experienced in 2007 and early 2008 raise the question of whether the market really can play a disciplining role as regards banks' liquidity management. Presumably, Northern Rock's wholesale funding market concentration risks were well known to the market, but it nevertheless failed to punish the bank with higher borrowing costs in earlier years. The usefulness of market discipline and disclosure as regards liquidity management thus remains an open issue.

## 2.2 International Financial Reporting Standards

This section focuses on two international financial reporting standards which are of particular importance for the topic of disclosure in banking: IAS 39 (financial instruments: recognition and measurement) and IFRS 7 (financial instruments: disclosures). It further shows the connection between Pillar 3 and IFRS 7, which share some similar features.

The objective of IAS 39, effective in the EU since 1 January 2005, is to establish principles for recognising and measuring financial assets and liabilities of firms, including derivatives. More specifically, IAS 39 foresees that all financial assets and liabilities must be recognised in the balance sheet and classified into one of six categories: i) financial assets at fair value through profit or loss, ii) held-to-maturity investments, iii) loans and receivables, iv) available-for-sale financial assets, v) financial liabilities at fair value through profit or loss, and vi) financial liabilities at amortised cost.<sup>(1)</sup> This classification thus determines the measurement method of each item (at cost, at amortised cost or at fair value) and where the gain or loss should be recognised (either in profit or loss or in reserves). The disclosure of each measurement method will assist users of financial statements in understanding the extent to which accounting policies affect the amounts at which financial assets and liabilities are recognised.

The objective of IFRS 7, which has been in force in the EU since 1 January 2007, is to require entities to provide disclosures in their financial statements that enable users to evaluate, first, the significance of financial instruments for the entity's financial position and performance, and second, the nature and extent of risks arising from financial instruments to which the entity is exposed during the

period and at the reporting date, and how the entities manage those risks. Table 2 (in the Annex) further details the qualitative and quantitative disclosure requirements for credit risk, liquidity risk and market risk imposed under IFRS 7.

As shown in Table 2, there are several areas of convergence between the disclosure requirements of IFRS 7 and Pillar 3. For instance, most of the qualitative disclosures related to credit risk and market risk can be aligned. Similarly, there is a considerable volume of quantitative disclosures that overlap, such as the analyses of credit risk exposures and value-at-risk measures. However, IFRS 7 does not cover operational risk while Pillar 3 does not address liquidity risk (as mentioned above, the Basel Committee is nevertheless working on strengthening banks' management of liquidity risk and should issue new standards in July 2008).

The above-mentioned similarities between IFRS 7 and Pillar 3 have been noted by the Basel Committee, which states that "in situations where the disclosures are made under accounting requirements or are made to satisfy listing requirements promulgated by securities regulators, banks may rely on them to fulfil the applicable Pillar 3 expectations" (Basel Committee, 2006, p. 227). Likewise, authorities in charge of the implementation of IFRS in their respective countries have published guidelines which are consistent with those published by the Basel Committee for Pillar 3. As a result, banks can prepare a single coordinated set of disclosures dealing with financial risk. It should nevertheless be noted that, contrary to Pillar 3, IFRS 7 will be required to be audited by external auditors.

As far as regulatory implementation is concerned, the move towards IFRS in the EU has been made in two parallel and interlocking ways: the Fair Value Directive and an IAS Regulation approach. However, there are still

(1) Fair value is defined as "the amount for which an asset could be exchanged, or a liability settled, between knowledgeable, willing parties in an arm's-length transaction (IASB, 2008).



a number of practical challenges regarding, for example, the implementation of IFRS 7. Most of these are due to differences in concepts, measurements, and methods between Pillar 3 and IFRS 7. For instance, although Basel II and IFRS are both to be applied at the consolidated level, consolidation criteria differ between the two regulatory arrangements.<sup>(1)</sup> The banking industry is therefore working to align, as far as possible, the concepts used in the disclosures (CEBS, 2007).

Interestingly, an analysis of the IFRS financial statements of 200 EU publicly-traded companies was recently carried out at the request of the European Commission (see Financial Reporting Faculty, 2007). The results for the 29 banks included in the study revealed that, while all of them disclosed their principal accounting policy, some did not disclose policies for all relevant instrument issues. It was also noted that all sample banks provided disclosures of their risk management policies and various types of risk, as required by IFRS 7.

### 3. Bank transparency and the subprime mortgage crisis

This section focuses on the recent turbulence in the credit markets following the outbreak of the subprime mortgage crisis. This episode is interesting because it provides an illustration of the importance of bank transparency for financial stability and because it highlights which additional disclosure requirements might be desirable relative to those already specified under Pillar 3 and IFRS.

As mentioned in the introduction, some banks were severely criticised during the 2007/2008 crisis for not being transparent enough about their subprime-related exposures and not publishing rapidly enough their write-downs and losses. Informal evidence gathered from major European and US banks' quarterly reports confirms that banks generally did not disclose information about their subprime-related exposures in their second quarterly report and only became more transparent in their third and fourth quarterly reports. In addition, information about subprime-related exposures was often incomplete and differed widely across institutions. For example, only a minority of banks disclosed the distribution of their subprime-related exposures by type of instrument (e.g. RMBS, ABS CDO) in addition to reporting their total

exposure. Also, there were notable differences between banks regarding the disclosure of their unconsolidated exposures through SIVs and ABCP conduits. More generally, comprehensive explanations on the origin of exposures (e.g. whether they were originated, retained or purchased) were often lacking.

As far as write-downs and losses on subprime-related securities are concerned, the following observations can be made. First, the write-downs initially released by banks were relatively low. Second, significant differences could be observed in the write-down policy adopted by some banks with comparable exposures to the US subprime market. Third, it was not always easy to infer with certainty whether the figures released by banks represented write-downs or actual losses.

Consistent with the theoretical literature reviewed in Section 1, this lack of transparency about exposures, write-downs and losses exacerbated problems of asymmetry of information between banks on the one hand and depositors, investors and supervisors on the other hand, and also between banks themselves. As a result, liquidity dried up in the interbank market and the shares of some banks were severely affected, which further led to an amplification of systemic risk.

The above-mentioned transparency shortcomings are not, however, necessarily intentional and could have different explanations. First, the absence of active and liquid markets for subprime-related exposures and the complexity of the relationship between the payoffs of these instruments and their underlying value drivers made it difficult for banks to value them. Second, different assumptions underlined banks' valuations and resulted in significant differences between their write-downs.<sup>(2)</sup> Third, some banks managed to decrease their overall write-downs as some of the hedging positions which they took to protect their risky exposures turned out to be profitable. These different elements undoubtedly contributed to fuelling market and regulatory uncertainty about the exact magnitude of losses sustained by individual institutions.

Some observers have nevertheless argued that banks could have acted more decisively to alleviate this uncertainty. For instance, banks could have been more forthcoming with information regarding their valuations and the sensitivity of these valuations to changes in key assumptions. Similarly, banks could have disclosed more information about the use of mark to market value for some of their positions. Finally, some banks could have been quicker to report estimates for their exposures and losses and should not have waited for market pressure to materialise.

(1) From the perspective of banking supervision, consolidation embraces only those companies of a group that conduct banking and other financial operations. This is only a fraction of the entities included in consolidation according to the accounting standards.

(2) Differences in write-downs across banks can be further explained by differences in vintages held by these banks but also by differences in hedging strategies (e.g. purchase of CDS protection), portfolio correlations, etc.

Against this background, several regulatory initiatives have been launched to investigate whether the disclosure requirements imposed by Pillar 3 and IFRS may need to be strengthened. For instance, the Financial Stability Forum (a group established by G7 finance ministers and central bank governors and which consists of a number of authorities responsible for financial stability) released a report on “market and institutional resilience” in April 2008.

This report sets out recommendations to improve, among other things, risk disclosures by market participants, accounting and disclosure standards for off-balance-sheet entities, valuation techniques, and transparency in securitisation processes and markets. Most of these recommendations involve the participation of regulators and market participants and should be implemented in the period 2008-2009. For instance, the report foresees that the Basel Committee will issue further guidance to strengthen disclosure requirements under Pillar 3.

On the topic of valuation, the report recommends that the IASB strengthen its standards to achieve better disclosures about valuations, methodologies and the uncertainty associated with valuations. The IASB should also enhance its guidance on valuing financial instruments when markets are no longer active. Indeed, fair value accounting requires banks to mark to market their exposures. However, this may prove to be an issue when there are no market prices available, as it has been the case for subprime-related securities in recent months. Several institutions (see e.g. IMF, 2008) have also suggested finding better ways to apply fair value through the cycle so as to mitigate its pro-cyclical character.

It is important to point out that most of the above-mentioned recommendations aim at a greater disclosure of banks' valuation methods and accounting standards, and not necessarily at wider harmonisation. This focus on greater transparency (rather than on greater uniformity) seems sensible for at least two reasons. First, it is unclear whether a uniform approach to those issues is feasible, given that, for some types of instruments, there is little if any past history to decide on what the “best” valuation or accounting standard might be. Second, even if valuations and accounting policies were identical across instruments and institutions, variations in the disclosure of exposures and write-downs, for instance, would still generate uncertainty among market participants and authorities. In this respect, transparency is already a desirable objective in itself. As a result, it may be appropriate for regulators working on those issues to be cautious and to accord some latitude to banks, e.g. in the strict application of fair value accounting during

stressful events (provided that appropriate disclosures are made).

## Conclusion

This article focuses on the role of transparency in banking. After surveying arguments relating to bank transparency and financial stability, it summarises two recent regulatory standards which have had an impact on disclosure among banks: Pillar 3 of the Basel II framework and the International Financial Reporting Standards. The article also examines the recent credit turmoil in light of the arguments relating to transparency. More specifically, it discusses how heterogeneous levels of disclosure across banks have likely impacted the turmoil.

A question that naturally arises is whether Pillar 3 could have helped to avoid some of the problems caused by heterogeneous disclosure had it been implemented earlier. Given that Pillar 3 disclosure requirements for securitisation exposures are quite limited, the answer is likely to be negative. As a result, several regulatory initiatives have been launched to strengthen Pillar 3 as well as to improve valuations and accounting standards.

Finally, it is worth stressing that, to some extent, bank transparency is a moving target, since it is very hard for regulators to predict which types of disclosures may be warranted in advance of a crisis. In a similar way, requiring the disclosure of a pre-defined list of bank items may not necessarily be optimal, as the order of priority of these items may change over time. One potential way to address this concern would therefore be, for any new regulatory arrangement, to adopt a more forward-looking approach, e.g. by requiring banks to systematically disclose information about their fast-growing business lines or sources of revenues. Although global CDO issuance more than tripled between 2004 and 2006, few banks actually disclosed detailed information about their holdings of CDOs or the risks involved. Disclosures of this type may help regulators and market participants to better assess any new developments that could have an adverse effect on banks. In addition, any future regulation aiming at addressing existing transparency shortcomings should also ensure that disclosure requirements cover the entire on-balance- and off-balance-sheet activities of banks and that they are not limited to capital but also address liquidity risk. Of course, these various suggestions may not entirely eliminate financial crises in the future but they may, at least, help to improve the existing transparency framework and contribute to financial stability.

## References

- Basel Committee (1998), "Enhancing Bank Transparency".
- Basel Committee (2006), "International Convergence of Capital Measurement and Capital Standards: A Revised Framework" (Comprehensive Version).
- CEBS (2007), "Report on Regulatory Implementation of Pillar 3".
- Chari V. and R. Jagannathan (1988), "Banking Panics, Information, and Rational Expectations Equilibrium", *Journal of Finance*, Vol. 43, 749-760.
- Cordella T. and E. Yeyati (1998), "Public Disclosure and Bank Failures", CEPR working paper No. 1886.
- Financial Reporting Faculty (2007), "EU Implementation of IFRS and the Fair Value Directive: a Report for the European Commission".
- Financial Stability Forum (2008), "Final Report to the G7 Finance Ministers and Central Bank Governors", FSF Working Group on Market and Institutional Resilience.
- Fitch (2006), "Rating Announcement on China Everbright Bank", August 14.
- Golin J. (2001), "The Bank Credit Analysis Handbook", Wiley & Sons.
- Gorton G. and L. Huang (2006), "Bank Panics and the Endogeneity of Central Banking", *Journal of Monetary Economics*, Vol. 53, 1613-1629.
- Hyytinen A. and T. Takalo (2002), "Enhancing Bank Transparency: a Reassessment", *European Finance Review*, Vol. 6, 429-445.
- IASB (2007), "IFRS 7: Technical Summary".
- IASB (2008), "IAS 39: Technical Summary".
- International Monetary Fund (2008), "The Recent Financial Turmoil – Initial Assessment, Policy Lessons, and Implications for Fund Surveillance".
- Janssens J., J. Lamoot and G. Nguyen (2007), "Liquidity Risk in the Banking Sector: the Belgian Perspective", *Financial Stability Review*, National Bank of Belgium, 123-133.
- Lee K. (1999), "Excess Volatility of Stock Prices Driven by a State-Dependent Information Model", *Journal of Economic Theory and Econometrics*, Vol. 5, 31–50.
- Moody's (1998a), "Disclosure and Transparency: Failures in Both Emerging and Established Markets". Special comment.
- Moody's (1998b), "Improving Transparency in Asian Banking Systems". Special comment.
- Moody's (1999), "Bank Credit Risk in Emerging Markets: an Analytical Framework". Rating methodology.
- Morgan D. (2002), "Rating banks: Risk and Uncertainty in an Opaque Industry", *American Economic Review*, Vol. 92, 874-888.
- Nier E. (2005), "Bank Stability and Transparency," *Journal of Financial Stability*, Vol. 1, 342-354.

S&P (2004), "Corporate Governance Scores and Evaluations – Criteria, Methodology and Definitions". Governance services.

Schinasi G. (2005), "Preserving Financial Stability", Economic issues No. 36, International Monetary Fund.

Tadesse S. (2005), "Banking Fragility and Disclosure: International Evidence", Unpublished Working Paper, University of South California.

Van Roy P. (2006), "Is there a Difference Between Solicited and Unsolicited Bank Ratings and if so, why?", National Bank of Belgium working paper No. 79.

## Annex

**TABLE 1** DISCLOSURE REQUIREMENTS UNDER PILLAR 3

Disclosure area	Qualitative requirements	Quantitative requirements
1. General disclosure principles	Formal disclosure policy approved by the board of directors	None
2. Scope of application	Name of the corporate entity to which the requirements apply, outline of differences in the basis of consolidation for accounting and regulatory purposes	Aggregate amount of surplus capital of insurance subsidiaries included in the capital of the consolidated group, etc.
3. Capital structure	Terms and conditions of the main features of all capital instruments	Amount of tier 1 capital (with separate disclosures), tier 2 and tier 3 capital, other deductions from capital, and total eligible capital
4. Capital adequacy	Discussion of the bank's approach to assessing the adequacy of its capital to support current and future activities	Capital requirements for: <ul style="list-style-type: none"> <li>i) credit risk</li> <li>ii) equity exposures in the IRB approach</li> <li>iii) market risk</li> <li>iv) operational risk</li> </ul> Total and tier 1 capital ratio
5. Risk exposure		
a) General requirements	For each type of risk listed below, description of: <ul style="list-style-type: none"> <li>i) strategies and processes</li> <li>ii) structure and organisation of the relevant risk management function</li> <li>iii) scope and nature of risk reporting and/or measurement systems</li> <li>iv) hedging/risk mitigating policies and strategies/processes for monitoring their effectiveness</li> </ul>	None
b) Credit risk		
General principles	The general disclosure requirements with respect to credit risk (see 5.a), including definitions of past due and impaired, description of approaches followed for specific and general allowances and statistical methods, discussion of the bank's credit risk management policy, etc.	Total gross credit risk exposures, geographic and industry/counterparty type distribution of exposures, residual contractual maturity breakdown of the whole portfolio, etc.
SA and supervisory risk-weights in the IRB	For portfolios under the standardised approach, information related to the ECAs and ECAs used for risk-weighting purposes (names, types of exposures risk-weighted, etc.)	Amount of the bank's outstandings in each risk bucket
IRB (foundation and advanced)	Supervisor's acceptance of approach, structure of internal rating systems and description of the internal rating process for five portfolios (corporate, equities, residential mortgages, qualifying revolving retail and other retail)	For each of the five portfolios except retail, information such as total exposures across a sufficient number of PD grades, actual losses, etc.

Note: ECAs: external credit assessment institutions; ECAs: export credit agencies; SA: standardised approach; IRB: internal ratings-based approaches; CCR: counterparty credit risk; IMA: internal models approach; IRRBB: interest rate in risk the banking book.

Source: Basel Committee (2006).

**TABLE 1** DISCLOSURE REQUIREMENTS UNDER PILLAR 3 (continued)

Disclosure area	Qualitative requirements	Quantitative requirements
Credit risk mitigation, SA and IRB	The general disclosure requirements with respect to credit risk mitigation (see 5.a), including policies and processes for on- and off-balance sheet netting and for collateral valuation and management, main types of collateral taken by the bank, main types of guarantor/credit derivative counterparty and their creditworthiness, information about risk concentrations within the mitigation taken	For each separately disclosed credit risk portfolio under the standardised and/or foundation IRB approach, the total exposure covered by eligible collateral; for each separately disclosed portfolio under the standardised and/or IRB approach, the total exposure covered by guarantees/credit derivatives
Counterparty credit risk	The general disclosure requirements with respect to derivatives and CCR (see among others 5.a), including a discussion of the methodology used to assign economic capital and credit limits, policies for securing collateral and establishing credit reserves, policies with respect to wrong-way risk exposures, etc.	Gross positive fair value of contracts, netting benefits, netted current credit exposure, collateral held and net derivatives credit exposure; measures for exposure at default or exposure amount; notional value of credit derivative hedges, etc.
Securitisation, SA and IRB	The general disclosure requirements with respect to securitisation (see 5.a), including a discussion of the bank's objectives in relation to its securitisation activity and the roles played by the bank in the securitisation process; a summary of the bank's accounting policies for securitisation activities, names of ECAs used for securitisations and types of securitisation exposure for which each agency is used	Total outstanding exposures securitised by the bank and subject to the securitisation framework (including amount of impaired/past due assets securitised and losses recognised), aggregate amount of securitisation exposures (retained or purchased) and associated IRB capital charges, etc.
c) Market risk		
SA	The general disclosure requirements with respect to market risk (see 5.a), including the portfolios covered by the SA	Capital requirements for: <ul style="list-style-type: none"> <li>i) interest rate risk</li> <li>ii) equity position risk</li> <li>iii) foreign exchange risk</li> <li>iv) commodity risk</li> </ul>
IMA (trading portfolio)	The general disclosure requirements with respect to market risk (see 5.a), including the portfolios covered by the IMA; other specific disclosure requirements	High, mean and low VaR values over the reporting period and period-end, comparison of VaR estimates with actual gains/losses experienced by the bank
d) Operational risk	The general disclosure requirements with respect to operational risk (see 5.a) and the approach(es) for operational risk for which the bank qualifies; other specific disclosure requirements	None
e) Equities risk (banking portfolio)	The general disclosure requirements with respect to equities risk (see 5.a) including differentiation between holdings, discussion of important policies covering the valuation and accounting of equity holdings	Value disclosed in the balance sheet of investments, types and nature of investments (publicly traded vs. privately held), cumulative (un)realised gains (or losses), total latent revaluation gains (or losses), etc.
f) Interest rate risk (banking portfolio)	The general disclosure requirements with respect to interest rate risk (see 5.a), including the nature of IRRBB and key assumptions	Change in earnings or economic value for upward and downward rate shocks according to management's method for measuring IRRBB

Note: ECAs: external credit assessment institutions; ECAs: export credit agencies; SA: standardised approach; IRB: internal ratings-based approaches; CCR: counterparty credit risk; IMA: internal models approach; IRRBB: interest rate in risk the banking book.

Source: Basel Committee (2006).

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**TABLE 2** DISCLOSURE REQUIREMENTS UNDER IFRS 7
 

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*Qualitative requirements*

Disclosures related to the nature and extent of risks arising from financial instruments are required for each type of risk (e.g. credit risk, liquidity risk) and include:

- the exposures to risks and how they arise;
- the entity's objectives, policies, processes and methods used for managing and measuring the risks.

*Quantitative requirements*

The level of detail of quantitative disclosure should be based on the information provided internally to key management of the entity (e.g., board of directors, CEO). Quantitative disclosures are required at a minimum in respect of credit risk, liquidity risk and market risk.

Required credit risk disclosures include:

- the reporting entity's maximum exposure without taking account of collateral or credit enhancements and a description of any collateral and credit enhancements;
- the credit quality of financial assets that are neither past due nor impaired;
- the carrying amount of financial assets with renegotiated terms that otherwise would be past due.

Required liquidity risk disclosures include a contractual maturity analysis for financial liabilities.

Required market risk disclosures include:

- a sensitivity analysis for each type of market risk (e.g., currency risk, interest rate risk and other price risk) showing how profit or loss and equity would have been affected by changes in the relevant risk variables, and methods and assumptions used in preparing such sensitivity analyses;
- for entities that prepare sensitivity analyses reflecting interdependencies between risk variables, such as value-at-risk, and use such sensitivity analyses to provide the disclosures required by IFRS 7, the standard requires the entity to provide an explanation of the method used in preparing the analysis, its objectives and limitations, and the main parameters and assumptions used.

If the quantitative disclosures do not result in providing the information representative of an entity's exposure to risk, then an entity has to provide further information that is representative.

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Source: IASB (2007).

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# Agency problems in structured finance – a closer look at European CLOs

Joachim Keller

## Introduction

The current turmoil in the credit markets, which originated with problems involving securitisation of US subprime mortgages but which quickly spread to the global financial system, has called into question the desirability of securitisation and the viability of the “originate-and-distribute model” of banking. Since securitisation and the widespread use of off-balance-sheet vehicles were related to the spreading crisis, market observers quickly suspected that the securitisation process was fundamentally flawed and that there were adverse incentives for participants along the various links of the chain. For example, originators and transaction arrangers who did not retain a portion of the securitisation transaction on their balance sheets may have had less interest in screening borrowers or in monitoring the quality of the securitised loans. This suggests that although the crisis originated in the US subprime segment, imprudent behaviour may also have occurred in other segments and asset classes used in securitisation or structured finance transactions, such as leveraged loans, which experienced a boom in recent years similar to that on the subprime market.

One potential problem in leveraged loan securitisations involves the management of the special purpose vehicles that are set up to carry out securitisation and structured finance transactions. The most important type of vehicles in the leveraged loan market are Collateralised Loan Obligations (CLOs), which are a variant of Collateralized Debt Obligations (CDOs) and which invest almost exclusively in leveraged loans.<sup>(1)</sup> The manager of a CLO purchases and manages a portfolio of around 100-200 leveraged loans and finances these purchases by

issuing tranching securities, i.e., securities with different risk/reward profiles, against the loan pool. CLO managers make a profit by exploiting the excess spread between the interest proceeds of the loan pool and the interest to be paid on the issued securities. Because CLOs are often actively managed and the managers appear to have a considerable impact on performance (see S&P, 2002b, Fitch, 2006), one concern is that these transaction managers may not have the incentive to act in the best interest of all the investors. This article analyses the potential incentive, or agency, problems facing CLO managers and the mechanisms that have been put in place to mitigate these problems.<sup>(2)</sup> Since CLOs represent one form of CDO, some of the agency problems in CLO management also apply to the management of CDOs. However, some of the special characteristics of loans lead to agency problems that are specific to CLOs.<sup>(3)</sup>

CLOs are also an interesting case to study because of the important role they have played in the private equity boom as buyers of leveraged loans. As with mortgages and other fixed income assets, the boom in leveraged loans led to very low risk premia. However, since the beginning of the current turmoil, leveraged loan issuance has virtually ground to a halt, and there has been a massive repricing of risk. One of the questions that has arisen

(1) CDOs are vehicles that invest in a wide range of fixed income assets, such as mortgage-backed securities, asset-backed securities, corporate bonds or loans. When they are specialized in investing in a certain type of assets, they are sometimes labelled according to the asset type. Examples are Collateralised Bond Obligations (CBOs) or Asset-backed Securities CDOs (ABS CDOs).

(2) Agency problems may also face other participants in the loan securitisation process such as originators, arrangers, trustees or rating agencies. However, the agency problem facing managers in CLOs appears to be the main concern because the tasks of the other participants are relatively more standardized and more easily verifiable by the counterparty and hence less susceptible to agency problems.

(3) For example, a CLO manager must choose between going through a work-out of a troubled loan and selling it. The manager of a CDO backed by other assets does not generally face this choice.



is whether the boom was associated with excessive risk taking by market participants, and if so, which factors may have contributed to such behaviour. As CLOs were important drivers of the demand for leveraged loans, it is quite natural to ask whether the presence of these vehicles may have had an adverse effect on the market.

The article proceeds as follows. The first section examines the growth in leveraged loan markets and CLOs and the general role of the CLO manager. Section 2 identifies potential agency problems arising in the management of CLOs. Section 3 uses pre-sale reports from European CLO transactions to examine their structure and the mechanisms designed to reduce the agency problems. The last section concludes.

## 1. Growth of CLOs and the role of the CLO manager

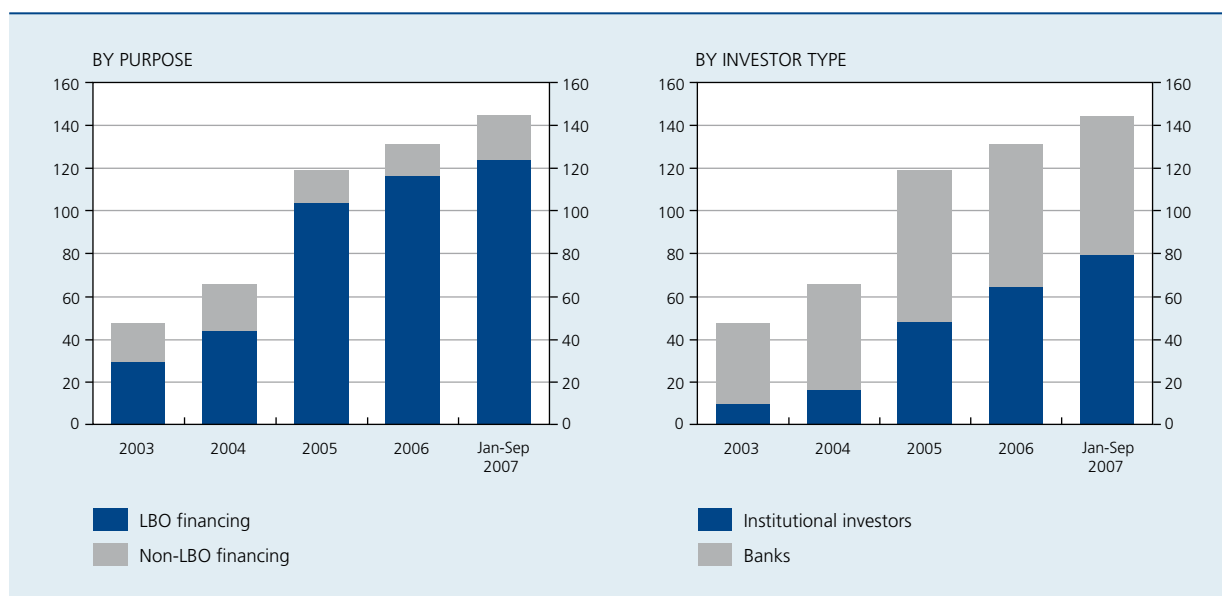
Like in the US, the European leveraged loan market has grown considerably in recent years. This growth was largely fuelled by the LBO boom (Chart 1, left-hand panel). At the same time, institutional investors have gained in importance in the leveraged loan market. It is worth noting that banks' demand for leveraged loans declined slightly from 2005 on, while institutional investors bought the extra supply (Chart 1, right-hand panel). As part of institutional demand, CLO managers are important players in the

leveraged loan market. According to S&P, they accounted for 61% of institutional demand for leveraged loans in the first three quarters of 2007 (S&P, 2007).

The boom in the leveraged loan market lasted until summer 2007 and provided CLOs with very favourable market conditions. CLO managers were able to issue securities at low cost and at the same time benefited from ample supply of leveraged loans and historically low default rates. The repricing of risk since last summer has virtually halted issuance of leveraged loans and, hence, new CLO transactions. However, a large number of CLOs issued in recent years are still active in the market and have to face the changed market conditions.

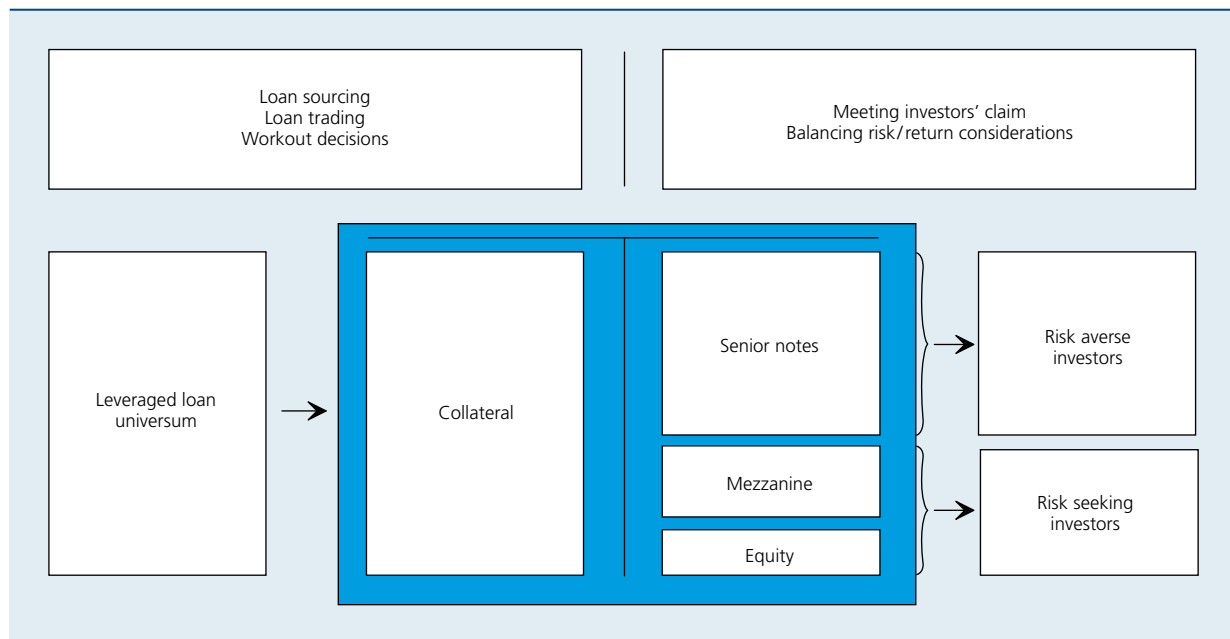
Chart 2 depicts the role of CLO managers as intermediaries in the market and the main tasks that they must perform. After investors have agreed to buy tranches of a proposed structure, the CLO manager must source collateral for the initial portfolio (the ramp-up period). Once the manager has assembled the portfolio, the CLO becomes effective and enters the reinvestment period, which lasts between five and seven years. During this period, the manager must re-invest proceeds from maturing loans and loan prepayments. The manager can also trade a certain volume of loans at his own discretion. The activities undertaken during the reinvestment period have a strong bearing on the performance of a CLO. At the end of the reinvestment period, the manager is usually restricted to

**CHART 1** EUROPEAN LEVERAGED LOAN ISSUANCE  
(billions of euro)



Source : S&P, own calculations.

CHART 2 THE ROLE OF CLO MANAGERS



replacing impaired and prepaid loans and with loans of a higher quality and shorter maturity. Since there is little scope for increasing returns after the reinvestment period, a manager usually calls in the CLO by redeeming proceeds to investors at or shortly after the end of this period (the legal lifetime of a CLO is around fifteen years).

Given the managers' degrees of freedom in constructing the loan portfolio and in trading loans, it is not surprising that the manager matters for the performance of a CLO. This is also evidenced by the reported fact that the identity of the manager is the most important variable for investors when deciding on an investment in a given CLO (S&P, 2002b). Credit rating agencies regularly rate CLO managers, evaluating them not only with respect to their performance, but also with respect to their overall skills in running a CLO.

## 2. Agency problems in CLO management

Considering the degree of discretion that CLO managers exercise, the question of their incentives naturally arises. It is well known that incentive conflicts and agency problems play an important role in the management of modern corporations and banks – but do they also apply to the case of CLO management? It is instructive to first recall the nature of agency problems in corporations and banks before discussing their role in CLO management.

### 2.1 The fundamentals of the agency problem

A fundamental source of agency problems in firms and banks is the separation of ownership and control. The owners of capital do not usually run the businesses they finance or the banks to which they trust their money themselves but leave it up to agents (managers) to maximise the return on their investment. This gives rise to conflicts of interest and diverging objectives between the agent and the capital owners (investors). Ultimately, the incentives of the managers and possible conflicts of interest depend on the precise nature of the (financial) contracts that govern the relationship between managers and the owners, as well as on the firm's financial structure. The types of contracts that underlie the financial structure in modern corporations are equity and debt. Equity contracts assign residual profits to the equity holders, who are thus residual claimants, and also give them the formal control over the firm's assets. Debt contracts specify fixed payments to the debt holders and assign only contingent control rights, which are typically triggered upon default on the fixed payments. Since managers are responsible for control in modern corporations, there is a triangular agency relationship between the manager and the two types of investors – those with residual claims (equity holders) and those with fixed claims (debt holders). As described by Jensen and Meckling (1976), both equity and debt financing generate specific agency problems. The problems associated with equity are managerial slack, while the agency problems associated with debt financing represent risk shifting (asset substitution):

- **Managerial slack.** A manager will only have weak incentives to exert effort and to increase the value of a business if he does not fully reap the profits he generates but only receives a share of them. This problem usually occurs in the presence of equity investors, as they are residual claimants and “cash in” on (most of) the profits. For example, a manager may devote less effort to screening the risk of a loan or to monitoring loans, as the benefits of such efforts will accrue mostly to equity holders.
- **Risk shifting (asset substitution).** Due to their different financial claims, equity holders and debt holders have a different view with respect to risk taking. This can be illustrated by considering an increase in the volatility of a business, which is equivalent to a simultaneous increase of the upside- and downside risk. Equity holders benefit from such an increase, as they cash in fully on the higher profits associated with the higher upside risk, but do not incur the additional losses from realizations of the greater downside risk when the firm’s revenues are so low that claims of debt holders cannot be met. By contrast, due to the fixed nature of their claims, debt holders do not gain from the increase in the upside risk but may recover even less due to the realizations of downside risk when the firm’s revenues do not fully cover their fixed claims. Hence, equity holders prefer strategies involving a higher degree of risk than is generally desirable. Managers, too, may benefit from the “extra” upside more than they suffer from the “extra” downside and hence might pursue excessively risky strategies. Note that the magnitude of the risk shifting problem depends on the likelihood of default. When the firm or bank is well capitalised and default remote, the risk shifting problem is of less concern, whereas it becomes more important when the likelihood of default is high.

Thus, managerial slack denotes the case where a manager fails to maximise the value of a firm or portfolio, while risk shifting denotes the case where the manager accepts an inefficiently high level of risk in his efforts to maximise the value of a firm or portfolio. Both problems may occur simultaneously.

## 2.2 Agency problems in CLO management

What role does risk shifting and managerial slack play in CLO management? At first sight, CLOs resemble firms in many respects: they are run by managers who act on behalf of the investors; and the investors have debt- and equity-like financial claims in the CLO. The CLO equity tranche holders are residual claimants, and they bear the first losses associated with any defaults in the underlying

portfolio. The senior tranche holders enjoy priority in payments. These tranches will only suffer losses once the defaults in the underlying portfolio have become high enough to completely exhaust the value of the equity tranche.<sup>(1)</sup> However, two idiosyncrasies of CLOs are worth discussing.

Firstly, while the senior tranche investors have similar claims as debt holders have in banks and firms (e.g., they usually have the right to vote on the course of action when the CLO experiences an “event of default”, which usually occurs after defaults in the underlying loan portfolio have reached a certain level), the characteristics of the equity tranche differ. The CLO equity tranche holders are residual claimants of the excess spread of the CLO and hence participate in the upside risk as do equity holders of a firm; however, unlike equity holders of banks/firms, they do not have the formal right to make ongoing decisions. Nevertheless, the equity tranche holders of a CLO may order the manager to sell the collateral and redeem all tranche holders (“to call in a CLO”) after a predetermined period (the “non-call period”), provided no covenant tests have been breached.<sup>(2)</sup> The equity tranche holders may want to call in the CLO in order to lock in realised profits or to exit an expensive CLO structure (S&P, 2008).

While it is straightforward to see that bank/firm managers’ incentives are aligned with the equity holders’ interests since the former exert control as agents of the latter, it is a priori not entirely clear whose interest CLO managers should serve in normal times.<sup>(3)</sup> As will be explained below, the remuneration scheme, possible ownership of the equity tranche and reputational concerns can all have a strong impact on managers’ incentives to serve the different investor groups.

A second factor that potentially differentiates CLOs from banks/firms is that the scope for risk shifting in CLOs may be more subject to debate. Risk-shifting incentives tend to increase in the level of leverage, as equity holders have more to gain from increasing risk when debt holders take a higher proportion of the downside risk. CLOs have a relatively high leverage (around ten), which implies that

(1) CLOs issue usually more than two different tranches (e.g. senior tranches, mezzanine tranches, equity tranches). For ease of exposition, this paper considers only two classes of tranches, senior tranches (debt) and equity tranches (equity). However, the message is carried over to the case of several tranches with different risk profiles.

(2) Note that the non-call period (3 to 5 years) often ends before the re-investment period (5 to 7 years), which denotes the period during which managers have greater discretion in trading loans. Thus, the equity tranche holders may exert control already at a relatively early stage where the managers have a larger impact on performance.

(3) Note that the incentives of the manager may depend on links with a given class of customers. For example, a CLO manager who is the subsidiary of a private equity firm might set lower credit standards when purchasing leveraged loans from deals by his parent company.

risk-shifting incentives can be important. This makes CLOs more akin to banks than to firms. However, banks are regulated, while CLOs are only constrained by third parties such as credit rating agencies (“delegated regulation”). Assuming that delegated regulation is less effective than direct regulation, risk shifting might then play a larger role in CLOs than in banks. With respect to regulatory discipline, CLOs thus resemble firms, which are also not directly regulated. However, firms usually have limited incentives to shift risk due to low leverage, despite the fact that they have a large upside of increasing risk (e.g. investment in radical innovations which may earn high profits). For the CLO manager the upside of increasing risk (e.g. increasing excess spread) is likely to be limited due to the fixed-income nature of the collateral, but CLO managers may also use other ways to “shift risk” by e.g. diverting payments from senior tranche holders to equity tranche holders, as explained below. In the end, risk-shifting incentives seem to matter in CLO management, but their degree relative to firms is somewhat open to debate.

Overall, it can be concluded that the two broad types of agency problems, namely managerial slack and excessive risk shifting, still apply in the case of CLOs. This is because the triangular relationship between managers, investors with equity-like claims and investors with debt-like claims is still intact.

### 2.3 Signs of agency problems in CLOs

The dimensions in which CLO managers enjoy discretion can be broadly grouped into two categories: a) loan sourcing and trading and b) treatment of impaired loans.<sup>(1)</sup> In the following, the specific strategies within each category are highlighted.

#### 2.3.1 Loan sourcing and trading

The main activity of a CLO manager is to buy collateral. Several adverse strategies related to loan sourcing and trading may be used, the most prominent being:

- **Concentrating risk.** The CLO manager may seek to build up a portfolio with high risk concentration, such as selecting loans with high default correlation. A highly risk-concentrated portfolio either performs very well or very badly. This strategy works in favour of equity tranche holders, as they benefit fully if things turn out well but take only a portion of the portfolio losses if things go wrong (and hence to the detriment of senior tranche holders). In a diversified portfolio, by contrast, equity tranche holders still bear the same proportion of portfolio losses linked to any idiosyncratic defaults. This strategy is purely risk shifting.

- **Buying (selling) loans below (above) par.** A CLO manager may want to buy loans below par to redistribute the unused proceeds to equity holders or to pay out realised gains from selling a loan above par to equity holders rather than trapping the proceeds inside the portfolio to increase over-collateralisation for senior tranche holders. Since the ratio of the portfolio par value to liabilities outstanding is an important benchmark of portfolio quality, such a strategy might be used to extract surplus for equity tranche holders while preserving benchmark tests with respect to the portfolio par value. Such a strategy increases the credit risk of the portfolio since a price below par value reflects higher default risk. This strategy represents risk shifting, as equity tranche holders gain at the expense of senior tranche holders.
- **Buying subordinated or lower rated loans.** A CLO manager might also seek to invest in subordinated or lower rated loans to earn higher yields. A potential concern is that, while increasing the ability of the CLO manager to meet the regular interest payments on tranches, it also raises the credit risk of the portfolio. Such a strategy represents risk shifting, since the manager can realise higher returns for equity holders when economic conditions do not deteriorate.
- **“Buying the market” and insufficient credit analysis.** The CLO manager might exert little effort to screen loans and to conduct a proper credit analysis but simply buy whatever is available (“buying the market”). For instance, a CLO manager might simply rely on public information to evaluate loans instead of private information obtained through meetings with the borrower. The adverse effects of such a strategy tends to be higher in the case of loans of smaller, less intensively monitored borrowers, where the degree of uncertainty regarding creditworthiness is greater (see S&P, 2002a). This strategy is harmful for both senior tranche and equity tranche investors, as the higher risk of such inferior loans is not compensated by higher expected returns. This is managerial slack.

#### 2.3.2 Treatment of impaired loans

CLO managers must also make decisions with respect to impaired loans. Principally, managers have different options as to how to deal with impaired loans. They may sell them in the secondary market, but they may also hold on to them and go through a workout process in the event

(1) The focus here is on cash flow CLOs and not on synthetic CLOs. The former invest in leveraged loans, while the latter gain exposures to leveraged loans by investing in credit default swaps (CDS) and other synthetic instruments. The agency problems identified in cash flow CLOs do not necessarily carry over to the case of synthetic CLOs. For instance, the ramp up is not an issue in synthetic CLOs, as the manager can instantly buy (CDS) and is not restricted to loan issuances.

of default. Going through a workout, however, requires a certain set of capabilities. An issue for managers, then, is their willingness in the first place to acquire such skills. Managers may specialise in a buy-and-sell strategy, relying on a functioning secondary market for loans throughout the credit cycle or on a buy-and-hold strategy, with eventual workouts of impaired loans. Specifically, the manager faces the following two decision problems:

- **Trade-off selling vs. workout.** The decision of whether to go through a workout or to sell loans involves a trade-off for investors: selling an impaired loan reduces the par value of the portfolio and the available proceeds, but lowers the credit risk of the portfolio. By holding an impaired loan in the portfolio, the manager retains the credit risk in the portfolio, but there is a chance that the loan might improve. This trade-off might be addressed differently by equity and senior tranche investors and therefore bears potential for conflict between the investor groups and, hence, risk shifting.
- **Investment in workout capabilities.** An indirect effect arises from the initial investment decision of the CLO manager in workout capabilities. CLO managers with dedicated workout capabilities are more likely to realise the economic value of an impaired loan (even when the secondary leveraged loan market is dislocated), while CLO managers without workout capabilities would be more likely to realise an inefficiently low recovery rate on their own and, hence, would be more willing to sell an impaired loan in the secondary market even at a very low price. Consequently, a viable strategy for CLO managers might be to gamble on low default rates and to save on workout capabilities. In the event of high default rates, the manager lacks the appropriate skills and will most likely get a low price from selling an impaired loan or going through a workout himself. This strategy resembles both risk shifting and managerial slack. It represents managerial slack, as it allows the CLO manager to reduce costs. Depending on whether this strategy hurts senior tranche holders more than equity tranche holders in times of stress, it may also represent risk shifting.

### 3. Mitigating factors for agency problems in CLO Management

CLO managers are not completely free to pursue their own goals, but are subject to constraints of various types. Such constraints have emerged as reactions by market participants to possible abuses. The constraints can be broadly grouped into three categories: portfolio constraints, behavioural constraints and reputational constraints.

#### 3.1 Portfolio Constraints

Portfolio constraints limit the manager's ability to structure the portfolio in an adverse manner and are of two types: constraints on portfolio composition and constraints on overall portfolio risk. The former determine "buckets", or limits, for permissible asset types, while the latter define global limits on certain risk parameters of the portfolio. The main function of portfolio constraints is to limit risk shifting by managers, but they also serve as a "quality check" for managers' trading decisions and hence also have a dampening effect on managerial slack.

##### 3.1.1 Constraints on portfolio composition

Bucket tests classify assets according to their general risk profile and put limits on their inclusion of certain assets in CLOs. Loans in general may be classified along several dimensions of risk. Most importantly, the risk profile of a loan depends on its level of subordination and the credit-worthiness of the borrower. However, there are also contractual elements which affect a loan's risk. Examples are loans that lack certain covenants ("covenant-lite" loans), and which result in less scope for intervention by lenders once the borrower's performance begins to deteriorate, or payment-in-kind loans (PIKs), which enable the borrower to defer payments to the lender and to effectively prolong the lending arrangement. The bucket tests of CLOs usually capture a broad range of such risks. Table 1 illustrates typical buckets relating to the subordination level of the loan. Senior loans rank highest in the level of subordination and are predominantly secured, e.g. they grant the lender access to the borrower's assets in case of non-payment. The bucket tests set a lower limit on the share of senior loans in the portfolio, since these are the least risky loans. Second lien loans rank behind senior loans and are usually secured as well. Mezzanine loans and high yield bonds rank third and fourth in the order of seniority, respectively, and are typically unsecured.<sup>(1)</sup> Because the recovery rate decreases in the level of subordination, these loans and bonds are riskier than senior loans.<sup>(2)</sup> For this reason, bucket tests set upper limits on the inclusion of second lien loans, mezzanine loans and high yield bonds in the CLO.

(1) There is no single definition of second lien and mezzanine loans and the terms differ in the US and Europe. In Europe, second lien loans are usually secured, while mezzanine is unsecured debt (Fitch, 2006).

(2) The assumed recovery rates are higher for second lien than for mezzanine loans in Europe (Fitch, 2006). However, there is little reliable information on "true" recovery rates of European leveraged loans due to differences across jurisdictions within Europe and individual loan characteristics. High yield bonds exhibit the lowest recovery rate due to their lowest subordination.

**TABLE 1** PORTFOLIO BUCKETS  
(by subordination)

Bucket	Typical bucket size as percentage of portfolio
Senior (secured) loans . . . . .	between min. 75 p.c. – min. 90 p.c.
Second lien loans . . . . .	between max. 10 p.c. – max. 20 p.c.
Mezzanine loans . . . . .	between max. 10 p.c. – max. 25 p.c.
High yield bonds . . . . .	max. 5 p.c.

Source: S&P's presale reports of European CLOs, own calculations.

CLOs differ in their specifications of buckets. Table 2 provides data on the appearance of certain buckets for riskier loans over time. The data show that CLOs have increasingly included buckets for second-lien loans and high-yield bonds, while the use of mezzanine buckets has also remained high.

Interpretation of these data is, however, not completely straightforward. To conclude that the scope for risk taking has increased since CLO managers have been given more discretion to choose from risky loan types would be premature, since CLO managers must still invest primarily in senior secured loans.<sup>(1)</sup>

There remain some doubts on the effectiveness of bucket tests for two reasons. First, the proliferation of second-lien and high-yield bond buckets suggests that the bucket specifications may have responded to the evolution of loan markets and the emergence of certain loan types. Second-lien loans became very popular in the LBO boom, as they offered borrowers a cheaper means of finance than senior secured loans, and they were attractive for lenders because they were supposedly less risky than mezzanine loans. Hence, the increase in the use of second-lien buckets might simply reflect the availability of these loans

**TABLE 2** EVOLUTION OF PORTFOLIO BUCKETS OVER TIME  
(percentage of CLOs with bucket)

Data	2004	2005	2006	2007
Second lien bucket . . . . .	6	19	48	63
Mezzanine bucket . . . . .	94	81	79	92
High yield bond bucket . . . . .	29	52	48	71

Source: S&P's presale reports of European CLOs, own calculations.

in the market. There is also evidence that CLO managers were increasingly seeking to include high-yield bonds buckets in CLOs, as they were having difficulty in sourcing enough leveraged loans to ramp up an entire portfolio. Again, this points to a potentially market driven specification of buckets.

These developments suggest that bucket tests may not be limiting the portfolio risk of CLOs; rather, they may be reflecting the emergence of riskier asset types in the market. For example, there is evidence that the aggressive and “loan-heavy” structure of private equity deals has likely shifted up the risk profile of subordinated loans, including second-lien loans, with negative consequences for the recovery rate and default probabilities of the loans. Hence, it is conceivable that the proliferation of second-lien buckets has actually provided greater leeway for managers to source risky loans.

A second reason to call into question the effectiveness of buckets for limiting risk is that buckets may not capture all types of risk. For example, there are no buckets for covenant-lite loans, since these loans qualify as senior secured loans. However, the lack of covenants reduces the scope for lender intervention when the firm’s performance deteriorates, suggesting that recovery rates following default will be lower than for loans with covenants. There is evidence that market participants may have overestimated the recovery rates of cov-lite loans and are now revising them (see, for instance, Fitch, 2008b).

### 3.1.2 Constraints on overall portfolio risk

The constraints on overall portfolio risk are likely the most important constraints on managers. Table 3 highlights the tests that are aimed at limiting the risk of the portfolio.

Coverage tests play a fundamental role in the tranching of the securities issued by the CLO, as these tests govern the size of the “cushion” for senior tranche holders’ claims. The coverage tests are individually tailored to each CLO to take into account that CLO’s portfolio characteristics. Over-collateralisation (O/C) tests define a lower threshold for the ratio of par value of total assets to the value of the senior tranche and thereby ensure that a portion of the portfolio can default without putting the senior tranche at risk. Interest coverage (I/C) tests require the portfolio to generate a sufficient level of interest payments to guarantee that the interest payments to senior tranche holders are protected.

(1) The average share of senior secured loans in CLO portfolios has remained stable at around 83 p.c. over the last few years.

**TABLE 3** OVERALL PORTFOLIO TESTS

Portfolio test	Comment
Coverage test	
par coverage ratio . . . . .	Overcollateralization test (O/C tests)
interest coverage ratio . . . . .	Interest coverage test (I/C tests)
Collateral quality tests	
Maximum weighted average maturity (WAM)	Limit on average maturity of portfolio to avoid forced sale of assets when liabilities mature
Minimum weighted average spread (WAS) . . .	Ensures payment of interest rates and sufficient cash flows
Minimum weighted average recovery rate . . .	Requirement to maintain a minimum average recovery rate
Minimum weighted average rating (WAR) . . .	Indicator of the average credit risk of a portfolio
Portfolio Evaluation	
Portfolio default analysis . . . . .	Estimates credit risk of portfolio, enables calculation of scenario default rates Inputs are default rates and recovery rates of assets and their correlation Other portfolio tests are derived from this data

Source : S&P (2002a).

The collateral quality tests provide thresholds on certain key measures of credit risk, including average asset maturity, spread, and rating. Finally, in order to calculate the precise risk profile of a portfolio and to justify the rating (and to calculate the coverage tests), rating agencies use methods of portfolio default analysis.

It should be noted that the effectiveness of such portfolio tests depends crucially on the reliability of estimates of the underlying risks. Rating agencies may not always be able to estimate the true risk of certain loans, which may give managers scope to increase portfolio risk if they believe that the agencies have underestimated the true risk. In particular, concerns have arisen with respect to the recovery rates of loans of different levels of subordination.

### 3.2 Behavioural constraints

CLO managers are also constrained in their actions through requirements to act in a certain manner or by financial incentives. More specifically, there are guidelines in place which govern the flows of proceeds to the different tranche holders. In addition, the remuneration scheme has a strong bearing on the manager’s incentives with respect to the different tranche holders. As will become clear below, the “waterfall”, which determines the priority of payments to the different tranche holders, seeks to eliminate risk shifting, while the remuneration

scheme affects both risk-shifting incentives and managerial slack.

#### 3.2.1 Constraints imposed by the waterfall

The waterfall is an important structural provision to ensure that the senior tranche holders’ claims enjoy priority over equity tranche holders’ claims. A waterfall usually follows several principles in order to ensure the desired ordering of claims.

A first set of principles centres on the separate treatment of interest and principal proceeds. Interest proceeds represent interim profits and are usually paid out regularly, which means that they cannot be used to buy additional collateral and to compensate for an eventual loss of principal. Therefore, CLOs actually have two waterfalls – one for interest proceeds and one for principal proceeds – where interest proceeds are only distributed when the principal is sufficiently protected. This also requires clear separation of interest and principal proceeds. A manager may be tempted to mask principal proceeds as interest proceeds and distribute them to the (senior and equity tranche) investors. This could be done by purchasing loans below par and redistributing the difference between par and the loan price as interest proceeds (see section 2.3.1). Hence, the CLO documentation specifies that unused proceeds should not be paid out but used to purchase additional collateral to increase the over-collateralisation of the tranches. The rating agencies impose such guidelines to clearly distinguish between interest and principal

proceeds and to prevent harm to senior tranche holders through purchase of weaker loans.<sup>(1)</sup>

A second set of principles governs the pay-down method of the tranches. With respect to principal payments, the pay-down method can be either sequential or pro-rata (or may combine both sequential and pro-rata elements). The sequential method stipulates that proceeds are paid down first to the most senior tranche holders (effective over-collateralisation increases) while the pro-rata method stipulates the simultaneous pay down of the senior and equity tranche (effective over-collateralisation remains constant). Table 4 presents a numerical example which highlights the differences of the pay-down methods.

Note that the over-collateralisation ratio also determines the default rate that a portfolio can sustain without harming the senior tranche. In this example, the sustainable default rate (given by the ratio of equity tranche/total assets) is 20 p.c. for the original portfolio and in the pro-rata pay-down scenario and 22.2 p.c. in the sequential pay-down scenario. The tranches are paid down either at the discretion of the manager (or equity tranche holders) to lock in profits at a given date (after the end of the reinvestment period) or when covenants are breached. In the former case, the value of the portfolio will be sufficiently high to satisfy the claims of the investors and hence the choice of the pay-down method is of minor importance (unless there are unexpected negative events during the period in which the tranches are redeemed). In the case of breached covenants, the situation is different. A breach of covenant tests means that the claims of the senior investors are at risk. In this case the pay-down method matters, as only the sequential pay-down method will be effective in remedying the violation of the covenants and bringing the risk to senior tranche holders back to the permitted limit. For this reason, rating agencies require all European CLOs to use the sequential pay-down method when covenants have been breached

### 3.2.2 Constraints imposed by the remuneration scheme

The remuneration scheme determines the financial incentives for a CLO manager and therefore potentially has a strong bearing on managerial slack and risk-shifting incentives. In order to limit managerial slack, a remuneration scheme must be performance-sensitive – that is, it must reward the manager sufficiently for efforts to increase return to the investors. Risk-shifting incentives depend on the degree to which the manager’s incentives are aligned with those of the equity tranche holders. Table 5 provides an illustrative calculation of manager remuneration, using a typical compensation scheme seen in most CLOs.<sup>(2)</sup>

The senior and subordinated management fees are embedded in the interest proceeds waterfall. The senior management fee ranks above interest payments on the senior tranche and therefore resembles a fixed annual fee. The subordinated management fee ranks below senior tranche payments but above equity tranche payments and is therefore linked to the performance of the senior tranche. The incentive fee is paid out at maturity (or when the CLO is called in) when the return to equity tranche holders exceeds a certain threshold. This fee is therefore linked to the performance of the equity tranche.

The performance-sensitive components (subordinated management fee and incentive fee) represent the largest part of the total fee. The incentive fee can make up a significant share of the total. It is worth noting that the CLO manager can also earn substantially higher fees when he/she achieves a return above the 12 p.c. internal rate of return (IRR) hurdle. In the example above, the manager earns incentive fees of 7.3 (16.6) million euro if he achieves 18 p.c. (24 p.c.) IRR. This represents a 41 p.c. (92 p.c.) increase in total fees compared to the benchmark of 12 p.c. IRR.

The high proportion of performance-based components (subordinated and incentive fees) should provide sufficient incentives to the managers to exert effort to maintain the quality of the portfolio, unless bad portfolio quality can go undetected for several years during which the manager receives the subordinated management fee. CLO managers are rewarded for increasing returns to equity tranche holders, but the subordinated management fee remains the largest fee component unless the CLO delivers very

**TABLE 4** COMPARISON OF PAY-DOWN METHODS ASSUMING A 10 EURO ASSET SALE  
(euro, unless otherwise stated)

	Original portfolio	Sequential pay-down	Pro-rata pay-down
Assets	100	90	90
Senior tranche	80	70	72
Equity tranche	20	20	18
Over-collateralization (percentages)	125 (100/80)	129 (90/70)	125 (90/72)

(1) For instance, S&P requires the difference between par and purchase price of a loan not to be distributed but “trapped” in the portfolio to increase over-collateralisation (S&P, 2002a). Then, the incentives to buy discounted loans and loans at par are roughly equal.

(2) In a recent study, S&P analysed the performance of fifty-three CLOs that were originated between 1999 and 2004 and have been called in (S&P, 2008). The internal rates of return across the whole sample had a mean of 15 p.c. and ranged from -30.4 p.c. to 40.1 p.c.. However, the IRR range was only 5.51 p.c. to 35 p.c. for CLOs originated between 2000 and 2004).



**TABLE 5** EXAMPLE CALCULATION OF CLO MANAGEMENT FEES

	Fee size	Fee per year (millions of euro)	Fee over lifetime (millions of euro)		
			12 p.c. IRR	18 p.c. IRR	24 p.c. IRR
Senior management fee	15 bps of 500 m€	0.75	4.5	4.5	4.5
Subordinated management fee	45 bps of 500 m€	2.25	13.5	13.5	13.5
Incentive fee	20 p.c. of IRR > 12 p.c.		0	7.3	16.6
<b>Total Fee</b>			<b>18</b>	<b>25.3</b>	<b>34.6</b>
<i>Percentage increase total fee</i>				<b>41</b>	<b>92</b>

Note: Assumed size of portfolio 500 m€, 450 m€ senior tranche and 50 m€ equity tranche outstanding; 6 years lifetime.

high returns, in which case the incentive fee can become the largest component (24 p.c. in this example). It can thus be said that the remuneration scheme generally provides balanced incentives to the managers. In other words, it reduces managerial slack but at the same time does not appear to provide “excessive” incentives to shift risk.

Whether managers have a stake in the equity tranche of the CLO further determines their incentives. It is debatable whether managers should hold the equity tranche or whether it is sufficient to align incentives via the fee structure. Standard market practice does not require CLO managers to hold a stake in the equity tranche. S&P, for instance, argues that the (partial) ownership of equity tranches is only one of the incentive-aligning mechanisms besides the remuneration scheme and reputation (see the following section for a discussion of reputational constraints). Hence, S&P does not require the manager to hold the equity tranche (S&P, 2002c). Nevertheless, available information suggests that it is common practice for at least some CLO managers to systematically buy a portion of the equity tranche: For instance, Alcentra holds a portion of the equity of most of its CLOs, totalling USD 80 million (which amounts to less than 10 p.c. of equity tranches); Mizuho holds on average 10 p.c. of the equity of its CLOs; and Prudential M&G holds no less than 10 p.c. of the equity of its CLOs.<sup>(1)</sup> Harbourmaster invests in the equity tranche of all of its CLOs as well (Fitch, 2007a). The degree to which holding the equity tranche tilts the incentives of managers towards equity tranche holders depends on the size of the manager’s equity tranche holding relative to the other fee components of the manager’s remuneration.

### 3.3 Reputational Constraints

Concerns about reputation may also serve as a powerful incentive device for managers to act in the best interest of investors. Reputation matters for players who act repeatedly in the market and who are concerned about their standing with the parties they are dealing with. Assuming that managers must establish a good reputation with senior tranche and equity tranche investors, reputational constraints may be effective with respect to both risk shifting and managerial slack.

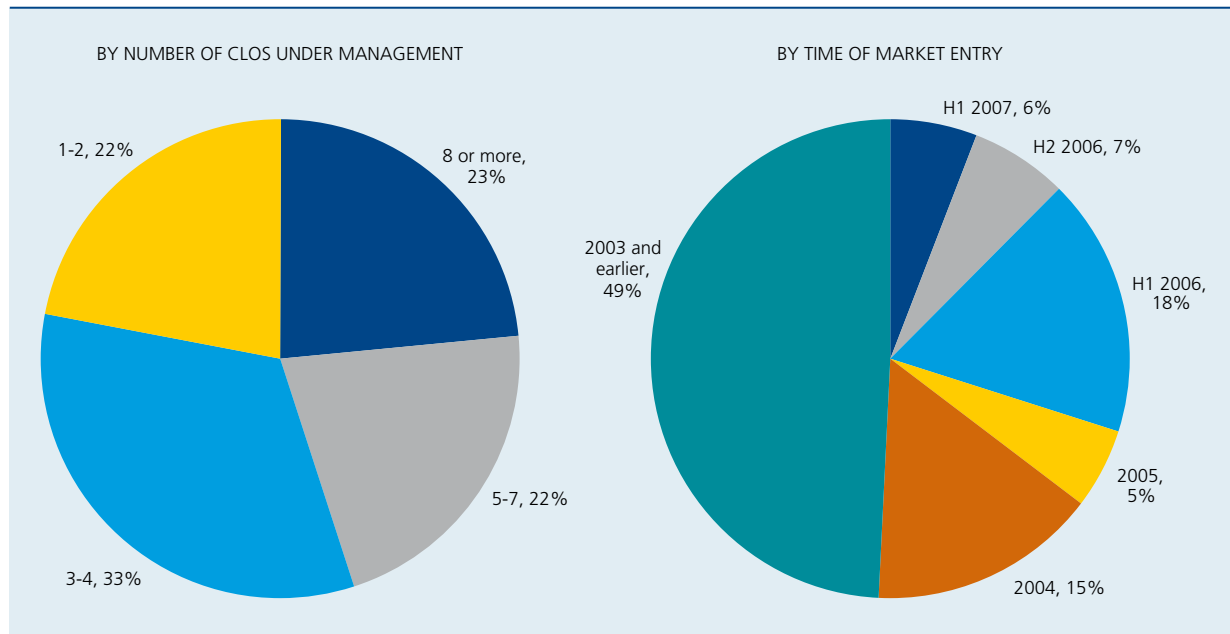
Reputation can be seen as a form of intangible capital that is costly to accumulate. Newcomers with the intent to stay in the market for a long time have an incentive to invest in reputational capital to facilitate business in the future, while established players with reputational capital have incentives to act prudently so that the reputational capital does not depreciate. It is therefore interesting to analyse the structure of the CLO manager market and to attempt to assess whether reputational concerns matter (see Chart 3).

The market data show that the boom of leveraged loan and CLO issuance, which lasted until summer 2007, has led to a heterogeneous CLO manager market. Although most of the CLO managers have a long track record and many CLOs under management, there are also a number of smaller and younger players with only one or two CLOs under management and little market experience.<sup>(2)</sup> The former have managed to establish a certain level of

(1) See Fitch (2007b, 2007c, 2007d).

(2) It is conceivable that the market newcomers had relevant experience through recruitment of experienced staff. However, the evidence points to the fact that the staff of many of the newcomer CLO managers (such as the US managers) had very little experience in the European leveraged loan market.

CHART 3 EUROPEAN CLO MANAGER MARKET<sup>(1)</sup>



Source : S&P's Quarterly Reviews of European CDOs of Leveraged Loans, own calculations.  
 (1) Market shares calculated as p.c. of total assets under management by end of H1 2007.

reputational capital, while the latter still need to do so. Generally, reputational concerns matter since the market is not a one-shot market but managers are usually acting repeatedly. As the issuance of new CLOs has slowed dramatically since the summer of 2007, the market structure is likely to remain stable for some time, until the active CLOs are called in. Two main concerns relate to the effectiveness of reputational concerns in the period preceding the events of the summer of 2007.

First, the overall effect of reputational concerns may have been limited, due to the favourable market conditions prior to the summer of 2007. This applies to all CLO managers, as even the most experienced had not faced very tough market conditions. The benign conditions were not suited to fully revealing the differences between CLO managers, and investors may have had problems attributing a high return to the performance of the manager or simply to the favourable market. In fact, managers' concern about reputation and investors' difficulties in recognising manager quality could have generated incentives for managers to engage in risky and inefficient strategies to produce good performance.<sup>(1)</sup> In a related manner, reputational concerns may also not have been effective with respect to capabilities that have not yet been fully tested. Specifically, CLO managers may have had incentives to save on workout capabilities, betting on continued benign market conditions. There is indeed evidence

that CLO managers differ with respect to their willingness and capacity to conduct workouts.<sup>(2)</sup>

Second, younger managers in particular may have had incentives to take excessive risk. The reason is that they may have sought to realise high returns in order to quickly establish a favourable reputation with investors. The performance of a new manager with respect to equity tranche holders quickly becomes visible as projected or realised interim returns; however, the performance with respect to senior tranche holders is less visible, as it only represents a binary signal (whether or not there was a breach of a test) and will likely only be fully revealed in adverse market conditions. This asymmetry may have provided incentives to new managers to "gamble" and take excessive risk.

## Conclusion

The aim of this article has been to highlight some agency problems that arise in structured finance transactions, in light of recent concerns regarding the incentives of the

(1) See Rajan (1994) for a model where reputational concerns lead banks to pursue inefficient credit policies.

(2) One could argue that CLO managers could invest in workout capabilities by hiring adequate staff when necessary. However, the hiring of staff is time-consuming and costly. It is therefore questionable whether a CLO manager could react in time to a crisis or deteriorating environment.

various players throughout the chain of the originate-and-distribute model of banking. The particular focus has been on CLOs of leveraged loans, which are an interesting case in point due to their managed structures and the importance of CLOs in the recent private equity boom as willing buyers of leveraged loans.

The article has demonstrated that agency problems do matter in CLO management, and it has highlighted the different dimensions in which these problems may occur. It has also described the various constraints that have emerged in the market to limit potentially adverse manager actions. These constraints address the major issues of the agency conflict and, generally speaking, should be expected to be fairly effective. However, there are still some gaps which may allow managers to engage in certain adverse strategies.

First, the overall reliability of certain portfolio tests has not yet been fully tested in tough market conditions. Specifically, there have been concerns about the reliability of estimates of the risk associated with certain loan types and of loan bucket specifications. These tests may have allowed some scope for excessive risk taking, and the problems may only surface once defaults begin to increase significantly.

Second, reputational constraints are not waterproof: they may not have been fully effective because of the extremely favourable market conditions in the years preceding the credit turmoil of 2007/2008, and they may also not have

provided managers with sufficient incentives to invest in workout capacities. Furthermore, new managers may have had incentives to push risk taking to the limits of what was formally allowed.

Ultimately, the market and events will judge whether CLOs have been structured and managed in a prudent manner. Market conditions characterised by rising default rates and below par loan prices in the secondary leveraged loan market may well provide such a litmus test for CLO managers.

This analysis of the problems facing the managers of certain special purpose vehicles represents only one step in the analysis of agency problems and conflicts of interest along the securitisation chain. Market observers are concerned that such problems and conflicts also play an important role for other participants in the chain, such as arrangers or servicers. This article has shown that the affected parties most often recognize potential conflicts of interest themselves and seek to establish measures to alleviate such conflicts. Yet, recent experience suggests that at least in some cases, the measures adopted by the market are not completely successful. A potentially fruitful avenue for assessment of other relevant agency problems and conflicts of interest along the securitisation chain would be to have each participant disclose the conflicts of interest that affect them and the measures they have taken to address these conflicts. This self assessment could be useful for improving market discipline and the functioning of securitisation markets.

## References

Fitch (2006), "Global Rating Criteria for Collateralised Debt Obligations", Credit Products Criteria Report, 18 October 2006.

Fitch (2007a), "CDO Asset Manager Report Harbourmaster Capital Management Limited", 2 April 2007.

Fitch (2007b), "CDO Asset Manager Report Prudential M&G", 12 June 2007.

Fitch (2007c), "CDO Asset Manager Report Alcentra Limited", CDO Asset Manager Report, 2 August 2007.

Fitch (2007d), "CDO Asset Manager Report Mizuho Investment Management (UK) Limited", 5 September 2007.

Fitch (2007e), "Fitch's Approach to Rating Covenant-Light Loans and CLOs", Criteria Report, 28 September 2007.

Jensen Michael C. & William H. Meckling (1976), "Theory of the Firm: Managerial Behavior, Agency Costs and Ownership Structure", Journal of Financial Economics, vol. 3(4), pages 305-360.

Raghuram G. Rajan (1994), "Why Bank Credit Policies Fluctuate: A Theory and Some Evidence", Quarterly Journal of Economics, vol. 109(2), pages 399-441.

S&P (2001), "CDO Manager Quality: A Critical Consideration", 2 October 2001.

S&P (2002a), "Global Cash Flow and Synthetic CDO Criteria", 21 March 2002.

S&P (2002b), "Rating Methodology for CDOs Backed by European Leveraged Loans", 14 August 2002.

S&P (2002c), "Balancing Debtholder and Equityholder Interests in CDOs", 13 November 2002.

S&P (2007), "European Leveraged Finance Market Update: Backlog Remains Large; Liquidity Limited To Smaller Relationship Deals", 31 October 2007.

S&P (2008), "Reviewing A Decade Of U.S. CLO Performance And Equity Returns", 14 January 2008.

S&P, Quarterly Reviews of European CDOs of Leveraged Loans.

S&P, Presale Reports of European CLOs.

# Measuring default risk in the trading book

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## Introduction

Risk management in the trading book implies the measurement of all the components of risk, including the risk arising from fluctuations in asset prices and risk related to defaults. Differences in the statistical characteristics of these two types of risk, however, imply that tools geared to the measurement of risk from market price fluctuations may not adequately capture the risk of losses due to default. Practical methodologies used by banks have focused primarily on measuring the former type of risk. At the same time, the volume of default-sensitive securities that are actively traded by banks has increased exponentially over the past decade. These developments have recently prompted regulators to propose new requirements that explicitly highlight the need for banks to develop methodologies that include the additional risk from default in their assessment of overall trading book risk. An important aspect of the new regulatory proposals for measuring the incremental risk related to obligor default for trading book positions is that capital standards for these risks depend on the liquidity of the markets for trading default-sensitive securities.

This article discusses some of the issues related to the measurement of incremental default risk in the context of a trading book portfolio. It is divided into three sections. The first section discusses the nature of market and default risk in the trading book and describes the present regulatory treatment of market risk as well as the new regulatory proposals to include a capital requirement for

default risk. The second section analyses how standard models of default risk can be adjusted to take account for the specific nature of the trading book, namely that positions are actively managed. The third section illustrates the potential impact of the assumptions about the liquidity of trading book positions on the new capital requirements for default risk and compare the impact of a change in liquidity and a change in the credit quality of the assets.

## 1. Default risk meets market risk in the trading book

### 1.1 Definition of trading book

Regulatory rules and thereby business practices distinguish between the trading and banking books of banks. The most important distinction between the two books is the horizon over which risk is managed. Banking book assets tend to be held for longer time horizons and are subject to regulatory capital requirements for credit risk. The trading book consists of positions which are actively traded at high frequencies or positions which are held to hedge banking book positions, and which are currently subject to capital requirements for market risk. Typical positions in the trading book include tradable securities, such as bonds and equities, and derivatives, like swaps and futures, for which active markets are well-established. Over the last decade, an increasing number of credit-sensitive instruments have also entered the trading book, for which markets were previously inexistent but have recently been developing at a rapid pace.

<sup>(1)</sup> The opinions expressed in this article are those of the authors and do not necessarily reflect the views of the authors' institutions.

Regulators define the trading book as consisting of “[...] positions in financial instruments and commodities held either with trading intent or in order to hedge other elements of the trading book. Positions held with trading intent are those held intentionally for short-term resale and/or with the intent of benefiting from actual or expected short-term price movements or to lock in arbitrage profits. To be eligible for trading book capital treatment, financial instruments should be free of restrictive covenants on their tradability or able to be hedged completely. In addition, the positions need to be frequently and accurately valued and positions should be actively managed” (BCBS, 2006, §685 and §687).

## 1.2 Market risk in the trading book

Conventionally, the trading book includes mainly items that are particularly sensitive to market risk. In 1996, regulators introduced rules for banks to provide an explicit capital cushion for the risks that arise from their trading activities (BCBS, 1996). The minimum capital requirements that banks need to hold for their trading book positions are expressed in terms of two separately calculated charges. One charge applies to “general market risk”, which is thought of as the systematic (e.g. non-diversifiable) component of market risk typically associated with movements in broad asset prices. An example is given by the risk of a decline in the price of bonds held in response to an increase in the level of the risk-free interest rates. The other charge is for the “specific market risk” of each security, which represents an idiosyncratic movement in price. For instance, the price of a bond can fall because of a merger announcement, earnings surprises or because of changes in the creditworthiness of the bond issuer.<sup>(1)</sup> Total market risk capital charges are the simple sum of the capital charge for general market risk and the capital charge for specific risk.

Banks can use a standardised measurement or an internal model approach to assess capital requirements in the trading book. In the standardised measurement approach, the risk charges follow a highly structured process. Exposures are broken down into different risk categories such as interest rate instruments, equities, foreign exchange and commodities. Net positions, which are long minus short positions, are multiplied by risk weights to obtain the general market and specific market risk capital charge.

General risk for interest-bearing securities is measured either through the maturity method, in which net positions are risk-weighted according to their residual maturity, or through the duration method, where the weighting depends on price sensitivity as a result of an interest rate shock. Specific risk weights depend on factors related to the individual security. For equities, the specific risk requirements are 8 p.c. on net positions unless the portfolio is both liquid and well-diversified, in which case the charge will be 4 p.c., while the general market risk charge is 8 p.c. in both cases. For foreign exchange risk and for commodity risk, the specific risk charge is zero, the general market risk charge is respectively 8 p.c. and 15 p.c. on the net position.

In the internal model approach, banks have the flexibility to develop their own specific models to measure general and specific risk. These models are used to measure the sensitivity of the market value of trading exposures, and thus of potential losses, to movements in risk factors, such as interest rates. The dynamics of the risk factors typically lead to symmetric loss distributions, from which risk measures such as the Value-at-Risk (VaR) can be derived. The VaR of a portfolio is defined as the maximum loss over a given period of time (the holding period) which is not expected to be exceeded with a certain probability (the confidence level). Regulatory rules set the following minimum standards for the risk assessment models. The VaR needs to be calculated assuming a uniform ten-day horizon and a 99 p.c. statistical confidence level, meaning that there is a 1 p.c. chance the portfolio could lose more than the VaR estimate in the next ten days. The capital charges need to be the higher of the previous day’s (VaR) figure and the average daily VaR of the preceding sixty business days. VaR can be measured for the separate risk categories (interest rate instruments, equities, foreign exchange and commodities) and be summed up afterwards. Hereby, banks are allowed to take account of possible diversification benefits across the risk categories so the total VaR may be less than the sum of the VaR of the different risk categories.

At the time the market risk capital rules were adopted, the requirements set out in the internal model approach worked well for the trading positions of a large number of banks. However, even then, banks and supervisors alike acknowledged that certain risks, such as default risk and other types of event risk, were not well captured in VaR models.<sup>(2)</sup> Therefore, supervisors were led to impose a safety multiplier on internally-modelled estimates of general market and specific risk. This factor must be at least three but can be set at a higher level (up to four) according to the supervisor’s evaluation of the bank’s models and backtesting results.<sup>(3)</sup> The multiplication

(1) Changes in the creditworthiness include changes in probabilities of default as well as changes in rating migrations (downgrades and upgrades).

(2) Other examples of event risk are migration risk, risk of a takeover bid or some other shock event (see BCBS, 2006, p 163).

(3) Backtesting is the process of validating a model for estimating VaR by comparing actual outcomes with those produced by the model.

factor was thus initially introduced as a correction factor for model risk.

### 1.3 Increased sensitivity of the trading book to default risk

The Basel Committee has recently proposed a new capital requirement for default risk in the trading book that will be incremental to the 1996 capital requirement for market risk. The decision was motivated by concern about increasing levels of default risk in banks' trading books, the desire to guide the development of more adequate tools that can capture default risk in that book, as well as to minimise any distortion in banks' incentives from differences in the regulatory treatment of similar types of risk in the banking and trading book.

Indeed, since the 1996 regulations were introduced, there has been a rapid expansion of default risk in the trading book. This growth in default risk is mainly due to the rapid development of the credit risk transfer market. Instruments like collateralised debt obligations (CDOs), for example, have become increasingly important components of banks' trading book portfolios.<sup>(1)</sup> Figure 1 illustrates the steady growth in global CDO market issuance from the beginning of 2004 until the first quarter of 2008. The turmoil in the credit markets during the second half of 2007, which was characterised by illiquidity among a large number of default-related instruments, caused CDO issues to plummet. This latter observation also illustrates the fact that CDOs and other default-related products may not be as liquid as other securities positions in the trading book.

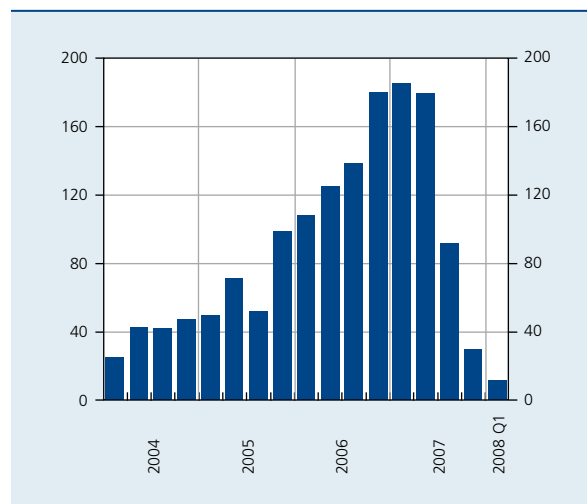
For a number of reasons, internal VaR models for market risk may fail to capture the entirety of default risk embedded in credit products. Firstly, internal VaR calculations are based upon historically observed market prices, which, by construction, are based on non-defaulted exposures. Secondly, default events are rare events, but when they do occur, losses can be high. This implies that in practice, models that capture default events need to produce fat-tailed loss distributions. Thirdly, the default risk of a position depends on the holding period and the liquidity of the position. Risk related to default-sensitive exposures, which are often not as liquid as market-sensitive exposures, will not be captured by models that assume a ten-day risk horizon. Therefore, internal

(1) Annual reports by banks rarely provide information about credit risk-related trading book exposures.

(2) The new trading rules also cover issues such as the treatment of counterparty credit risk, of double default effects, short-term maturities and unsettled and failed trades. A discussion of these issues is beyond the scope of this article.

**CHART 1** GLOBAL CDO MARKET ISSUANCE

(billions of US dollar)



Source : SIFMA.

VaR models for market risk are typically not suitable for measuring the default risk associated with the sudden failure of an issuer.

It is important that banks' risk measurement systems take sufficient account of all the risks related to trading book positions, including default risk, in their risk measurement systems. If not, trading book business can be run at lower capital requirements than the banking book, which may lead to arbitrage possibilities with further undesired consequences on behaviour. The introduction of the multiplication factor reflected the possibility that the method of using VaR models may underestimate the frequency of large losses. This factor, however, is a crude attempt to provide a correction to known deficiencies, but is arguably too simple to capture the true nature of default risk in different portfolios and circumstances. In addition, it may have given banks capital incentives to move assets from the banking to the trading book. It may even have created disincentives for banks to improve their specific risk models as they may have preferred to apply the multiplication factor of four.

The recently proposed capital rules include an explicit requirement for banks to develop adequate methodologies for measuring default risk in the trading book (BCBS, 2006).<sup>(2)</sup> These rules, although published in 2006, have not yet been implemented. Banks that have already received internal model recognition for the specific risk under the 1996 capital requirement rules will have until 2010 to implement the incremental default charge.

## Box 1 – Basel II capital requirements for incremental default risk (BCBS, 2006)

The requirement for the incremental default charge is set out in the form of the following standards:

718(xcii). "In addition, the bank must have an approach in place to capture in its regulatory capital default risk of its trading book positions that is incremental to the risk captured by the VaR-based calculation as specified in paragraph 718(LXXXViii) above. To avoid double counting a bank may, when calculating its incremental default charge, take into account the extent to which default risk has already been incorporated into the VaR calculation, especially for risk positions that could and would be closed within ten days in the event of adverse market conditions or other indications of deterioration in the credit environment. No specific approach for capturing the incremental default risk is prescribed; it may be part of the bank's internal model or a surcharge from a separate calculation. Where a bank captures its incremental risk through a surcharge, the surcharge will not be subject to a multiplier three or regulatory backtesting, although the bank should be able to demonstrate that the surcharge meets its aim."

718(xciii). "Whichever approach is used, the bank must demonstrate that it meets a soundness standard comparable to that of the internal ratings-based approach for credit risk as set forth in this Framework, under the assumption of a constant level of risk, and adjusted where appropriate to reflect the impact of liquidity, concentrations, hedging, and optionality. A bank that does not capture the incremental default risk through an internally developed approach must use the fallback of calculating the surcharge through an approach consistent with that for credit risk as set forth in this Framework."

The other banks will need to agree with their supervisors to implement the new rules in as timely manner as practicable. The rules are set out in very high standards (see Box 1) and specify that banks must develop their own methodology for measuring default risk in the trading book. In addition to these rules, the Basel Committee has proposed a set of guiding principles on how banks should put these rules in practice and on how supervisors will assess these internal models. These guidelines were issued for comment in October 2007 (BCBS, 2007). Recently, the Basel Committee announced (BCBS, 16 April 2008) its plans to extend the scope of its existing proposed guidelines for the incremental default risk to include other potential event risks in the trading book. The Committee expects to issue its new risk proposal for public consultation later in 2008 and plans to conduct a quantitative impact assessment. In what follows, the article focuses on the new rules for default risk.

The new rules cover trading book instruments that are subject to default risk and strive to achieve greater coherence in the treatment of similar risks in the bank's different books.<sup>(1)</sup> Banks will not be allowed to take account of possible diversification benefits between default and market risk in the trading book, which is consistent with current rules that do not allow banks to take account of

diversification benefits between default risk in the banking book and market risk in the trading book. This non-recognition of diversification effects has been highly criticised by the industry (see ISDA, IIF, LIBA, 2007). Banks will nevertheless be allowed to subtract the capital requirement for default losses implicit in their internal VaR-based capital computation to avoid double counting, assuming they can demonstrate that the VaR actually captures some part of losses related to default. The incremental default capital charge will not be subject to the safety multiplier. The maximum specific risk (excluding default) multiplier of four will be replaced with a multiplier of three. A novelty of the trading book rules is that firms are allowed to measure the default risk of trading book instruments while taking liquidity into account. This will be discussed in detail in the next section.

(1) As with banking book positions, banks need to take account of possible concentration risk in their risk measurement of trading activities. Concentration risk can come from an excessive exposure towards a particular name or a particular sector. Techniques to measure concentration risk in trading book do not differ from techniques to calculate this risk in the banking book. Therefore, for a discussion on concentration risk, we refer to that literature. (BCBS, 2006b)



## 2. Modelling default and liquidity risk in the trading book

The mere fact that an asset is intended for trading does not alter the basic nature of the underlying risks but it does affect the combination of the different risks in a portfolio (see the discussion in Masschelein and Tsatsaronis, 2008). Banks should therefore be able, at least in principle, to use models developed for measuring default risk in the banking book in order to calculate default risk capital charges for trading book positions. Indeed, this is a principle that has been adopted by regulators. New regulatory rules allow banks to develop their own credit risk models in accordance with the regulatory models for default risk in the banking book and to apply the appropriate confidence level for distributions reflecting low probability and high-severity events, e.g. 99.9 p.c. The capital rules for default risk in the banking book, however, are not sufficiently flexible to be applied in the context of the trading book as they assume a buy-and-hold strategy and do not account for the active management of exposures in the trading book. For this reason, the trading book framework is amended by introducing four concepts: the liquidity horizon, the unavoidable default ratio, the capital horizon and the constant level of risk approach. These are discussed below.

Active management of default risk for tradable positions involves the elimination of risk through hedging or disposal of deteriorating positions. Therefore, the rules introduce the concept of a **liquidity horizon**, which is the time horizon required to hedge or sell the risk of a position. Banks are required to choose an appropriate liquidity horizon which is consistent with their risk management process and with actual trading experience in rebalancing similar positions during stressed conditions when these positions suffer a decline in credit quality. The liquidity horizon is at least ten business days, which is the minimum horizon for market capital rules. The implicit minimum liquidity horizon for banking book positions is one year.

Independently of the liquidity of the positions, default risk can be avoided only if it can be foreseen during the period corresponding to the liquidity horizon. The notion of the **unavoidable default ratio** accounts for this predictability of defaults. It is defined as the proportion of defaults that cannot be foreseen or avoided within a given liquidity horizon. The ratio would be equal to one if all defaults occur as surprises within the liquidity horizon. In this case, default losses cannot be avoided and default risk for a liquid book is exactly the same as that for an illiquid book over the same horizon. In other words, active risk management does not reduce risk. By contrast, if no

defaults occur unexpectedly within the liquidity horizon, then a bank could avoid losses from all defaults by selling or by hedging the risk of the deteriorating exposures. The unavoidable default ratio in this case would be zero. In practice, the unavoidable default ratio is not likely to be a binary variable: it may vary between zero and one. Some, but not all, defaults may come as a surprise. It is expected that the longer the liquidity horizon, the more difficult it is to avoid the default of that exposure as firms have to wait longer before they can sell or hedge the risk of the exposure. Unavoidable default ratios are thus likely to be larger for portfolios with longer liquidity horizons. They may also depend on the credit quality of the assets held in the trading book. The ratios are expected to be smaller for investment-grade positions and bigger for speculative-grade positions (see Dunn et al., 2006).

The fact that firms may reduce their default risk when markets are liquid does not necessarily mean that it is appropriate to measure capital requirements assuming that the **capital horizon**, which is the time horizon over which capital is assessed, should be equal to the liquidity horizon. It is important for banks to be sufficiently capitalised when suffering large trading losses. Capital is there to absorb losses, thereby allowing banks to continue to operate as a going concern during periods when losses are being experienced (see also BCBS, 2007). Further, banks are often not affected in isolation when financial markets are liquidity-distressed. Market liquidity stress is likely to affect many financial institutions at the same time. This may make it very costly and very time-consuming for banks to raise additional capital or to change the dividend policy in distressed financial markets. Therefore, like the banking book rules, current guidelines from regulators for the trading book (BCBS, 2007) set the capital horizon at one year. The industry is highly critical of the one-year capital horizon, arguing that raising capital in the marketplace does not take a year as implied by a one-year capital horizon. In fact, practitioners have recently re-interpreted the multiplication factor of three to imply a sixty-day horizon and a 99.9 p.c. confidence level, since three times the typical VaR at a ten-day horizon at a 99 p.c. confidence level is actually very close to a typical VaR measured at a sixty-day horizon at the 99.9 p.c. confidence level. Therefore, the industry argues in favour of a sixty-day capital horizon (see ISDA, LIBA, IIF, 2007).

To bridge the gap between the one-year capital and the shorter-term liquidity horizon, regulatory rules specify that capital needs to be measured assuming that the positions of the portfolio are rebalanced at every liquidity horizon to achieve a **constant level of (default) risk** over the capital horizon. This concept relates directly to the presumed objective of active risk management. It assumes

that exposures which see a significant change in their risk profile are sold and replaced with other exposures in order to achieve an overall distribution of risk profiles that is similar to that of the original portfolio. If an exposure deteriorates gradually over the capital horizon, it is reasonable to assume that the bank would reduce its exposure and avoid suffering a loss from default. This constant level of risk assumption does not mean that banks should hold the same risk profile over the capital horizon. It only means that they need to measure the capital for the portfolio as if the risk profiles were constant over time. Rebalancing comes at a cost because there has been a loss on the position being downgraded and sold. However, this loss should be captured by the internal VaR and should be an element of the 1996 capital charge.<sup>(1)</sup> In the banking book, capital requirements are measured under the assumption of a constant level of positions over a one-year capital horizon.

### 3. Impact of the liquidity assumption on default charge

This section uses example portfolios of (traded) securities to illustrate the concepts outlined above in the measurement of incremental default risk. It examines the impact of the assumptions about the liquidity horizon of trading book positions on capital requirements. The analysis also provides a rough measure of the relative effects of a shift in the liquidity horizon and a deterioration in portfolio credit quality in terms of the assessed capital requirements.

#### 3.1 Methodology

As discussed above, regulators do not impose a particular model for the measurement of the incremental default risk. For the purpose of this section, risk is measured in a default-only model, where the value of a position, which is commonly referred to as the asset return, is driven by a single common factor and an idiosyncratic factor specific to each individual exposure. The two factors are assumed to be independent from each other and normally distributed. A linear correlation coefficient summarises the interdependence (co-movements) between asset returns underlying different exposures. The probability of default (PD) of any individual exposure is the probability that the asset return falls below a certain default threshold.

(1) In practice, however, banks often use average spreads for a particular rating class as a basis for their VaR estimates, which may not be sensitive to the idiosyncratic risk embedded in the individual securities. The average spreads may suffer from some type of survivorship bias since they reflect risk of a portfolio with a constant credit rating.

The loss for each defaulted position in the portfolio is calculated by multiplying the loss given default (LGD) with the exposure size. Losses for the entire portfolio are then calculated by adding up the losses of each exposure in default. This model is similar to that underpinning the capital formula used to measure capital requirements for banking book exposures (see Gordy, 2003). Monte Carlo simulations are used to generate the loss distribution, and risk measures, such as economic capital, can be derived from this loss distribution.

The PDs, LGDs and correlations need to be measured over the capital horizon taking account of the fact that losses can be avoided by rebalancing the portfolio. Little is known yet about how LGDs and correlations are affected by the rebalancing and, therefore, we focus here on the probabilities of default. The PDs, which are used in the simulations, are calculated over a one-year capital horizon and take account of the fact that defaults in the portfolio can be (partially) avoided by rebalancing the portfolio over the liquidity horizon by reference to the unavoidable default ratio. The defaults that materialise between the points where the portfolio is rebalanced are those that could not have been foreseen or avoided. The PDs, which are used in the simulations, can therefore be measured as the probability of default over the capital horizon times the unavoidable default ratio (which is the proportion of defaults that cannot be avoided over the capital horizon). This is equivalent to multiplying the probability of default over the liquidity horizon by the number of times the portfolio is rebalanced over the capital horizon (which equals the capital horizon over the liquidity horizon). Under each formulation, there is the implicit assumption that the level of risk is constant over the capital horizon and that unavoidable defaults are independently distributed over consecutive liquidity intervals.

More formally, the PDs used in the simulations are measured as follows:

$$PD = PD_{cap} * UDR = PD_{liq} * \frac{capital\_horizon}{liquidity\_horizon} \quad (\text{Eq. 1})$$

where  $PD_{liq}$  = PD over the liquidity horizon liq;

$PD_{cap}$  = PD over the capital horizon cap;

$$UDR = \frac{PD_{liq}}{PD_{cap}} * \frac{capital\_horizon}{liquidity\_horizon} \quad (\text{Eq. 2})$$

where  $UDR$  = unavoidable default ratio

(see also Dunn et al., 2006).

### 3.2 Data

Measuring probabilities of default over a short liquidity horizon, e.g.  $PD_{liq}$ , poses some challenges. One way is to calculate the default ratio over a shorter time span. The probability of default is then the number of defaults over a certain period over the number of firms in the sample at the beginning of the period (see also Dunn et al., 2006). However, there is very little understanding of intra-year default behaviour. One of the obstacles associated with measuring probabilities of default over short horizons is the low number of defaults in the higher rating categories and for newly-developed instruments, in particular. It is not unusual for a portfolio of highly rated positions to register no default events for many shorter periods. In addition, a portfolio which includes many new instruments may not have experienced enough defaults either. There is no clear solution on how to deal with this issue. However, it is important that banks are aware that short run PD estimates are subject to this uncertainty.

The PD over the capital horizon,  $PD_{cap}$ , is derived from credit ratings, as set out in Table 1. Unavoidable default ratios, taken from Dunn et al. (2006) where they are calculated as described in equation (2) above, are presented in Table 2. The table suggests that unavoidable default ratios increase in line with the liquidity horizon and decline with credit quality of the underlying credit. The relatively high unavoidable default ratio of A1-A3 exposures at a six-month liquidity horizon is an exception in this respect and is likely to be due to the limitations with measuring probabilities of default at short horizons.

(1) The impact of concentration on economic capital has been illustrated in Düllmann and Masschelein (2006).

(2) This is in line with data on market expectations of entity-specific LGDs, as reported by Markit.

**TABLE 1** 1-YEAR PROBABILITIES OF DEFAULT PER RATING CLASS ( $PD_{cap}$ ) (percentages)

Aaa	0
Aa1	0
Aa2	0
Aa3	0.017
A1	0.02
A2	0.024
A3	0.034
Baa1	0.151
Baa2	0.16
Baa3	0.32
Ba1	0.716
Ba2	0.813
Ba3	1.843
B1	2.931
B2	4.58
B3	9.05

Source: Moody's.

Economic capital is calculated for a number of homogeneous portfolios of tradable loans. Each portfolio with differing credit quality is highly granular and represents a total volume of 2,000,000 monetary units that consists of 2,000 loan exposures of equal size, implying a highly granular portfolio.<sup>(1)</sup> Loss severity, or the rate of loss given default, is assumed to be uniform across portfolios equal to 60 p.c.<sup>(2)</sup> The correlation across exposures is also assumed

**TABLE 2** UNAVOIDABLE DEFAULT RATIOS (percentages)

	Liquidity horizon				
	2 weeks	1 month	3 months	6 months	1 year
Aaa	0	0	0	0	100
Aa1-Aa3	0	0	0	32	100
A1-A3	13	18	22	71	100
Baa1-Baa3	13	18	43	64	100
Ba1-Ba3	30	34	55	73	100
B1-B3	53	60	71	82	100

Source: Dunn et al. (2006) based on data for the period 1970-2004.

to be uniform set either at 12 p.c. or at 24 p.c. The choice of correlation assumptions corresponds to the least and the most conservative correlation estimates assumed for corporate exposures in the Basel II Framework. In line with the guidelines from the Basel Committee (BCBS, 2007), the capital horizon is set at one year. The number of simulation runs for each portfolio is set at 100,000.

### 3.3 Results

Table 3 shows economic capital as a percentage of portfolio value for a number of homogeneous portfolios that differ in terms of both credit quality and liquidity horizon. Results are presented assuming a 24 p.c. correlation and a 12 p.c. correlation estimate. The capital charges assuming a one-year liquidity horizon are similar to the minimum required charges for banking book positions.

Not surprisingly, capital requirements increase for portfolios with longer liquidity horizons and for portfolios with more risky securities. It is interesting, however, to analyse the two dimensions together. Academic literature has

pointed up the positive relationship between default and illiquidity (see, e.g., Ericsson and Renault, 2006). The current financial market turmoil has also illustrated the fact that generalised market distress situations often go hand in hand with an evaporation of market liquidity as well as an increase in default risk.

Table 3 compares the effect of a deterioration in credit quality on economic capital with the impact of an evaporation of liquidity on economic capital. An A3-rated (A-) portfolio with a two-week horizon and assuming a 24 p.c. correlation requires 0.24 p.c. capital in percentage of total exposure. An extension of the liquidity horizon from two weeks to six months increases the capital requirement to 0.77 p.c., which is roughly equivalent to a two-notch downgrade of all securities to Baa2 (BBB). For lower-graded portfolios, the effect of a downgrade is more pronounced than the effect of an extension of the liquidity horizon. For example, a B1 (B+) portfolio with a two-week horizon requires economic capital equal to 12.93 p.c. of overall exposure. An extension of the liquidity horizon to six months increases the capital requirement to 16.44 p.c., which is roughly equivalent to only a

**TABLE 3** ECONOMIC CAPITAL  
(as a percentage of total exposures)

	Liquidity horizon									
	Correlation = 24 p.c.					Correlation = 12 p.c.				
	2 weeks	1 month	3 months	6 months	1 year <sup>(1)</sup>	2 weeks	1 month	3 months	6 months	1 year <sup>(1)</sup>
Aaa-Aa2	0.00	0.00	0.00	0.00	0.88	0.00	0.00	0.00	0.00	0.43
AA3	0.12	0.18	0.20	0.38	0.88	0.10	0.15	0.17	0.23	0.43
A1	0.18	0.21	0.25	0.50	0.88	0.15	0.16	0.19	0.29	0.43
A2	0.18	0.24	0.27	0.56	0.88	0.15	0.18	0.20	0.32	0.43
A3	0.24	0.30	0.33	0.77	0.88	0.18	0.20	0.21	0.35	0.46
Baa1	0.58	0.88	1.46	2.02	2.82	0.30	0.43	0.68	0.96	1.29
Baa2	0.65	0.88	1.64	2.13	2.96	0.36	2.02	0.77	0.99	1.37
Baa3	1.09	1.46	2.71	3.48	4.82	0.55	0.68	1.27	1.62	2.24
Ba1	3.59	3.94	5.47	6.62	8.12	1.65	1.84	2.59	3.14	3.95
Ba2	3.94	4.39	6.06	7.21	8.81	1.84	2.02	2.85	3.46	4.28
Ba3	6.87	7.51	10.07	11.97	14.29	3.27	3.58	4.96	6.00	7.36
B1	12.93	13.88	15.25	16.44	18.27	6.60	7.16	7.96	8.70	9.79
B2	16.57	17.67	19.25	20.63	22.60	8.74	9.45	10.44	11.36	12.70
B3	23.07	24.31	26.05	27.50	29.43	13.08	13.99	15.25	16.40	1.80
Caa	31.28	31.84	32.81	33.58	34.36	24.47	24.70	25.07	25.24	25.33

(1) In line with the regulatory guidelines (BCBS, 2007), capital is measured using an annual PD which is subject to a floor of 3 basis points.

one-notch downgrade of all securities to a B2 (B) rating. This conclusion also holds for similar portfolios assuming a 12 p.c. correlation between exposures. Liquidity can thus have a similar impact on capital than changes in traditional credit risk drivers such as changes in the probabilities of default.

Further, Table 3 illustrates that capital requirements may increase rapidly in a crisis situation in which liquidity dries up and in which credit risk gets worse. Suppose that, in normal circumstances, a bank holds a tradable loan portfolio that only includes A3 (A-) securities with a two-week liquidity horizon. Suppose that, in a stressed situation, all securities in this portfolio get downgraded to Baa2 (BBB) and the liquidity horizon widens to six months. The results show that, for a portfolio assuming 12 p.c. correlation, capital requirements increase from 0.18 p.c. to 0.99 p.c., which is a difference of 0.81 p.c. in absolute values. This difference widens to 1.89 p.c. (from 0.24 p.c. to 2.13 p.c.) if the correlation assumption is raised to 24 p.c. These new capital requirements for default risk, which come on top of current capital requirements for market risk, may thus lead to a significant increase in banks' total capital requirements, particularly in distressed circumstances.

The current crisis provides an interesting context for the debate on the adequacy of the incremental default charge. Market liquidity for a large number of products has dried up due to the difficulties in assessing the risks associated with these products. Initially, liquidity problems only emerged in markets for securitised assets, but they gradually spread to other market segments, such as the market for credit default swaps. This signals that the minimum ten-day liquidity horizon may not be a sufficiently conservative assumption for a large number of products, certainly not in the type of stressed conditions experienced by those markets in recent times. Another aspect of the recent turmoil has been the exceptionally high number of downgrades of mortgage-backed securities and structured finance CDOs. For instance, Moody's reported that the twelve-month downgrade rate for the global structured finance market climbed to 7.4 p.c. in 2007 from 1.2 p.c. in 2006, while the upgrade rate fell from 3.6 p.c. to 2.2 p.c. (Moody's, 2008). This unprecedented rate of downward credit migration even in the most super senior tranches exceeds anything that had

been observed in the past. However, given that the new capital rules only refer to default risk and not to rating migration risk, had they already been implemented, they would most likely not have been sufficient to cover some of the recent trading book losses. The current crisis illustrates the importance of banks holding sufficient capital for trading book positions for situations in which liquidity evaporates and in which credit risk, both default and rating migration risk, soars.

## Conclusion

The rapid growth in relatively illiquid default-sensitive products in the trading book has led regulators to introduce a new default risk charge for trading book positions. The novelty of this default risk charge in the trading book is that it takes account of the fact that trading book positions are actively traded positions. Default risk can be reduced when it can be sold or hedged in liquid markets. The aim of this article is twofold. First, it has described the regulatory regime of measuring market and default risks in the trading book. Second, it has illustrated the potential effect of liquidity on capital requirements for default risk in the trading book and compared this with the effect of a change in credit quality.

The new trading book rules for an incremental default capital charge aim to strengthen banks' resilience to losses incurred on less liquid positions during normal and turbulent market conditions so as to provide a better safeguard against the consequences of market dislocation. They also aim to help to achieve one of the objectives of the Basel II Framework, namely promoting improved risk management techniques. However, experience during the recent crisis suggests that even if the new trading book rules for default risk had already been implemented, it is likely that they would not have covered some of the trading book losses. This suggests that it is worth devoting further attention to adequately measure the different types of risk in trading books, including the types of event risk that have led to current losses such as rating migration risks. Indeed, the Basel Committee is currently analysing how to extend the scope of the existing proposed guidelines for incremental default risk to include other potential event risks in the trading book.

## References

- BCBS (1996), "Amendment to the Capital Accord to Incorporate Market Risks" ([www.bis.org](http://www.bis.org)).
- BCBS (2006), "International Convergence of Capital Measurement and Capital Standards: A Revised Framework" ([www.bis.org](http://www.bis.org)).
- BCBS (2006b), "Studies on Credit Risk Concentration: an Overview of the Issues and a Synopsis of the Results of a Research Task Force Project", *Working Paper* no. 115.
- BCBS (2007), "Guidelines for Computing Capital for Incremental Default Risk in the Trading Book – Consultative Document" ([www.bis.org](http://www.bis.org)).
- BCBS (16 April 2008), "Basle Committee on Banking Supervision Announces Steps to Strengthen the Resilience of the Banking System" ([www.bis.org](http://www.bis.org)).
- Düllmann K. and N. Masschelein (2006), "The Impact of Sector Concentration in Loan Portfolios on Economic Capital", *NBB Financial Stability Review*.
- Dunn et al. (2006), "Assessing Alternative Assumptions on Default Risk Capital in the Trading Book".
- Ericsson J. and O. Renault (2006), "Liquidity and Credit Risk", *Journal of Finance* 61(5), pp. 2219-2250.
- Gordy M. (2003), "A Risk-Factor Model Foundation for Ratings-Based Bank Capital Rules", *Journal of Financial Intermediation* 12, pp. 199-232.
- Masschelein, N. and K. Tsatsaronis (2008), "Credit risk Meets Market Risk in Credit-Risky Portfolios", Forthcoming Working Paper.
- Moody's (2008), "Structured Finance Rating Transitions: 1983-2007".
- ISDA, LIBA and IIF (2007), "Industry Technical Paper on Incremental Default Risk".

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